



Connecticut Green Bank

Incentivizing Private Investment
In Clean Energy, Energy Efficiency
& Resiliency with Public Capital

The Alaska State Legislature
House Community & Regional Affairs



28 March 2017



Agenda



- What is the Connecticut Green Bank
- Green Bank Basics
- Green Bank Benefits / Impacts
- Project / Program Examples
- Green Bank Movement

Connecticut Green Bank

About Us

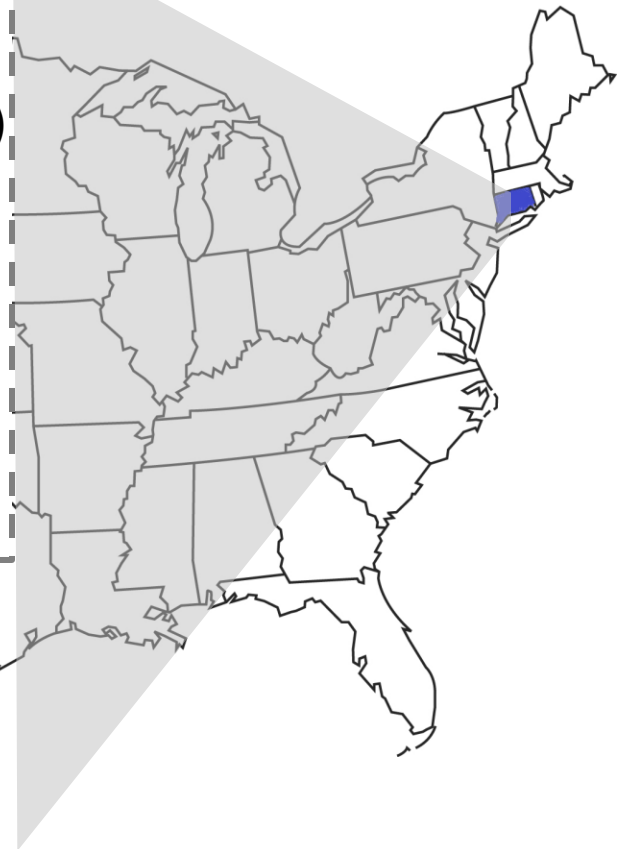


- **Quasi-public organization** – created 2011 and succeeded the Connecticut Clean Energy Fund (1999-2011) ... with **~\$60 MM**
- **Focus** – finance clean energy (i.e. renewable energy, energy efficiency, and alternative fuel vehicles and infrastructure)
- **Balance Sheet** – approximately **\$175 MM** in assets (**growing**)
- **Support** – supported by
 - a \$0.001/kWh surcharge on electric bills
(~ \$10 per household / year) ... approximately **\$27-30 MM / year (stable)**
 - A “CO² Cap & Trade” ... approximately **\$5 MM / year (stable)**
 - Portfolio Income ... approximately **\$2 - \$3 MM / year (growing)**
 - Private capital, foundations, US Govt (i.e. SunShot & ARRA) – (**varies**)

