



Leveraging the Impact of Public Resources through Green Banks

*Provincial Agency Leaders on
Energy Efficiency Forum*

18 May 2018

Agenda

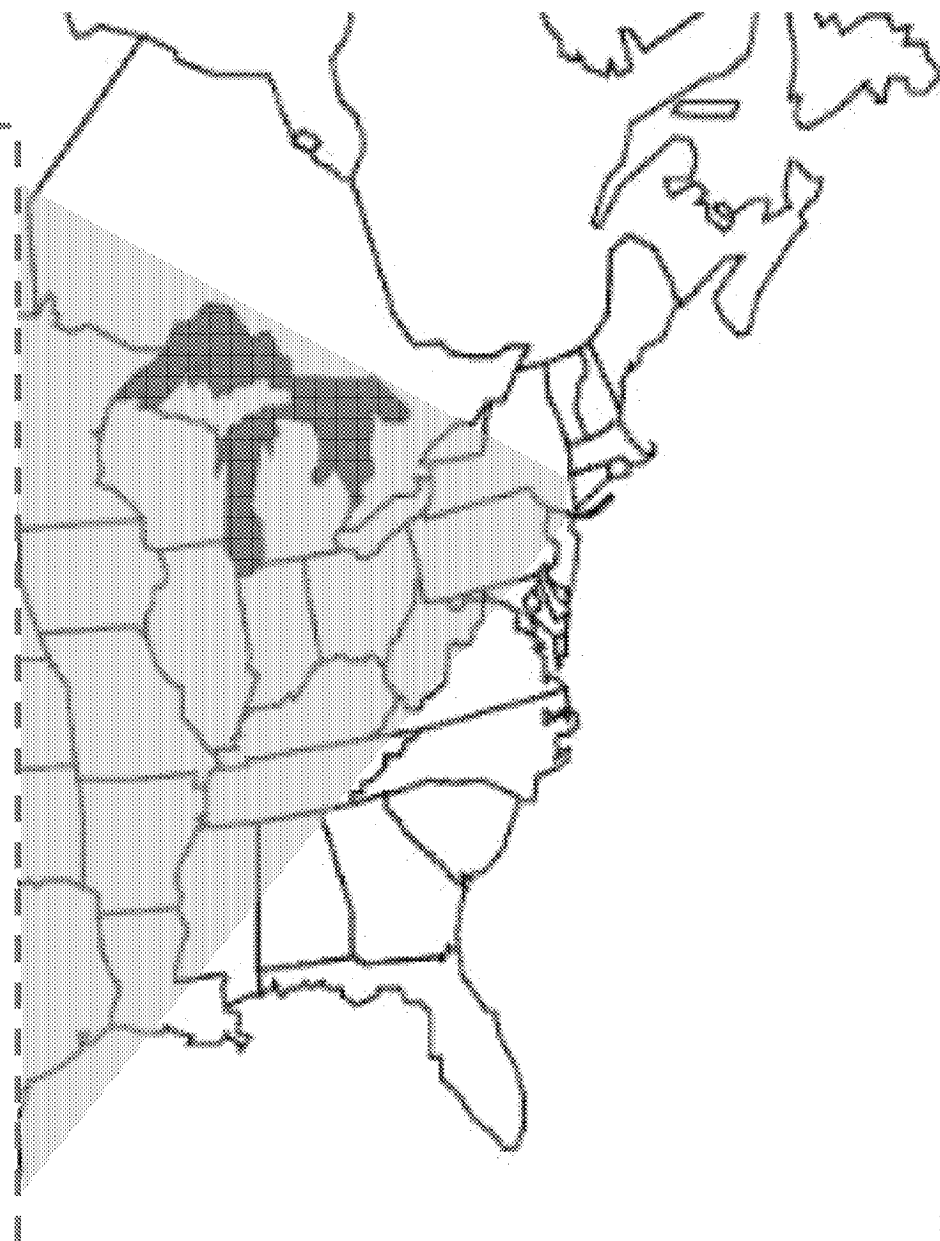
- **About Connecticut – High Level**
- **About Connecticut Green Bank – High Level**
- **Green Bank Model – How It Works - Structure**
- **Sources & Uses of Funds / Balance Sheet Composition**
- **Lessons Learned**
- **Examples of Green Bank Products & Projects**
- **Green Bank Expansion (US & Global)**
- **Q&A**

Connecticut

Microcosm of the United States



- **Region** – New England
- **Population** – 3.6 million (4th in population density 286/km²)
- **Gross State Product** – ~\$225 B (#3 – 2015)
- **Buildings** – some of the oldest, most energy inefficient, and “health & safety” issues
- **Energy Costs** – one of the highest electricity costs in USA (“Top 5”)
- **Grid Resiliency** – major storms routinely knock thousands of customers off the grid with outages lasting several days, even 2 or 3 weeks



Connecticut Green Bank



About Us

- **Quasi-public organization** – FIRST STATE GREEN BANK in the USA
 - created 2011 (statute) – **Independent Board / State Representation**
 - “inherited” ~**\$72 MM in Capital**
- **Focus** – finance **clean energy** (i.e. Solar PV, wind, small hydro, energy efficiency, and alternative fuel vehicles (EVs) and infrastructure)
- **Balance Sheet** – approximately **\$191 MM** in assets (**FYE 2017**)
- **Support** – supported by
 - Small charge elec bill (\$10 / HH / yr) – approximately **\$27 MM / year (stable)**
 - Small share of “CO² Cap & Trade” – approximately **\$3 MM / year (stable)**
 - Portfolio Income – approximately **\$5 - \$8 MM / year (growing)**
 - Private capital, foundations (PRI*) , US Govt (more limited**) – (**varies**)

* Program Related Investment

** New administration took office 20 January 2017

Connecticut Green Bank

Policy Framework (partial)

CT

- Comprehensive Energy Strategy (3 yrs) Global Warming Solutions Act (2008)
- Governor's Council on Climate Change
- Regional Greenhouse Gas Initiative
 - 7 states – first “cap-and-trade” program for CO2 emissions (2005)
- ZEV MOU – 8 states
- Energy Efficiency Fund (Jan 2000)
- Clean Energy Fund (July 2004)
 - CT Green Bank (July 2011)
- Renewable & Energy Efficiency Business Association (REEBA)

Alberta

- Climate Action Plan
- Alberta Climate Leadership Panel
- Economy wide carbon tax
- Green Transit Incentives Program (GreenTRIP)
- Energy Efficiency Alberta
- *Alberta Green Bank?*
- Alberta Energy Efficiency Alliance

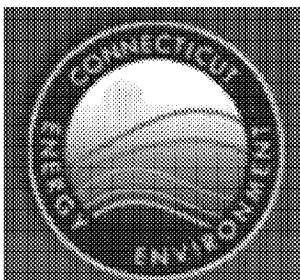
Utility (electricity) Tariffs & Policies are also Important
(TOU, demand charges, T&D, adders – Net Metering)

UNITED STATES CLIMATE ALLIANCE



Each Member State Commits to:

- Implement policies that advance the goals of the Paris Agreement, aiming to reduce greenhouse gas emission by at least 26-28 percent below 2005 levels by 2025
- Track and report progress to the global community in appropriate settings, including when the world convenes to take stock of the Paris Agreement, and
- Accelerate new and existing policies to reduce carbon pollution and promote clean energy deployment at the state and federal level.



Key Environmental Goals

- **GHG Reduction Targets**

- 2010 Target – Attain 1990 Level (43.75 MMT CO₂) → Achieved 2010
- 2020 Target – 10% below 1990 Level by **2020** → @ 4% below (2013)
- 2030 Target – New 45% below 2001 Level* by **2030** → @ 14% below (2013)
- 2050 Target – 80% below 2001 Level by **2050**

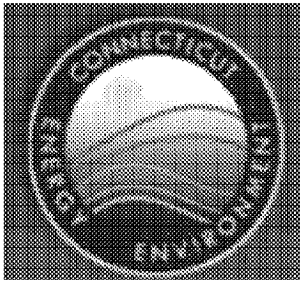
- **Renewable Portfolio Standard**

- Previously 20% by 2020
- New 40% by 2040

- **Zero Emission Vehicles**

- **5% of all vehicles by 2025 (currently 0.15%) → ZEV MOU Mandate**
- % of Fleet to reach GHG Goal (45% below by 2030 & 80% below by 2050)
 - 2020 – 3%
 - 2030 – 32%
 - 2050 – 95%

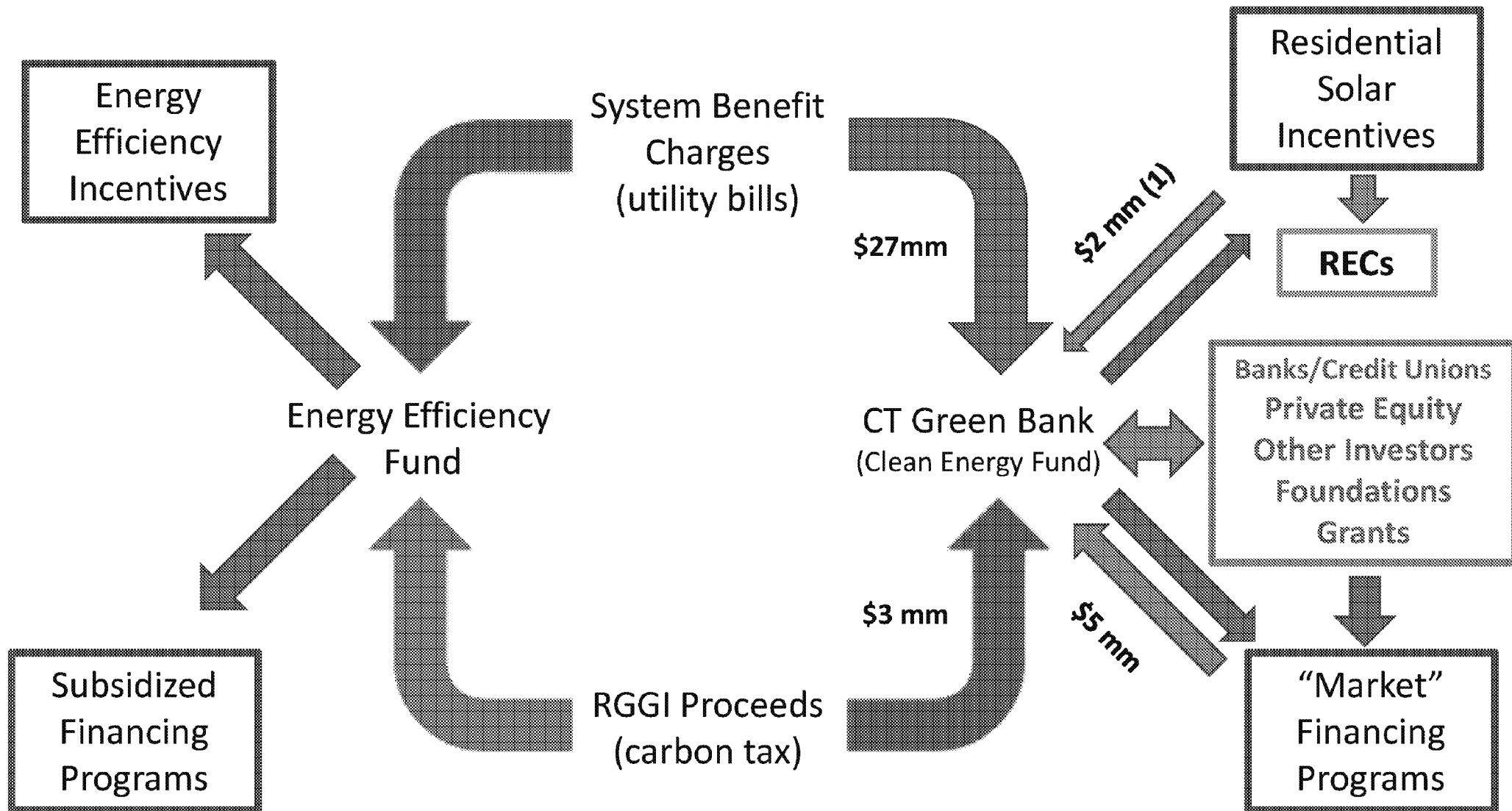
* 46.25 MMT CO₂ (2001 Level)



Key Strategies & Initiatives

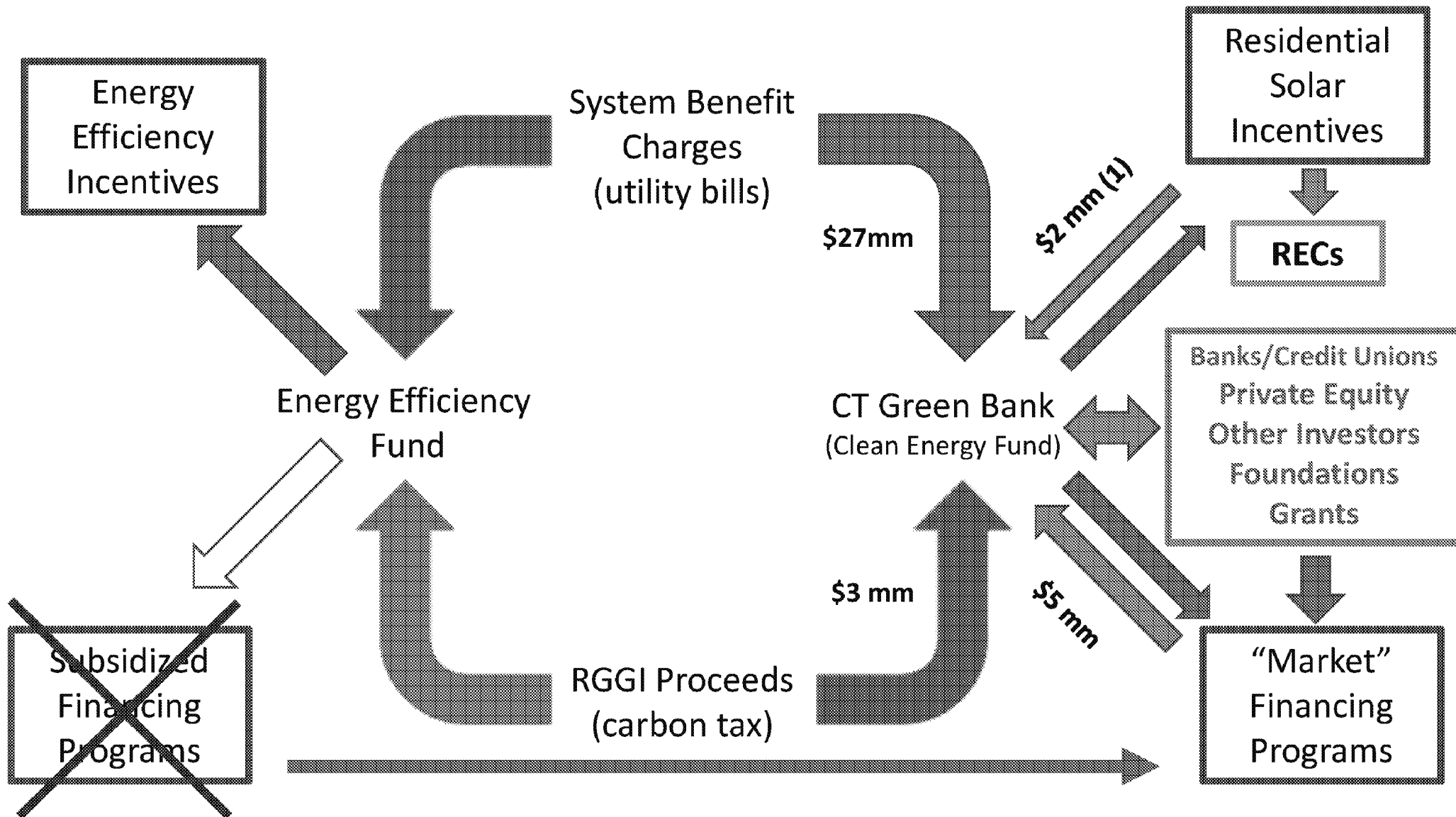
- **“RGGI”** – auction of carbon allowances – funds for EE & RE
- **System Benefit Charges** – funds for EE & RE
- **Low Emission LRECs & Zero Emission ZRECs ... >\$1 billion program**
 - Supports Solar, Fuel Cells, Hydro & wind – REC price set by annual auctions 600mw
- **Residential Solar Incentives (declining subsidies for resi rooftop solar (200mw)**
- **Virtual Net Metering → Just changed! Ends net metering 2021 (grandfathering provisions)**
- **Community Solar program – recently changed / improved**
 - 80% no access to solar (apartment / shady roof / rent)
- **Energy Efficiency Fund – about \$240 m / year managed by the states IOUs**
- **2nd largest Commercial PACE program behind CA**
 - **“Open Market” approach**
 - Amazing considering the difference in size of our 2 states – \$130 mm
- **“Lead by Example” – reduce energy consumption by State Agencies (70 MSF space)**
- **Rebates for clean transportation ... EVs & hydrogen fueled vehicles**
- **Statewide Microgrid Program**
- **Efforts to reduce the energy burden on low income households (now at solar parity)**
- **The Green Bank (1st in Nation) – supported by ~\$30 million annually**

Sources & Uses for CT Energy Efficiency & RE Programs



(1) Does not reflect SHRECs

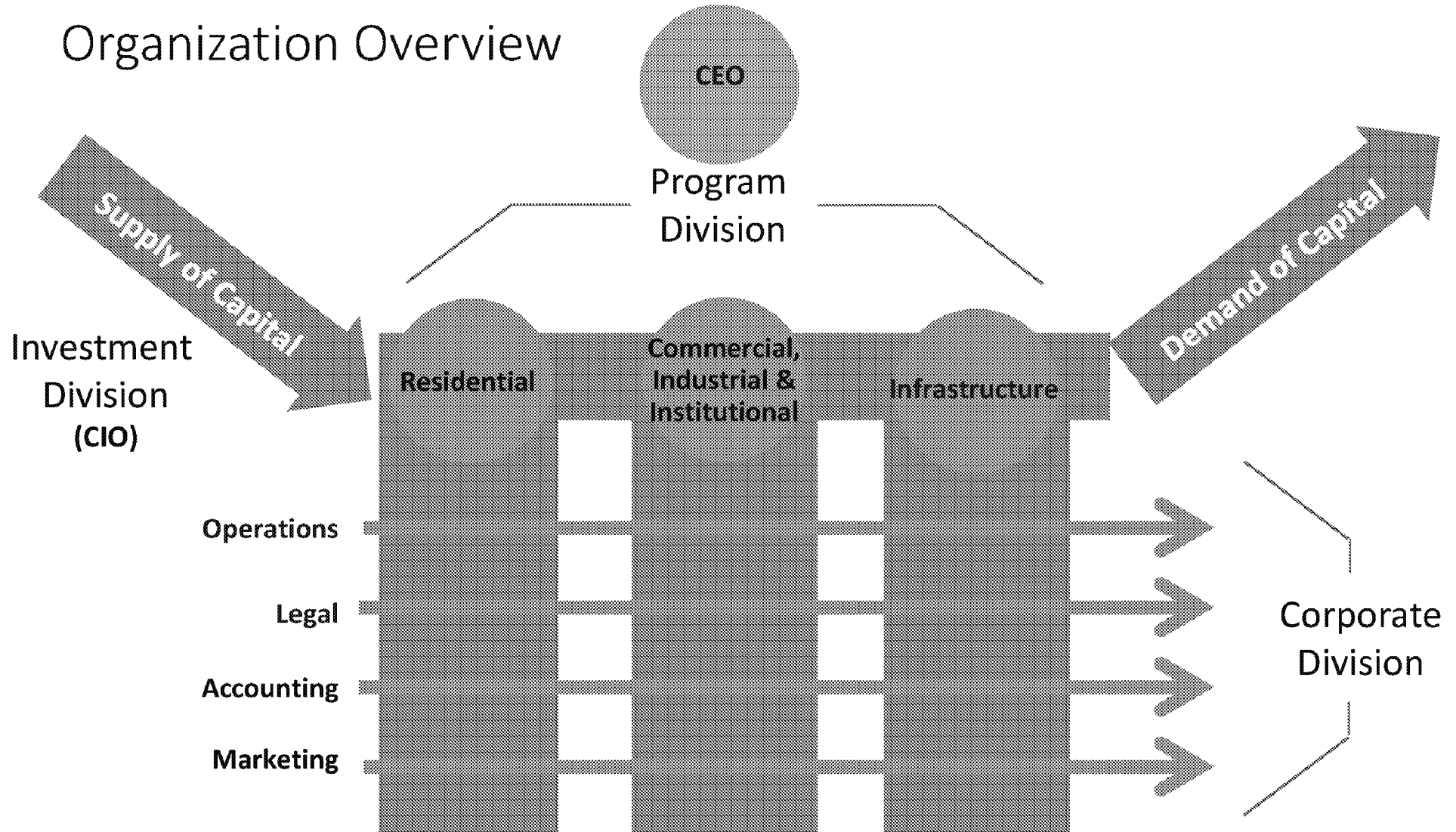
Sources & Uses for CT Energy Efficiency & RE Programs



(1) Does not reflect SHRECs

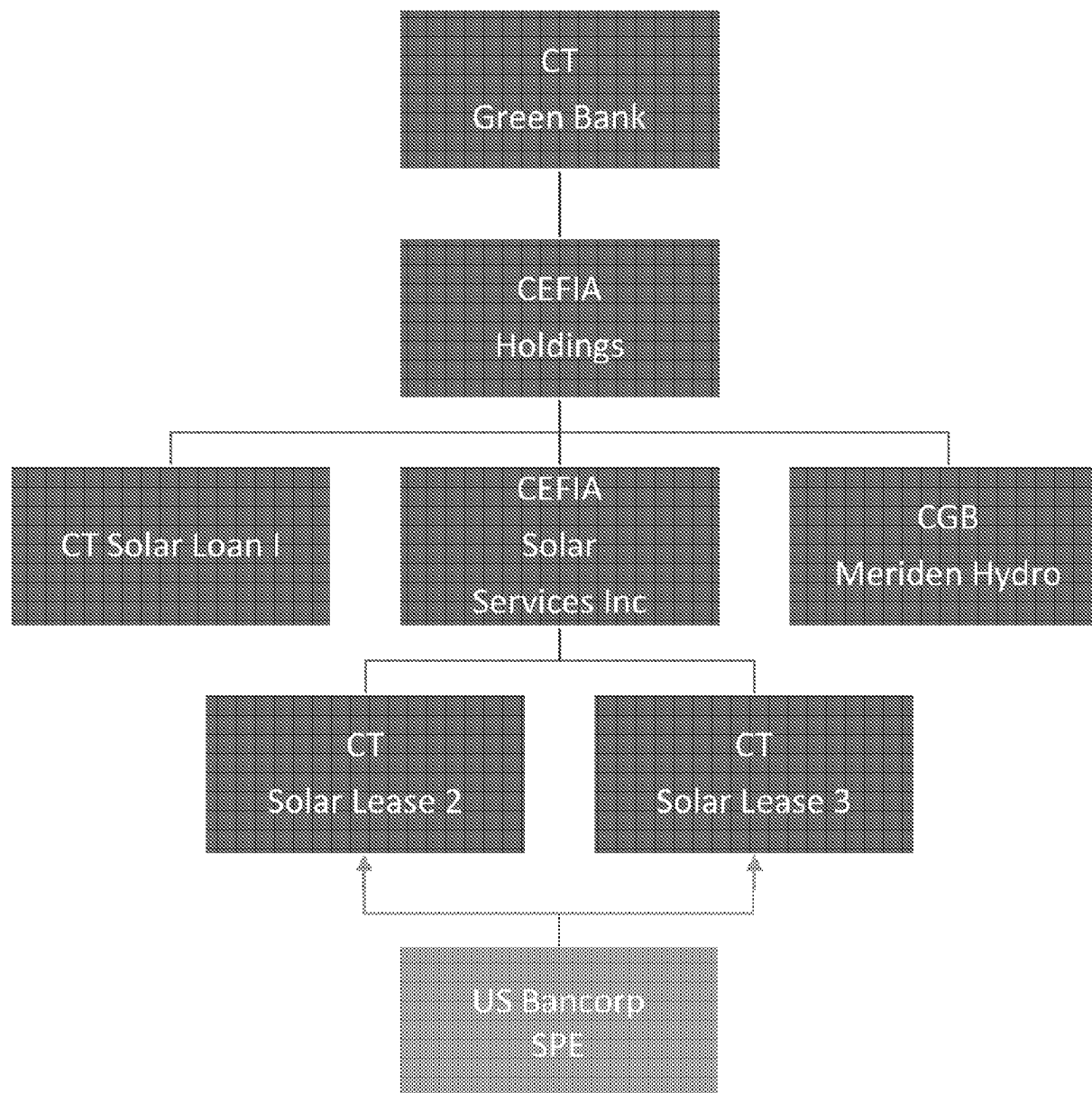
Connecticut Green Bank

Organization Overview



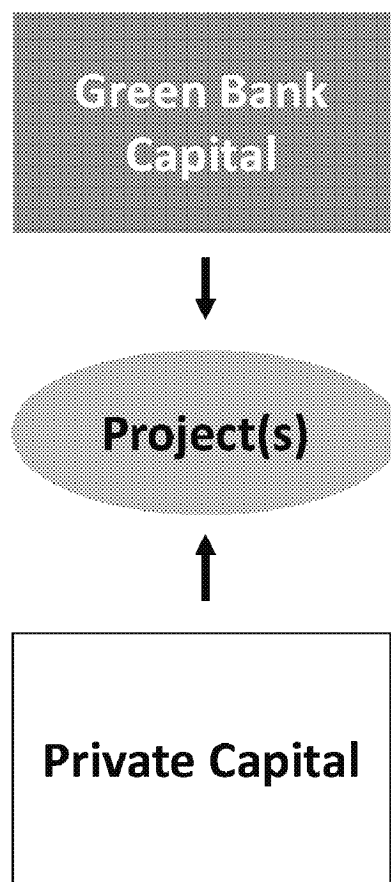
Connecticut Green Bank

Organization Overview (FYE17)