Connecticut

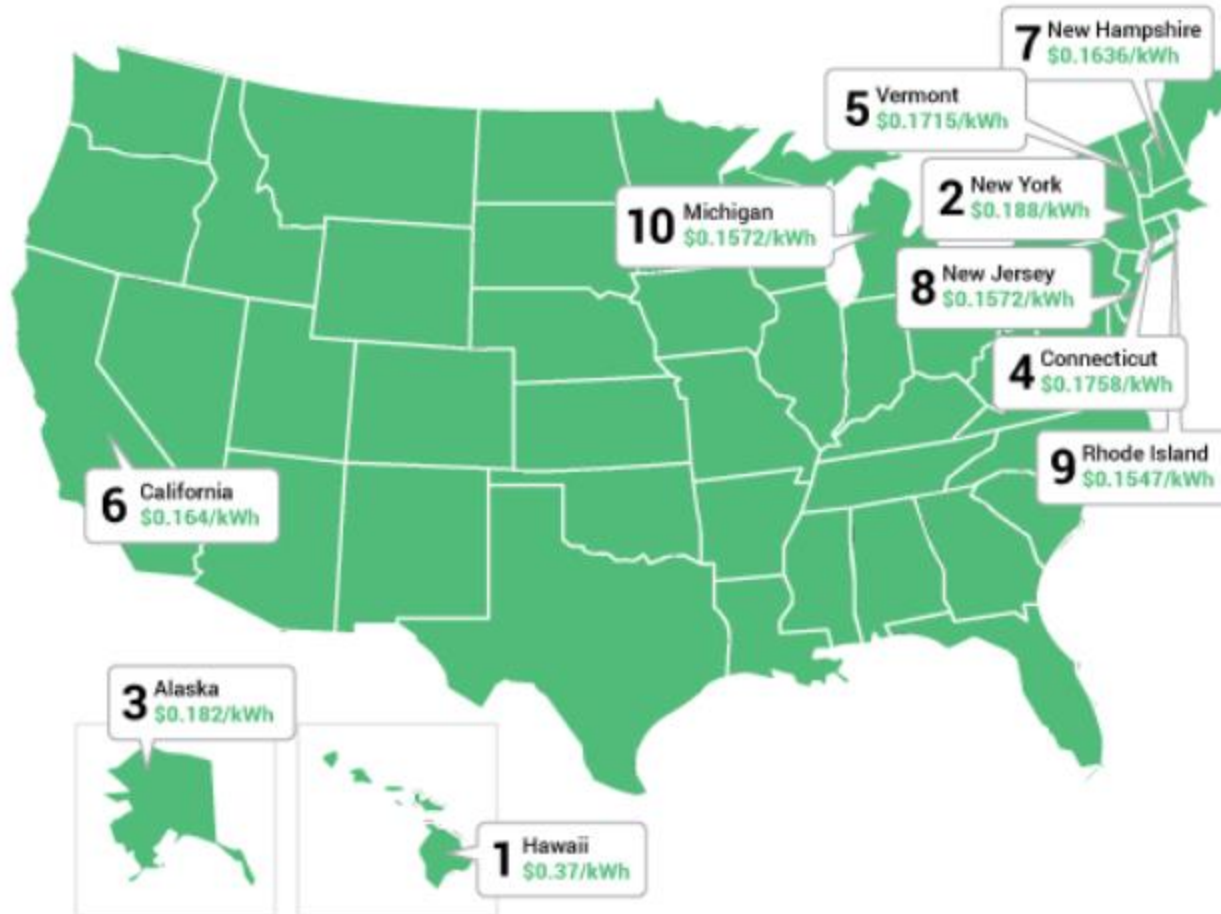
Microcosm of the United States

- **Region** – New England
- **Population** – 3,597,000
- **Gross State Product** – ~\$225 B (#3 – 2015)
- **Buildings** – some of the oldest, most energy inefficient, and H&S issues
- **Energy Costs** – one of the highest electricity costs in USA
- **Grid Reliability** – 5 major storms in the past 5 years with unacceptable outages



Connecticut & Alaska

2 of the “Top 10 Most Expensive States for Electricity”