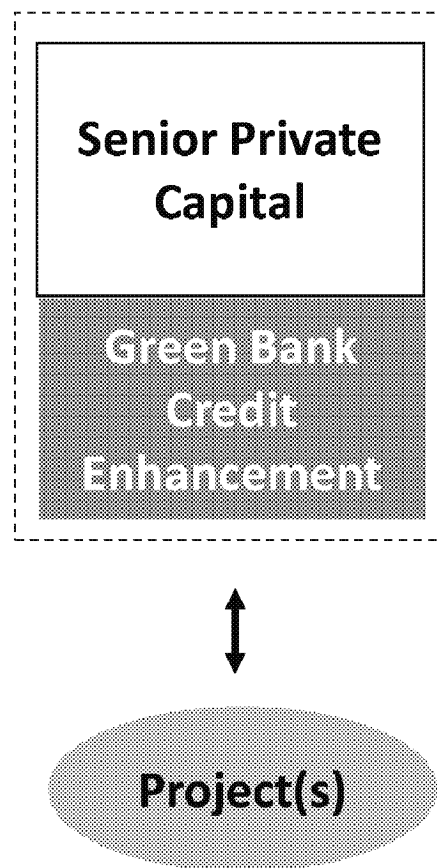


How Green Banks Leverage Public Capital with More Private Capital

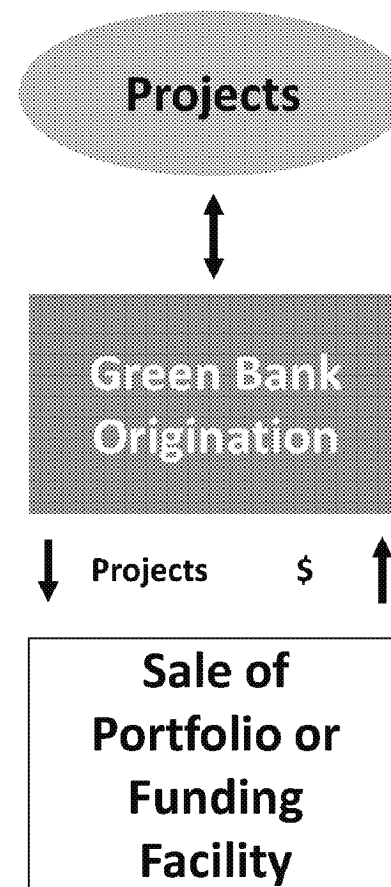
Co-Investment



Credit Support

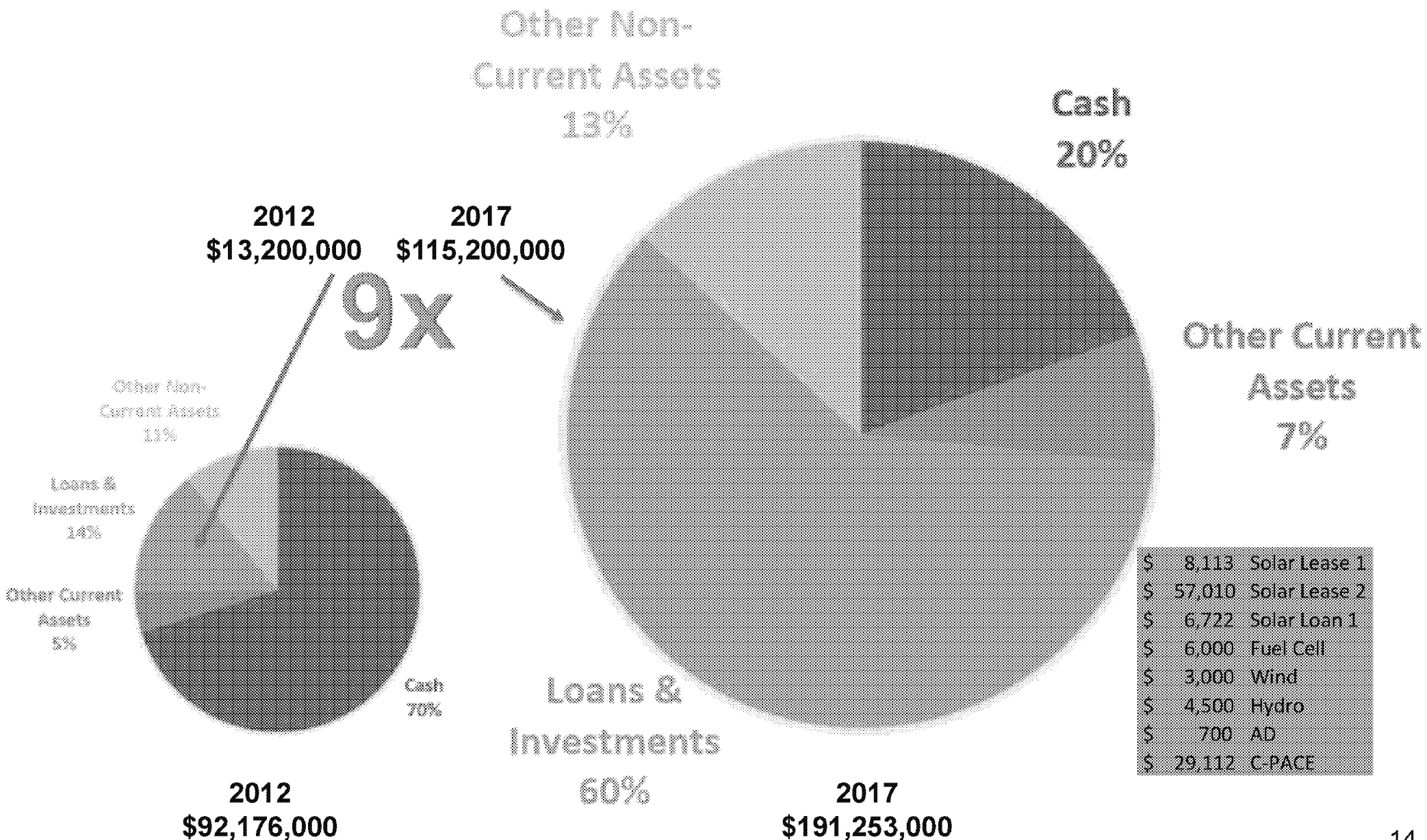


Warehousing



Connecticut Green Bank

Balance Sheet Evolution



What did we get right?

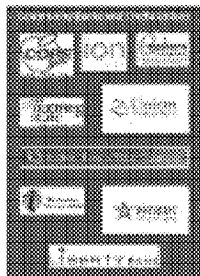
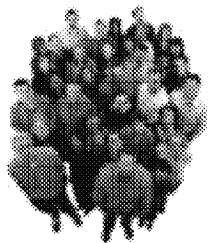
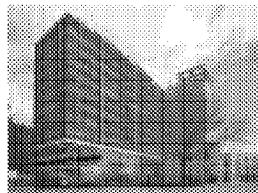
- The Green Bank model **works!** – financing rather than grants leads to more clean energy being deployed, at a faster rate, while using public resources more responsibly
 - With respect to “creation process” important to have the leadership and support of key stakeholders to transition an existing grant-making organization into a new entity focused on clean energy finance.
 - Having bipartisan support from the legislature was important.
 - Various stakeholders initially resisted a Green Bank Model because they like government providing grants to subsidize the market.
 - Framing the “market potential” was a key tactic used to explain that government doesn’t have the resources by itself to help the market reach its full potential.
 - Only by leveraging limited public funds to attract more private capital investment could the market potential have a greater likelihood of being realized, delivering more near and long-term benefits to society.

What did we get right? – 2

- **Essential to design programs / initiatives that facilitate partnerships with private capital**
 - Community, regional or money-center banks, credit unions, yieldcos, REITs, crowd funding, accredited investors, etc.
- **Key importance are relationships with the local banking community**
...these institutions offer operational and financial leverage that can enable Green Banks to use their resources more effectively.
- **Need for “early wins”**
 - Nothing builds credibility like Success
 - Set Goals & Make them Public
 - Achieve them
 - Celebrate them
 - Repeat them
- **Need for Transparency & Clarity**
 - What you won't do can often be more important than what you will do

A Green Bank in Action

Finding Innovative Financing Mechanisms



- **CT Solar Lease 2**
- \$60 Million Public (\$10M) Private (\$50M) Partnership
- Lease / PPA model for residential / municipal / commercial solar
- Innovative approach to “commercial scale” solar – cracks the code

- **C-PACE**
- \$40 million "warehouse" – \$80 million across >100 deals (to date)
- Saving between 30-50% energy consumption
- Sold \$30 million – first securitization of commercial PACE projects

- **CT Solar Loan** - Funding from "the Crowd" (>\$1 million)
- Green Bank \$10 million aggregation facility / 20% sub debt
- First affordable solar loan product not tied to OEM or home equity

- **Smart-E Loans** - \$30 Million Public-Private Partnership
- "2nd Loss" LLR - Supported by \$2.5 million ARRA funds
- 9 Credit Unions & Community Banks

Public-Private Partnerships



OVER \$500 million in private capital raised

\$65 MM

CLOSED
10:1



Grid-Tied

\$6 MM

CLOSED
6:1



Residential Solar

\$75 MM

CLOSED
7.5:1



Residential Solar
Commercial Solar

\$30 MM

CLOSED
4:1



C-PACE

\$30 MM

OPEN
10:1¹



Residential Energy

\$20 MM

OPEN
4:1



Residential Solar &
Energy Efficiency

\$50-100 MM

OPEN
9:1



C-PACE

\$5 MM

OPEN
100%²



Multifamily Energy

\$60+ MM

OPEN
6:1³



Commercial Solar

\$3 MM

TERM SHEET
100%⁴



Residential Storage
Commercial Storage

\$75 MM

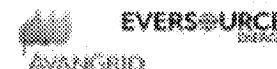
IN Process
100%⁴



CT Green Bank
REC Securitization

\$50 MM

IN PROCESS
10:1



Small Business
Energy Advantage

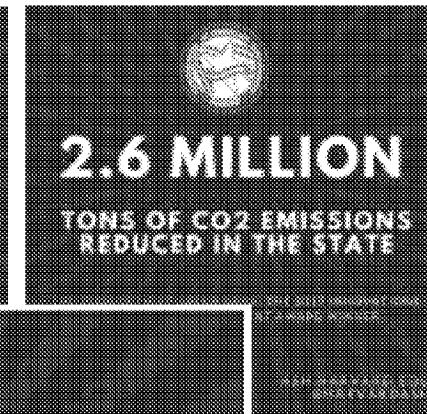
REFERENCES

1. LLR yields high leverage – and it is 2nd loss and thus with no to low defaults, we haven't used to date. IRB's not considered in the leverage ratio.
2. Foundation PRI is to HDF, guaranteed by the CGB in the case of MacArthur Foundation.
3. Onyx Partnership has no upper limit and CGB currently has authorization to commit up to \$15mm. The team expects to commit \$5mm for the first \$60-70mm.
4. Securitization of Solar Home Renewable Energy Credits - \$75mm in gross receivables securitized

Connecticut Green Bank



Innovations in American Government Awards 2017



What were the key challenges?

- Managing growth with the limited public resources we have.
- First three years we were in start-up mode – establishing goals, developing products, attracting and deploying capital.
- Fortunately – we were created with a funding mechanism that is (for the most part) outside of annual budget debates.
 - System Benefit Fund – \$0.001/kWh that amounts to \$27 to \$30 million / yr
 - Cap-and-Trade Allowance Proceeds – ~\$5 million / yr
 - “One-Time” Capital Transfer – as the successor entity to the Connecticut Clean Energy Fund, the Green Bank was established with ~\$70 million in initial capital.