Five Macro Energy Challenges



Connecticut



High Energy Costs

CT has one of the highest cost for electricity in USA



Old, Energy Inefficient Building Stock

CT has some of the oldest and most energy inefficient building stock



Need for "Cleaner / Cheaper" Energy Sources

Programs that will diversify our energy mix into renewable/clean power



Grid Reliability

5 major storms in recent years with unacceptable outages

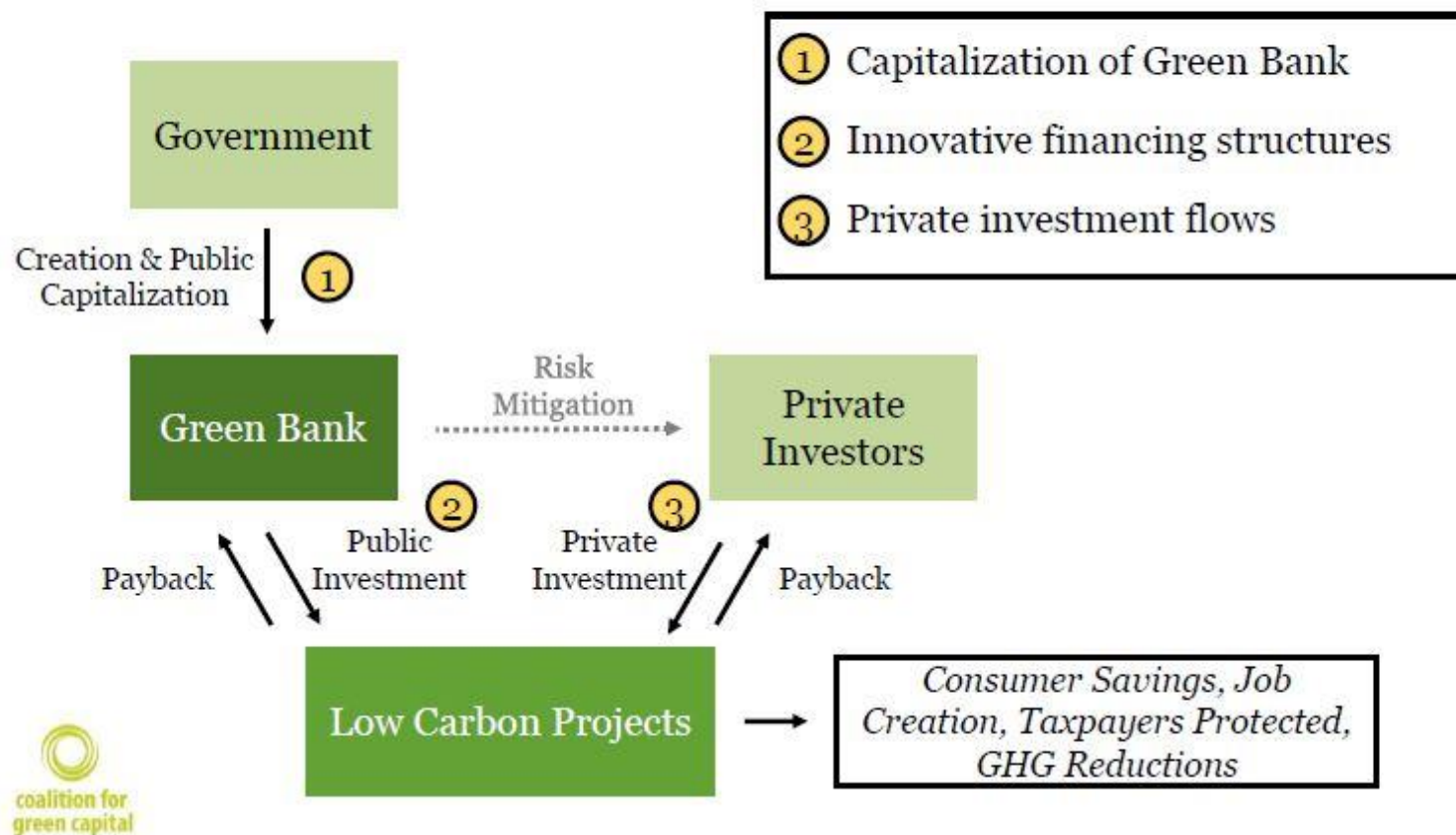


Government Spending Constrained

Federal \$\$s greatly diminished ... Large State Budget Deficits

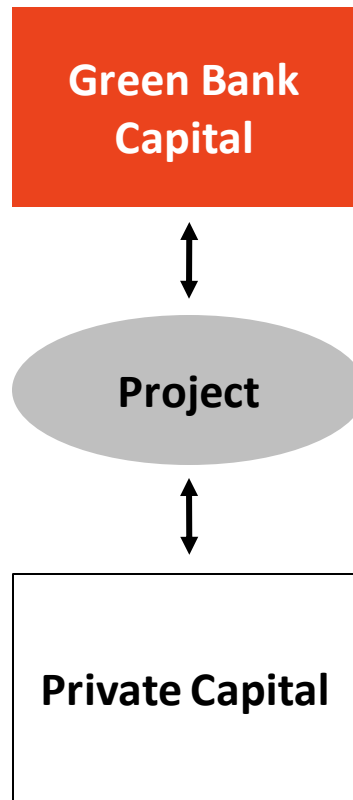
Basic Green Bank Model

Create New Public Institution to Channel Public & Private Investment

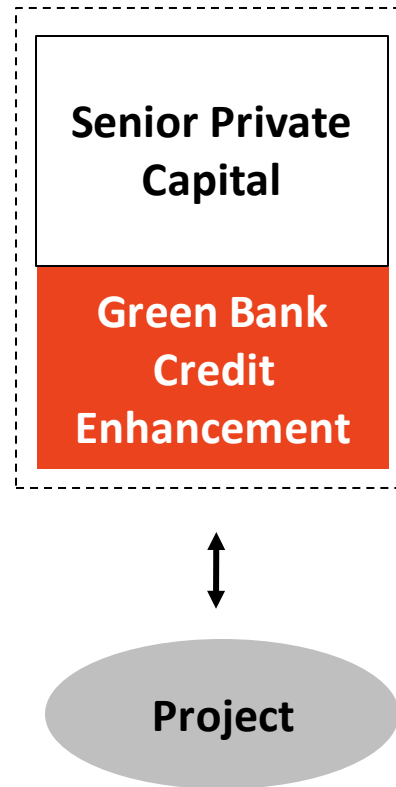


How Green Bank's Leverage Public Capital with More Private Capital