An initial capital base is fundamental to any start-up financial institution and in our case enabled us to fund multiple initiatives more quickly and to have credibility when negotiating with private capital for their participation in Green Bank sponsored facilities.

- The more a Green Bank is perceived as being vulnerable to legislative impulse, the less credible it will be seen as a reliable counterparty in its financial dealings.

What were the key challenges? – 2

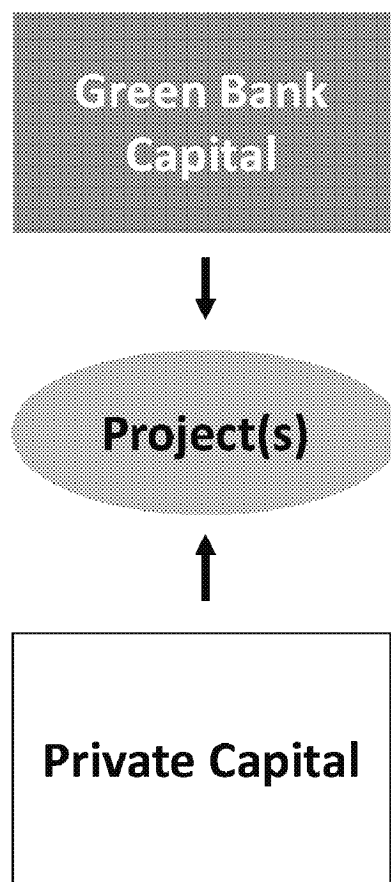
- **FINDING THE RIGHT PEOPLE – as with other organizations – makes all the difference...**
 - Smart – Motivated – Passionately Committed to the Mission
 - >50% of senior staff hold “Ivy League” degrees
 - Private Sector Mindset (“Public sector goals .. Private sector discipline”)
 - Budgets with Goals and Consequences
 - >90% of staff have private sector experience
 - Ability to combine experience, credibility & relationships with new talent eager to make a difference
 - Compensation – always a challenge
 - We’re a “bank” and we’re competing for talent that could easily make more in the Private Sector
 - Reality is that the best people will stay for a few years, make a great contribution, then move on
 - In the meantime, we do our best to retain the best talent by giving them the freedom to innovate and lead on projects

What to keep in mind...

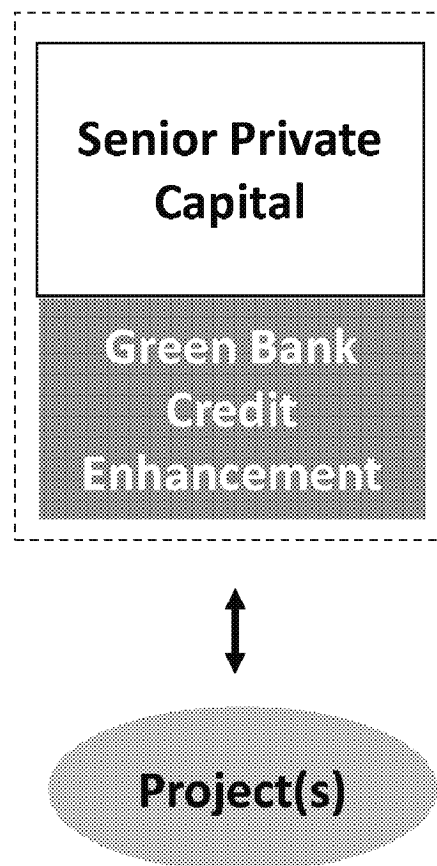
- **Private capital likes this asset class!**
- Green Bank "crowds in" funds by taking early risk & aggregating
- Must think holistically and strategically to be successful
 - **ORIGINATION** ("front end") more important / challenging than **FUNDING** ("back end") ...
- ◆ Lots of moving parts / Lots of interdependencies
- Success is a balance between originating, underwriting, aggregating, securitizing & servicing → **SCALE MATTERS!**
- The market is dynamic: more players becoming active (lenders, investors), ratings methodology is evolving (1st rated deal coming...)
- Constant feedback loop – everyone is getting smarter / better

How Green Banks Leverage Public Capital with More Private Capital

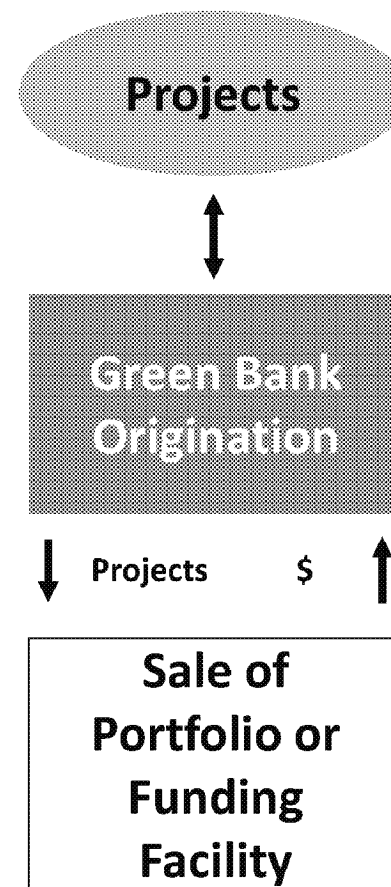
Co-Investment

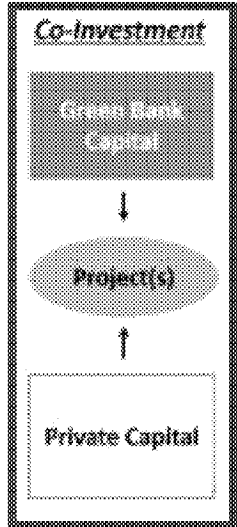


Credit Support

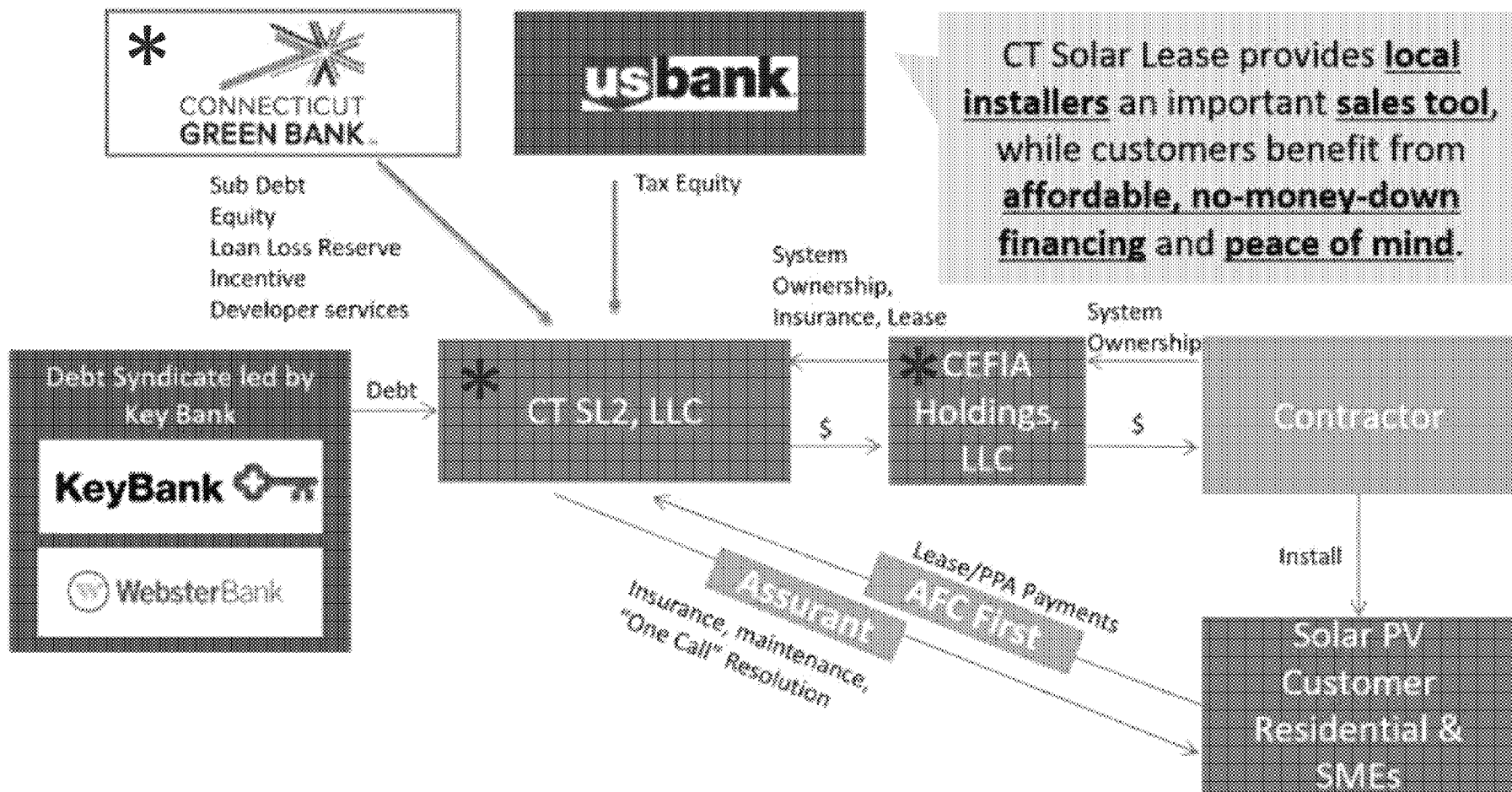


Warehousing





CT Solar Lease 2 (Residential & SMEs)



* = CT Green Bank Entity

Co-Investment

Green Bank
Capital

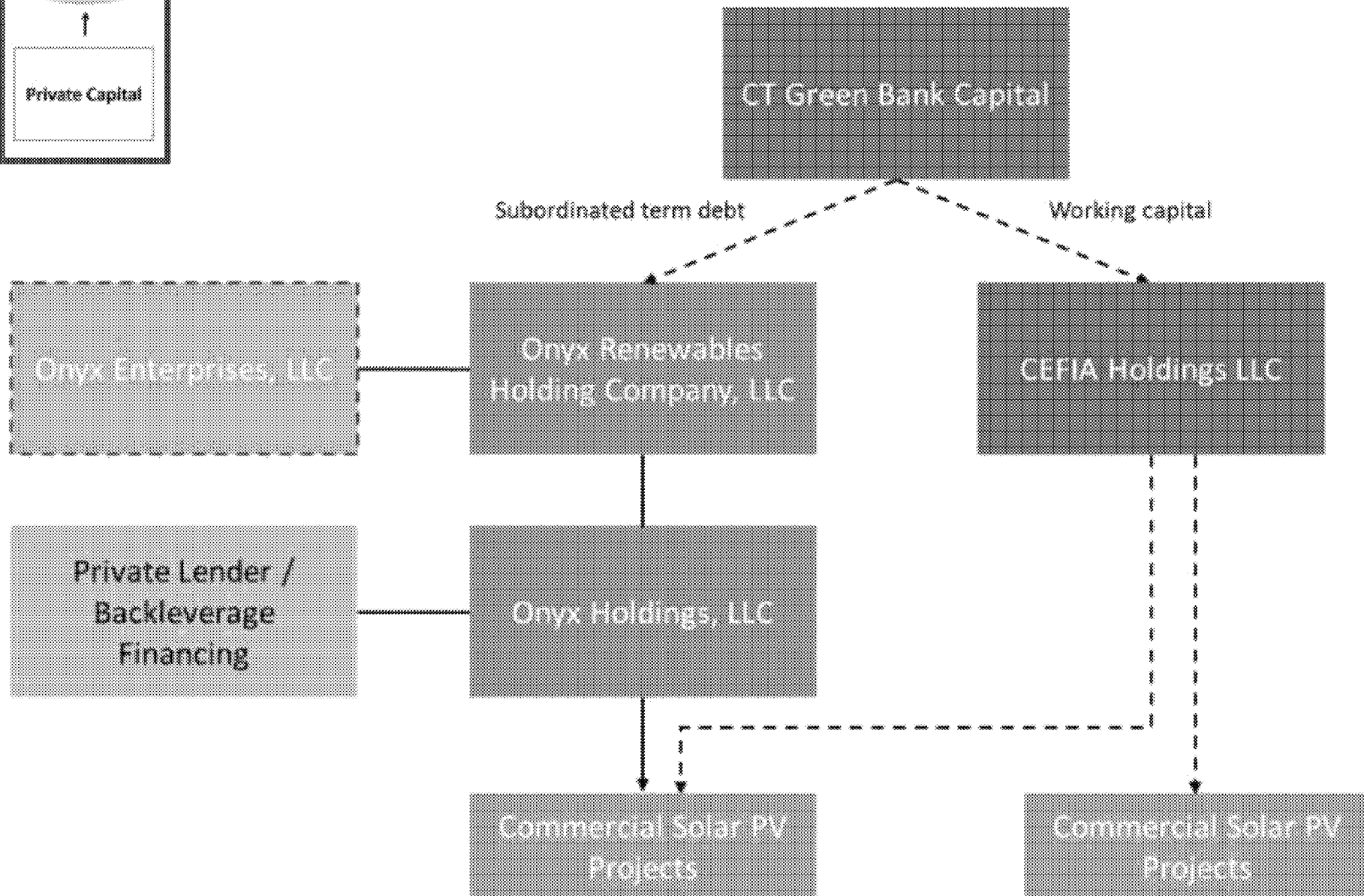


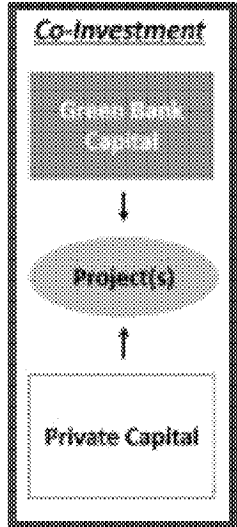
Project(s)



Private Capital

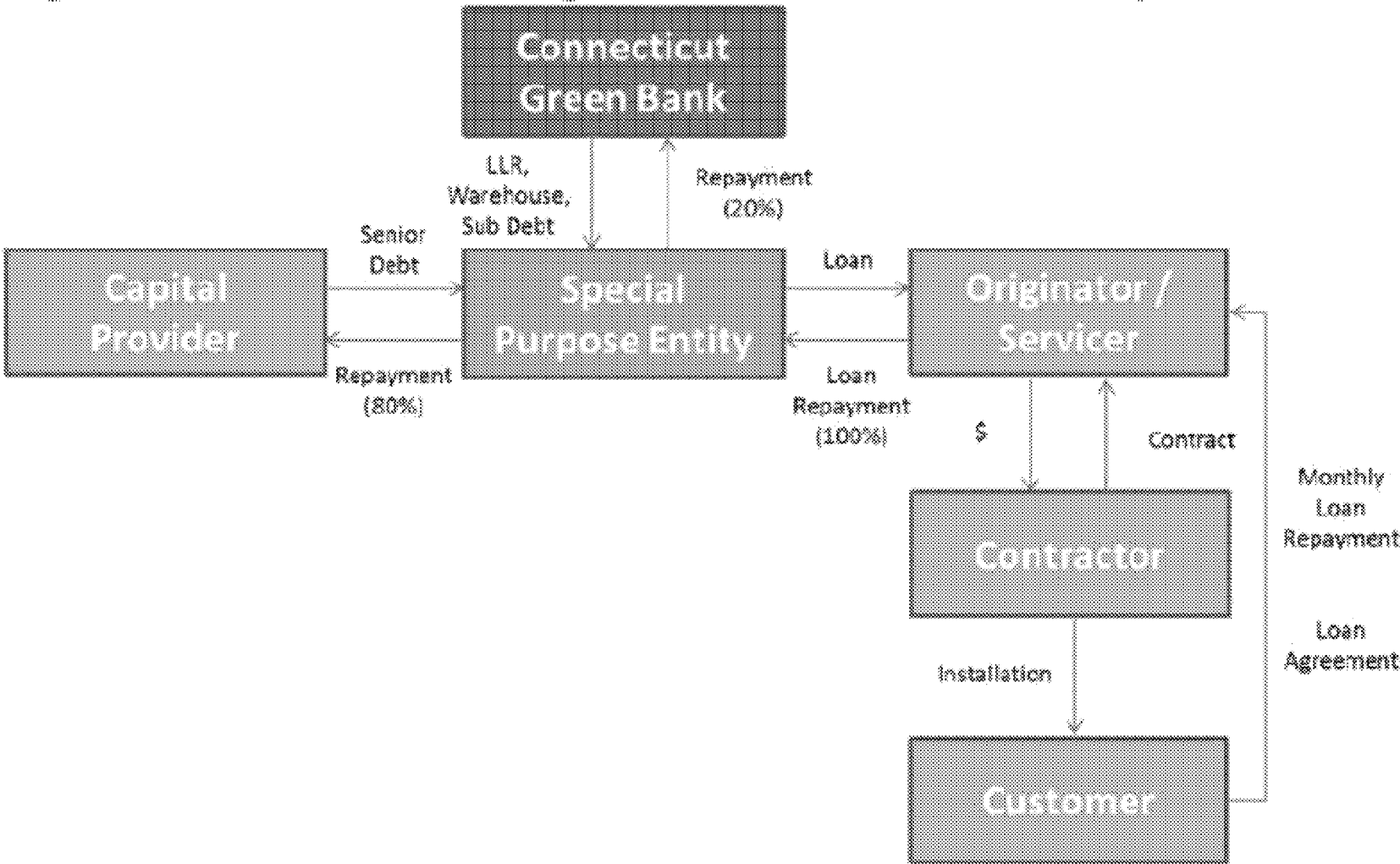
CT Solar Lease 3 + Onyx Renewables





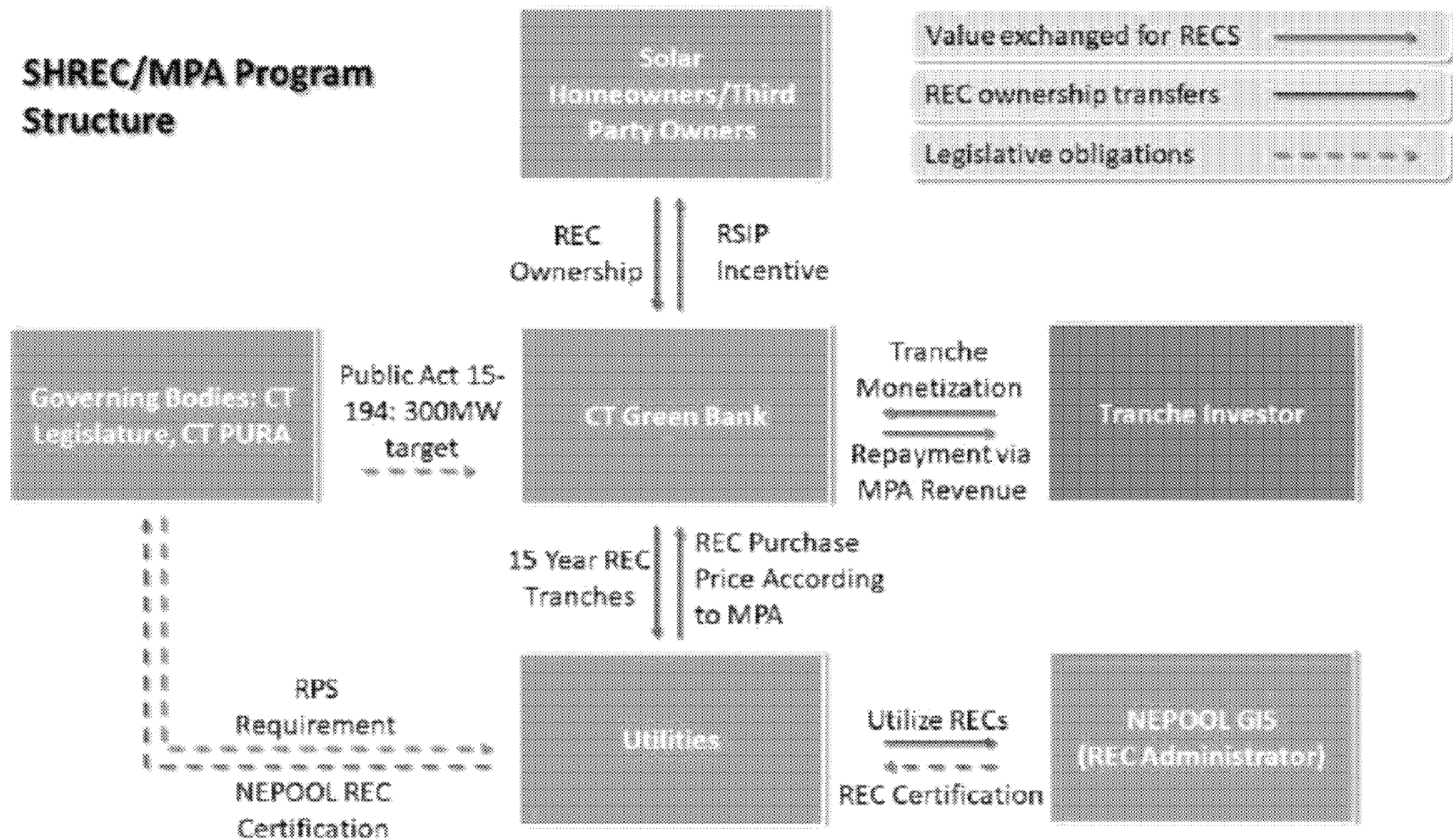
CT Solar Loan

Figure 11. CT Solar Loan Legal Structure and Flows of Capital



Securitization

Solar Home Renewable Energy Credits



Credit Support

Senior Private
Capital

Green Bank
Credit
Enhancement



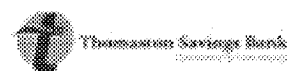
Project(s)



Loan Loss
Reserve
T/A + Marketing



Union
Savings Bank



ion BANK



The West Southern Bank of Middlebury



WORKERS'
Credit Union

eastern
savings bank

COREPLUS CREDIT UNION

cpu



nutmeg
state

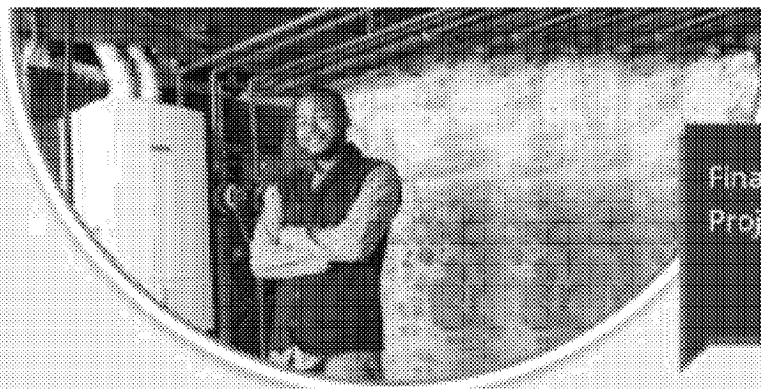
smart-e loan
energize CT
CONNECTICUT

*New Customers
& Depositors*

*More Loan
Volume*

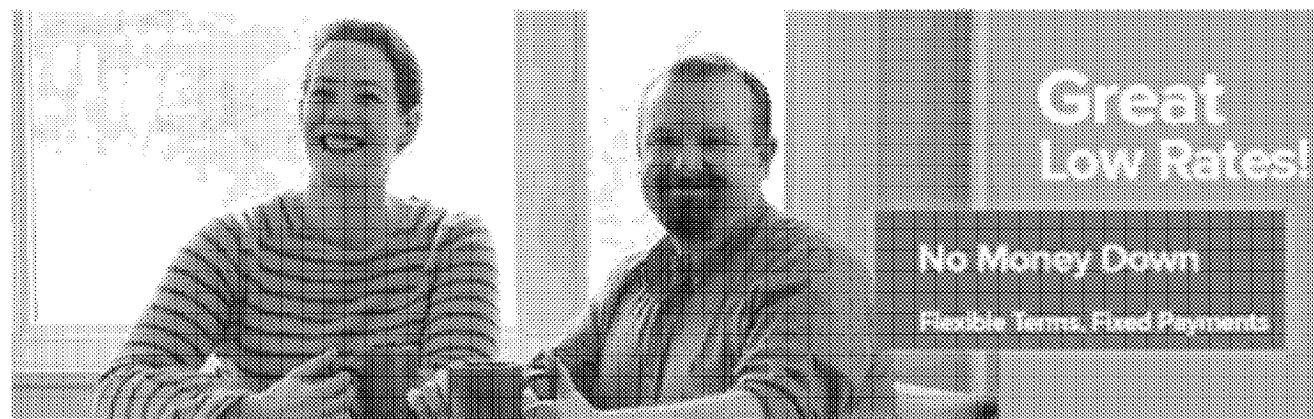
*Lower Interest
Rates*

*Longer
Repayment
Periods (5 – 12 Y)*



Finance Your Next Smart Energy
Project with a Smart-E Loan

Smart-E Loans



Introducing the Smart-E Loan!