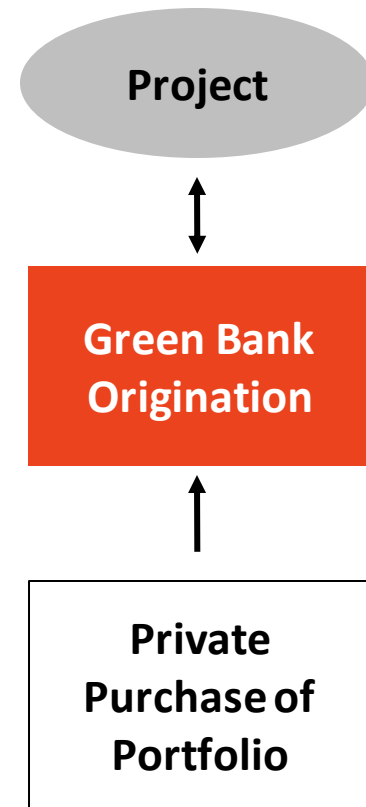
Co-Investment



Credit Support



Warehousing



What Impacts are Being Achieved through the Connecticut Green Bank?

Connecticut Green Bank



Accelerate Green Energy Deployment

	FY 2000- FY 2011 (CCEF)	FY 2012- FY 2016+ (CGB) ¹
Model	VC and Subsidy	Financing
Years	11.00	5.25
Energy (MW)	43.1	208.2
Investment (\$MM)	\$349.2	<i>\$1 Billion</i>
Leverage Ratio	1:1	3:1 to <i>11:1</i>
% of Funds as Loans	10%	50%

Deploying **more** green energy at a **faster** pace while using ratepayer-taxpayer resources **responsibly**

REFERENCES

1. Approved, closed, and completed transactions

Connecticut Green Bank

Accelerate Green Energy Deployment



Table 10. Project Performance – Clean Energy Approved, Closed, and Completed Projects in Connecticut (FY 2012-2016)