A Smart-E Loan offers no money down, low-interest financing with flexible terms to help you upgrade your home's energy performance - and save money! Over 40 home improvement projects that reduce energy use and lower utility bill costs may qualify. With rates as low as 4.49% applying through a local lender is as easy as child's play!

What is a Smart-E Loan?



What Home Improvements Can I Finance with a Smart-E Loan?



How Do I Get Started with a Smart-E Loan?



Smart-E Loan Eligibility Requirements



Get Pre-Approved for a Smart-E Loan with a Participating Lender



Each lender has a landing page
with contact information at
www.energyecf.com/smart-e

RATES AS LOW AS **4.49%**
NO MONEY DOWN FLEXIBLE TERMS

Learn More About...

Heat Pump Financing

Natural Gas Conversion

Smart-E Bundle

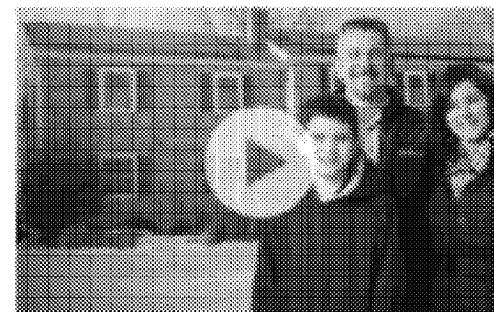
GET STARTED NOW

Find A Smart-E Lender

Find A Smart-E Contractor

STORIES

Smart-E Loans are cutting energy
costs for homeowners like you.



IESO-N-0046535

Credit Support

Senior Private
Capital

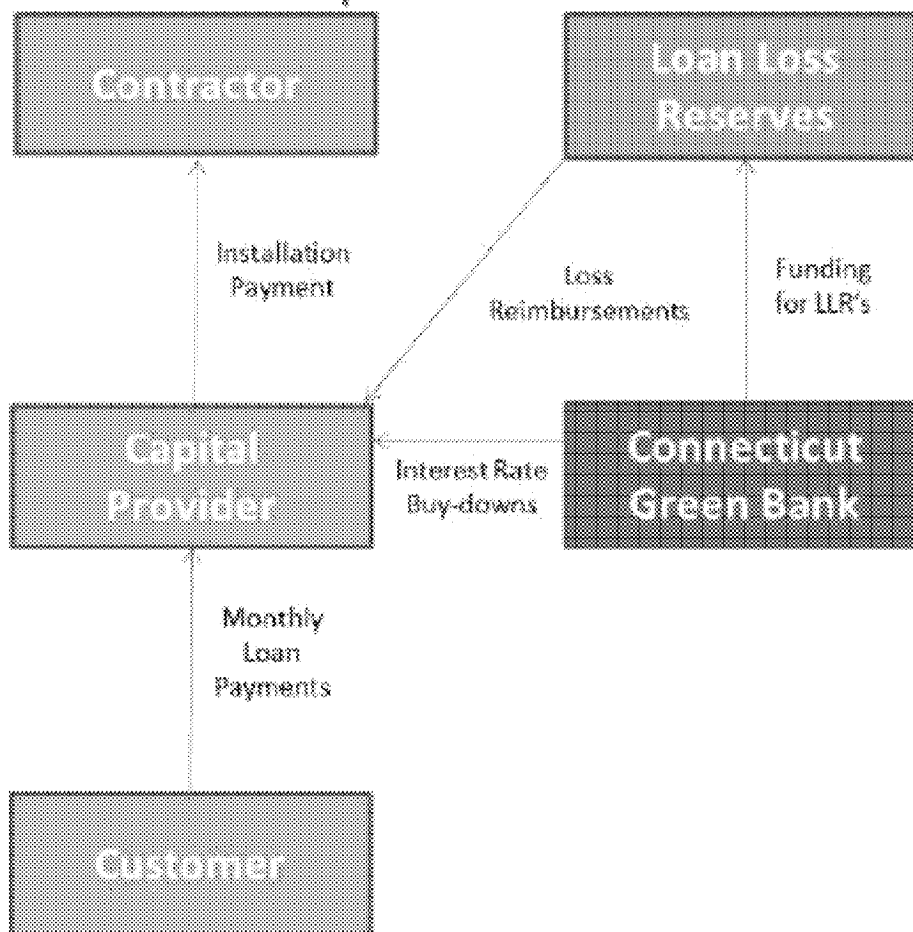
Green Bank
Credit
Enhancement



Project(s)

smart-e loan
energize **CT**
CONNECTICUT

Figure 9. Legal Structure and Flows of Capital for the Smart-E Loan



Warehousing

Projects



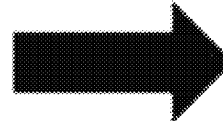
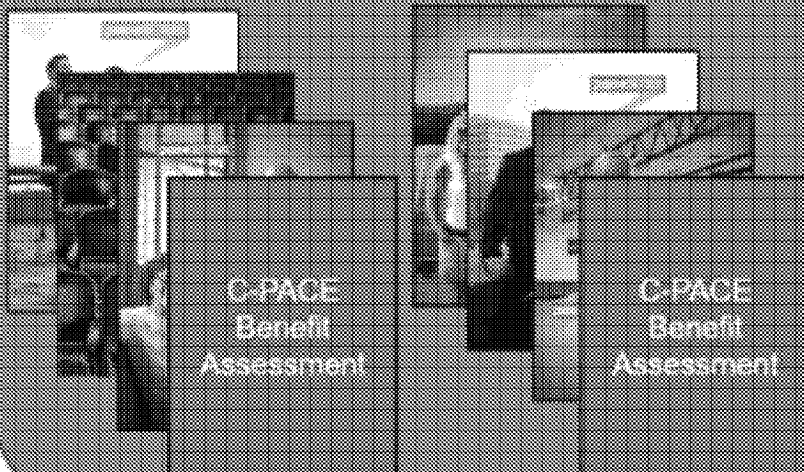
Green Bank
Origination

↓ Projects \$ ↑

Sale of
Portfolio or
Funding
Facility

cpace

Connecticut Green Bank C-PACE Warehouse (\$40 MM)



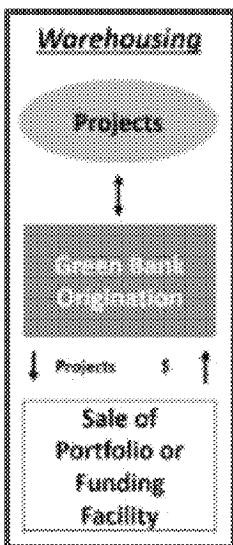
Class B Bonds
(10%)

Class C Bonds
(10%)

\$30 Million in Funding
*Private Placements &
Ultimately Public Markets*

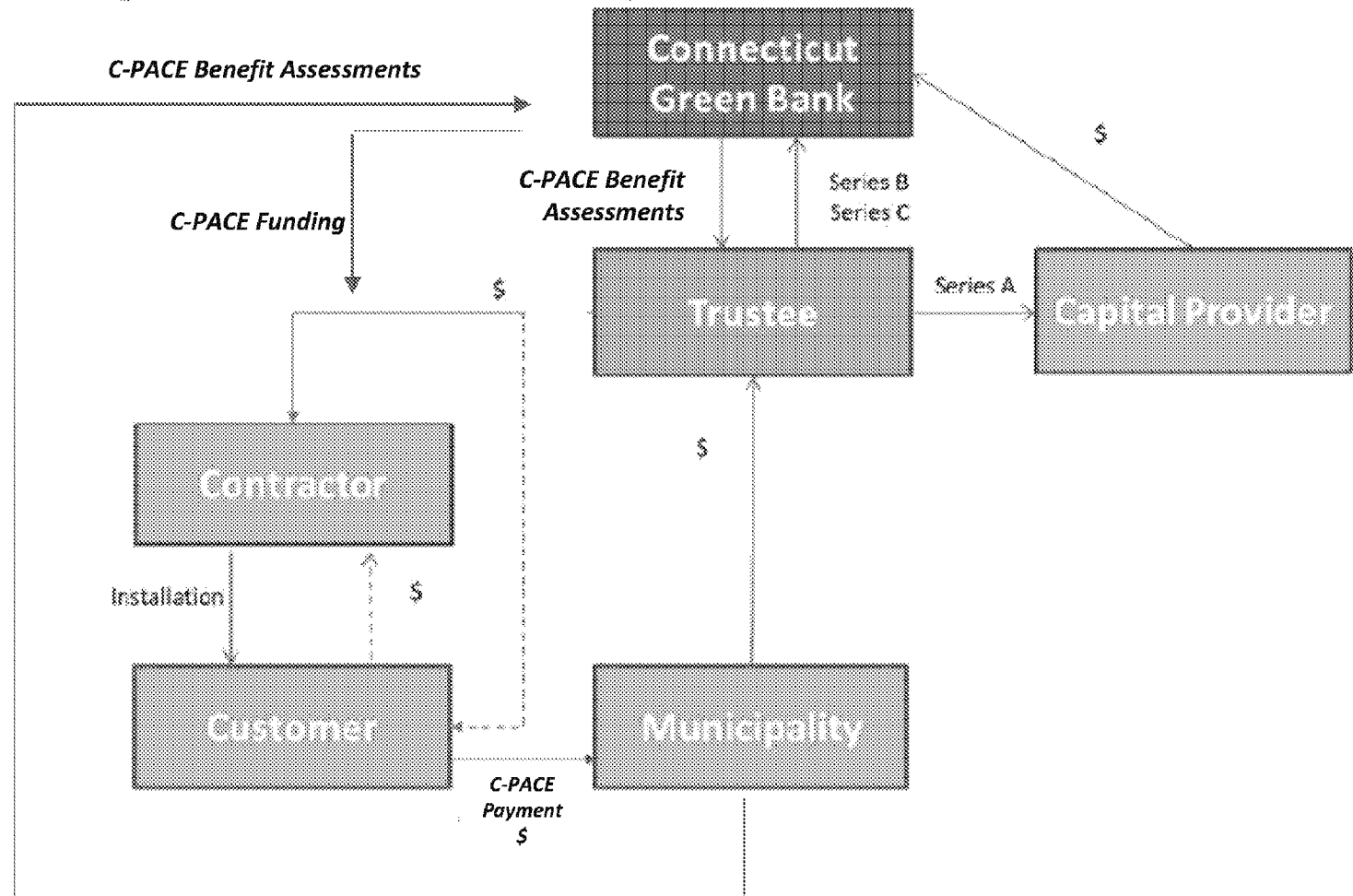
Class A Bonds
(80%)

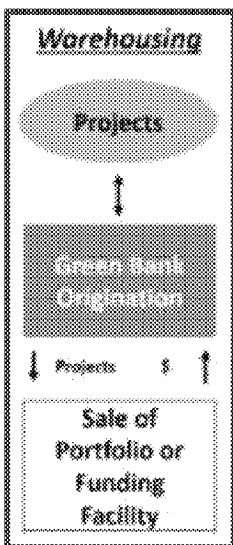
Clean
Fund



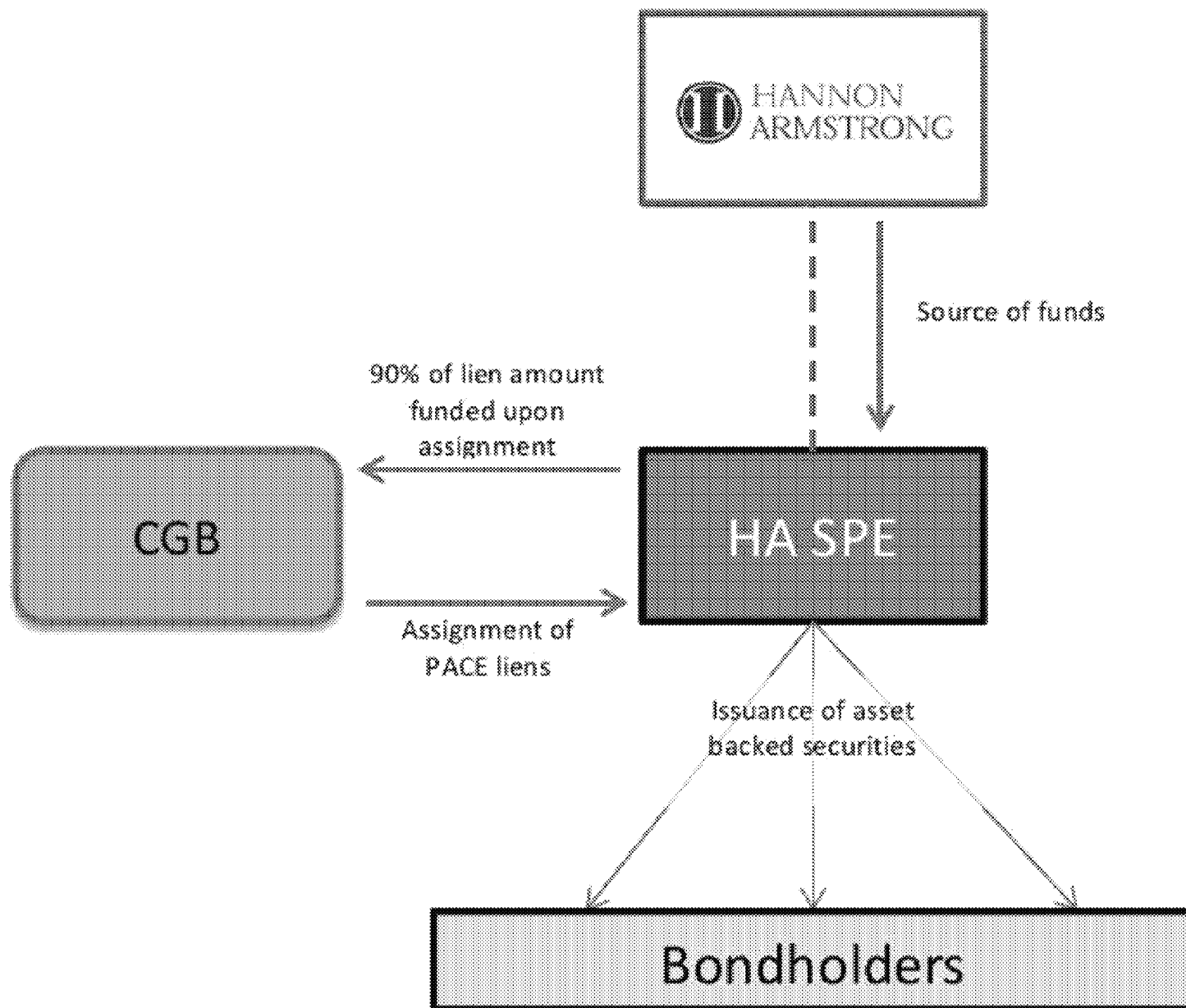
cpace

Figure 5. Legal Structure and Flows of Capital for C-PACE





cpace



C-PACE

Demand Continues to Increase

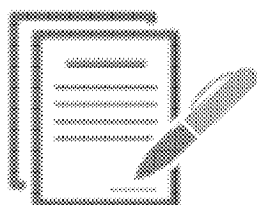


C-PACE is Growing

The total amount of project financing continues to grow as more energy saving projects are closed.

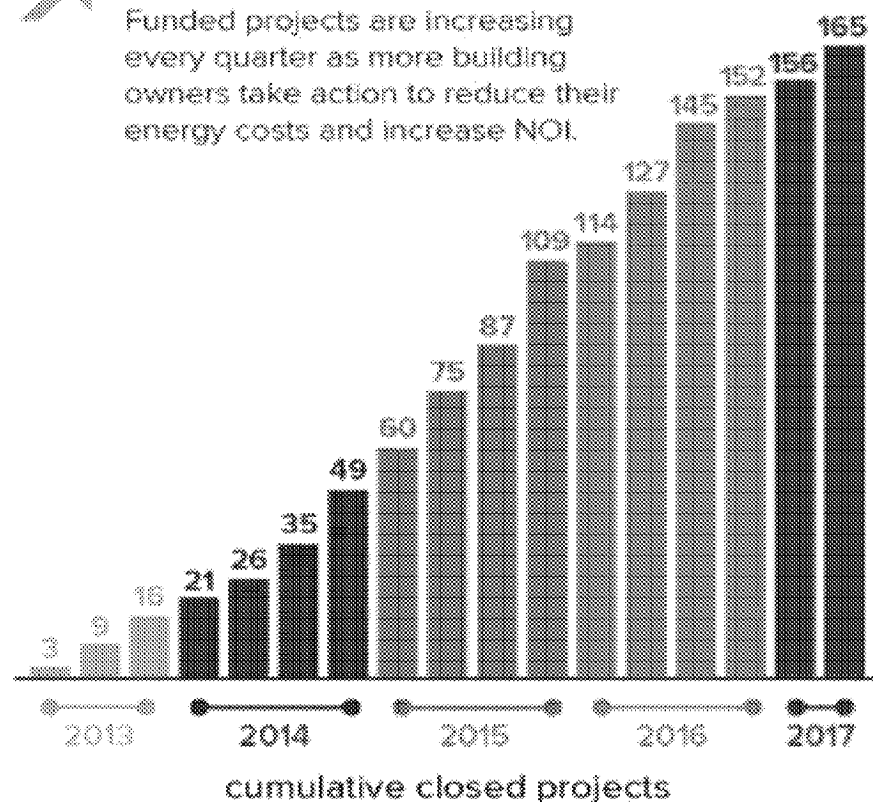
\$101.3M

**total closed
project financing**



Closed Projects

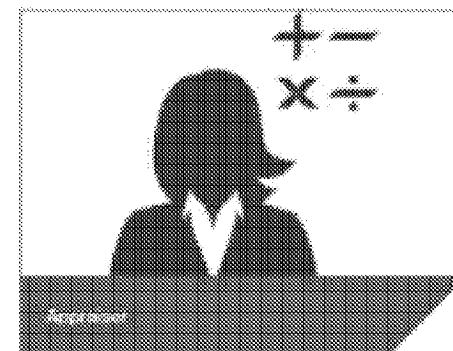
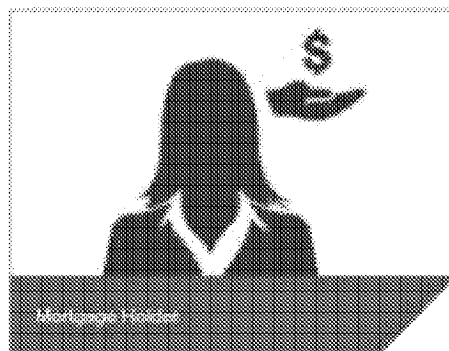
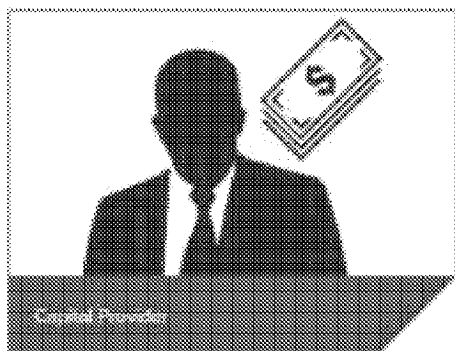
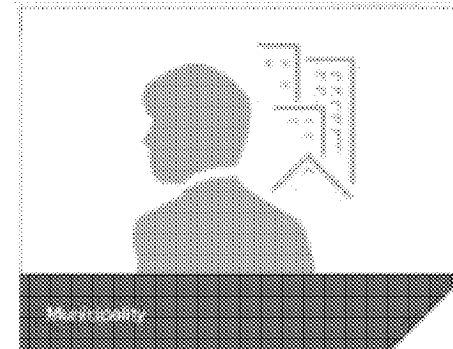
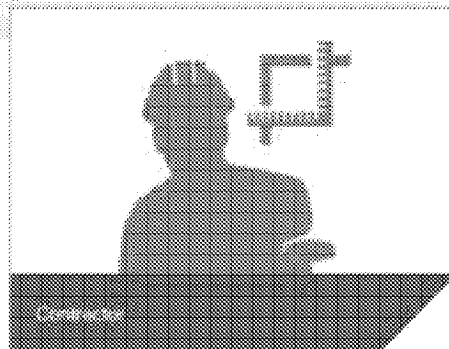
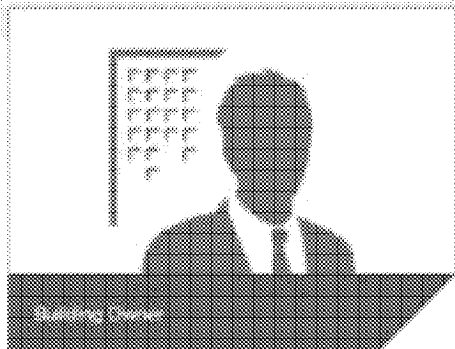
Funded projects are increasing every quarter as more building owners take action to reduce their energy costs and increase NOI.



Green energy financing that builds better businesses

C-SPACE (Commercial Property Assessed Clean Energy) financing makes green energy investments more accessible and affordable. This innovative financing program is accelerating the green energy movement, and making a positive impact on many different stakeholders across Connecticut.

What type of stakeholder are you?



Co-Investment

Small Business "On Bill" Financing With Private Capital

Green Bank
Capital

Project(s)

Private Capital

Customer and utility enter into
financing agreement

UI
EVERSOURCE
ENERGY

Funding
provided to
utilities annually
based on
anticipated
budget

Connecticut
Energy
Efficiency Fund
(CEEF)

Provides:
• Rate Buydown
• Loan Loss
Coverage
• Administrative
Expense Recovery

Utility bills
customer for loan
amount

Customer repays
through on-bill
mechanism

Efficiency loan
proceeds

Efficiency
incentives

Utility confirms to SBEA LLC
when loan proceeds can be
paid to contractors

SBEA LLC confirms to utility
when proceeds are paid and
repayments can be put on
utility bill

Upon collection from
customers, utilities transmit
loan repayments to SBEA LLC

CEEF funds
• IRS pre-funded to
cover interest
expenses for lifetime
of loans
• Loan losses and
admin expense
reimbursed as
requested

Program &
Services
Agreement and
Functions

CONNECTICUT
GREEN BANK

Small Biz
or Many
Customers

SBEA
Contractors

Efficiency
projects &
equipment

Efficiency
loan
proceeds

SBEA
LLC

Capitalize the LLC
CGB advances
capital and draws
loan funding from
third-party capital
provider as needed

Capital
repayment

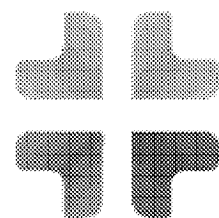
Customer and SBEA LLC
enter financing
agreement

Security
interest

Green Bank
\$3m subordinated capital

JP Morgan
\$27m senior capital

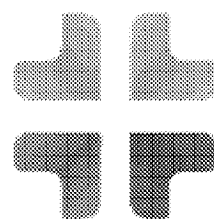
Capital Providers



PosiGen
Solar Solutions



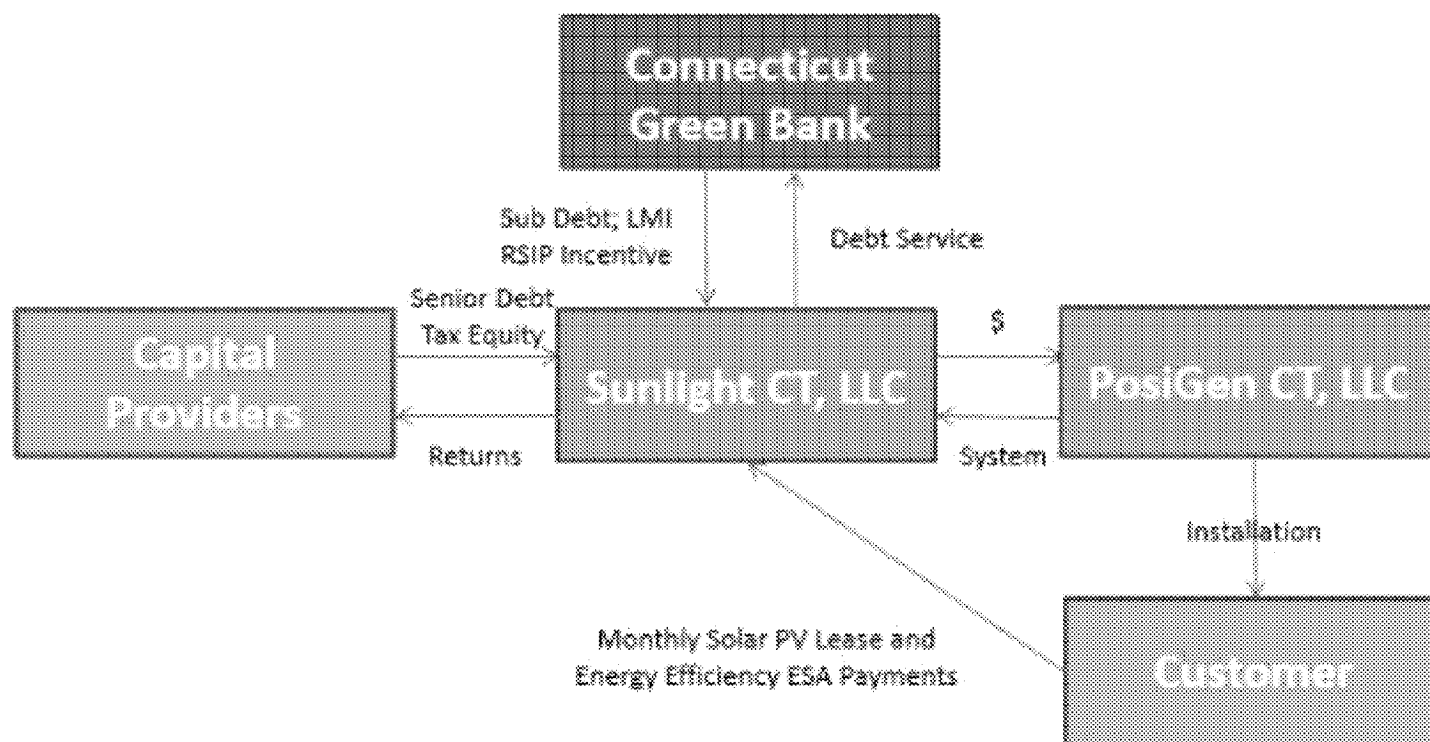
- **Solar for All Campaign Progress** – 835 installations in 17 months, 5.8 MW of solar PV
 - ✓ 71% of contracts are LMI*
- **Energy Efficiency Progress**
 - ✓ 99.9 % of households get Direct Install EE measures
 - ✓ 66% of households also undertake “deeper” energy efficiency projects through \$10 ESA payment/month for 20 years
- **Community Campaigns** – in Bridgeport, Hartford, New Haven, New London
- **Jobs** – 62 current CT based Employees



PosiGen
Solar Solutions



Figure 10. Low Income Solar Lease Legal Structure and Flows of Capital



Multifamily Programs

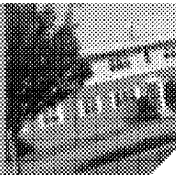


Technical assistance and financing to help owners save money on energy, increase property values, and improve tenants' safety & comfort.

Pre-Development Resources

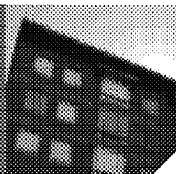
Benchmark CT

- Free energy benchmarking resource



Sherpa Loan

- Designated service provider
- Standardized process & fee schedule



Navigator Loan

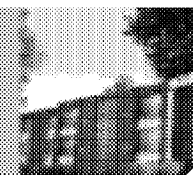
- Client managed contractors
- Customized technical services



Project Financing

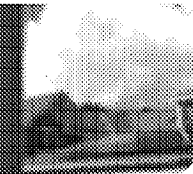
LIME

- Low Income Multifamily Energy
- Affordable
- Unsecured



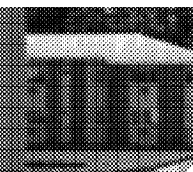
Solar

- Solar projects only
- Commercial solar lease



Gap Financing

- Flexible low-cost financing
- Energy & health/safety

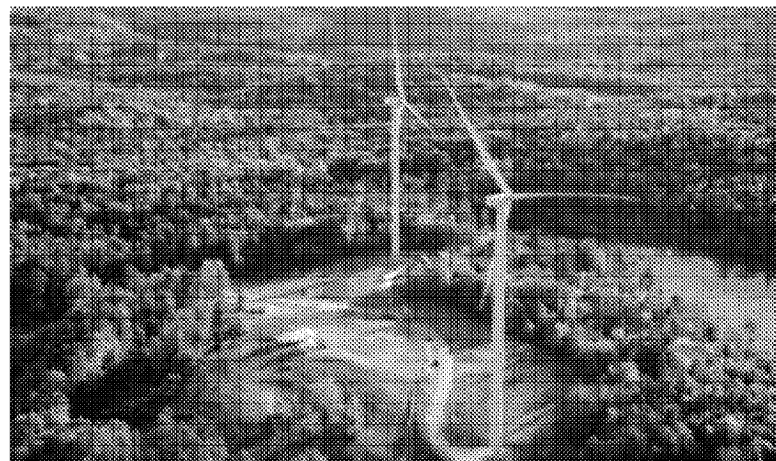


Co-Investment

Project Finance Structures for Larger Projects

Fuel Cells, Small Hydro, Wind, District Heating Loops, Microgrids

Summary	Chunky, economically valuable projects where we take a risk position at a cheaper price.
Credit Type	Senior / Subordinate Debt or Equity Stake in single asset entity.
Channel to Market	Project-specific developers operating in target markets with technology solutions / business model innovations that demonstrate growth opportunity across specific or multiple geographies and have yet to reach capital markets scale.
Opportunity	Good spread & deal fees. Risk tolerance at same price potentially greater than other capital markets players. Projects below utility scale have a high burn rate because of capital availability and timeline that we are able to uniquely address.
Challenges	Where longer-term debt is required, may require long-term investment capital that is not easily available. Requires greater risk positions in some cases.

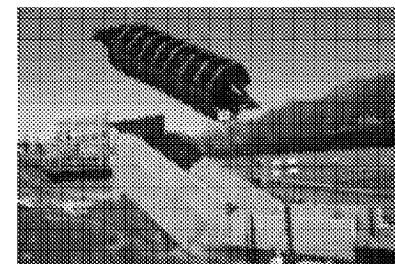


Co-Investment

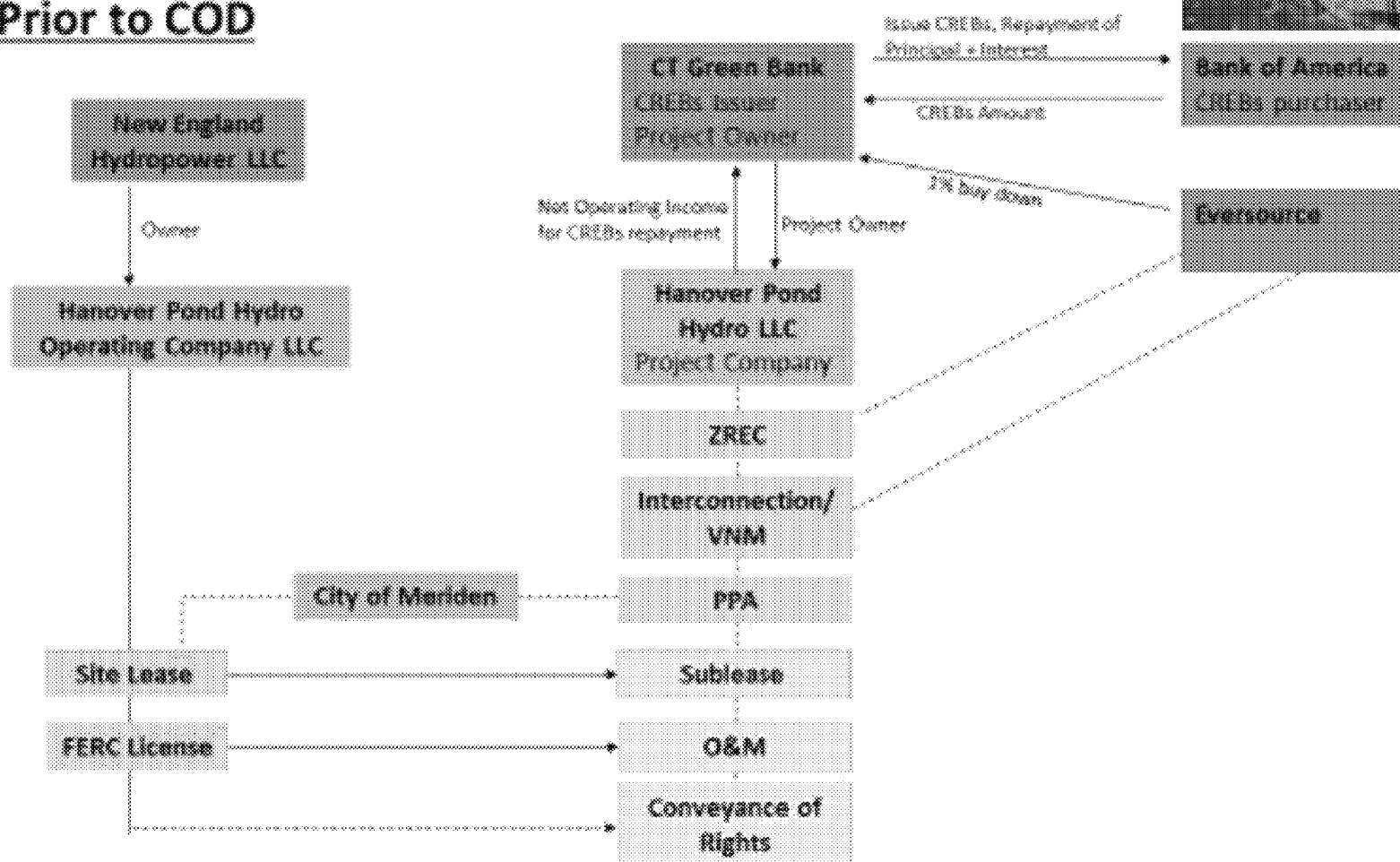
Project Finance Structures for Larger Projects



Small Hydro – Clean Renewable Energy Bonds



Upon or Prior to COD



Green Bank Movement

United States Trends



REFERENCES

Map provided by the Coalition for Green Capital

5th Annual Green Bank Congress: **Green Bank Successes and Expanding Opportunities for Green Finance around the World**

Co-hosted by NY Green Bank and Connecticut Green Bank
in partnership with the Green Bank Network





Green Bank Network

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Australian Clean Energy Finance Corporation

Established by the Clean Energy Finance Corporation Act of 2013, the Australian Clean Energy Finance Corporation (CEFC) invests

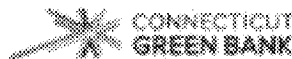
commercially to increase the flow of funds into renewable energy, energy efficiency and low emissions technologies. It is an independently governed Government institution that operates like a traditional financier. The CEFC's mission is to accelerate Australia's transformation towards a more competitive economy in a carbon constrained world by acting as a catalyst to increase investment in emissions reduction.



Malaysia Green Technology Corporation

The Malaysian Green Technology Corporation (GreenTech Malaysia) is an organisation under the purview of the Ministry of Energy, Green Technology and Water, Malaysia

(KEMTRAK), charged with catalysing greentechnology deployment as a strategic engine for socio-economic growth in Malaysia in line with the National Green Technology Policy 2009.



Connecticut Green Bank

The first Green Bank in the U.S., the

Connecticut Green Bank (CGB) is a quasi-public corporation established in 2011 as part of the Connecticut Legislature's Public Act 11-40, an act concerning the establishment of the Department of Energy and Environmental Protection and Planning for Connecticut's clean energy future. The CGB was established to develop and implement strategies that bring down the cost of clean energy in order to make it more accessible and affordable to consumers in the residential, commercial, and industrial sectors.

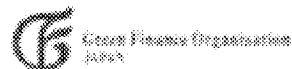


NY Green Bank

New York Green Bank

NY Green Bank (NYGB) is a state-sponsored specialized financial entity

whose mission is to accelerate clean energy deployment in New York State by working with the private sector to transform financing markets. The USD 1.8 billion state-sponsored specialized financial entity was launched in 2014 and works with the private sector to stimulate financing gaps in New York's clean energy markets. NYGB is one of the main pillars of Governor Andrew M. Cuomo's Reforming the Energy Vision (REV) strategy to help consumers make better and more informed energy choices, enable the development of new energy products and services, protect the environment and create new jobs and economic opportunity throughout New York State.



Green Finance Organisation Japan

Japan's Green Fund commenced operations in July 2015 after the

Environment Minister announced the "Finance initiative to build a Low Carbon Society", which highlighted the need for using private capital for measures tackling global warming, in January of that year. The Green Fund is governed by the Green Finance Organisation, and its objective is to validate the business case of small to large-scale clean energy projects by making equity and mezzanine investments that attract further capital from private sources.



Green Investment Group

Green Investment Group

The Green Investment Group (GIG) was established as the UK Green Investment Bank in 2012 by the UK

Government, which provided the business with its initial investment capital. The GIG was wholly owned by the UK Government until April 2017, when it was privatized and renamed the Green Investment Group. As one of the most active investors in the UK Green Economy, GIG has funded the creation of new, modern and green infrastructure across the UK. GIG's approach is to back projects that have a double bottom-line of being green and profitable. GIG profitability is an important signal to other investors and helps attract new investors and higher levels of investment to UK green infrastructure.



Q&A

Thank You!

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