	# Projects	Investment (Project Cost)	Investment /Capita*	MW	Watts /Capita*	Annual MMBTU)	Total Job Years	Lifetime CO2 Emissions (tons)
Not Distressed	14,039	\$618,511,153	\$528.15	135.1	115.8	883,168	7,933	1,573,531
Distressed	4,728	\$298,095,849	\$123.88	57.0	23.7	1,089,678	3,655	609,933
Unknown	4	\$1,221,600	-	0.2	-	609	5	2,315
Total	18,771	\$915,828,602	\$255.90	192.3	53.8	1,953,454	11,594	2,185,779
% Distressed	25%	33%		30%				

* Calculated using the 2016 distressed community designations

Deploying more green energy at a faster pace while using ratepayer-taxpayer resources responsibly

REFERENCES

1. Approved, closed, and completed transactions

IMPACT! Public-Private Partnerships

Investment Transactions



\$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

\$10 MM

TERM SHEET
100%⁴



Connecticut
Green Bank

\$75 MM

IN PROCESS
>20:1



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 \$5m for the first \$60-70mm.
4. Foundation PRI and commercial loan are backed by CGB balance sheet in the case of the Kresge Foundation and Bank of America respectively.

IMPACT! Connecticut Green Bank



Delivering Results for Connecticut

- **Investment** – mobilized over \$1 billion of investment into Connecticut’s clean energy economy so far
- **Jobs** – created 4,710 direct jobs and up to an estimated 12,500 total jobs, translating to an estimated 7.5% to 20% of total job creation in CT over the Green Bank’s first 5 years.*
- **Energy Burden** – reduced the energy burden on over 20,000 households and businesses
- **Clean Energy** – deployed more than 200 MW of clean renewable energy helping to reduce 2.5 million tons of greenhouse gas emissions that cause climate change

REFERENCES

*62,500 private non-farm jobs created in the state over 5 years since Green Bank creation mid-2011. Green Bank statistics are in job-years; “total jobs” include direct, indirect and induced. CT DOL statistics are aggregated from monthly point-in-time estimates. CT Department of Labor - <http://www1.ctdol.state.ct.us/lmi/privatesectoremployment.asp>

Project / Program Examples

Support for Homeowners

Smart-E Loan

PosiGen Solar Lease and Efficiency Bundle

Smart-E Loan

smart-e loan

energize CTSM
CONNECTICUT



CONNECTICUT
GREEN BANK

- Residential, **1-4 unit** loan product for homeowners
- **Low-interest** financing with **flexible terms**
 - 5, 7, 10 and 12 year terms
 - Rates range from **2.99%** to 6.99%
- **40+** energy improvements can be financed
 - Boilers, Furnaces, Heat Pumps, Central Air, Insulation, Solar, EV Chargers and more!
- **Easy** application through eleven **local lenders**
- Borrow from \$500 up to **\$40,000**

www.energizect.com/smart-e



Smart-E Loan (Credit Support)

\$28 MM Loan Capital Available



COREPLUS CREDIT UNION



- Credit Support – \$2.5 MM “2nd loss” loan loss reserve attracts \$28 MM of loan capital



Smart-E Loan

“Bundle” Special Offer



smart-e loan



- **Smart-E Bundle 2.99%** interest rate at **5, 7 or 10** years for qualifying projects with **multiple measures**
 - ✓ **Solar + Insulation**
 - ✓ **Solar + Energy Efficient Windows**
 - ✓ **Solar + EV Charger**
 - ✓ **Solar + High Efficiency HVAC (Any fuel type or heat pumps)**
 - ✓ **Insulation + Windows**
- “Credit” given for an eligible measure installed in last 5 years, with proof
- www.energizect.com/SmartEBundle

Residential 1-4 Owner Occupied Low Income Portfolio



- Residential Solar Investment Program
- Low-to-Moderate Income Performance Based Incentive for Third Party Owners
- More than double Step 9 incentive
- Income screen of 100% AMI or lower

- \$27 MM Solar for All campaign
- Solar Lease and Energy Efficiency Energy Services Agreement
- HES or HES-IE (direct install EE) leveraged
- Alternative underwrite
- Community partnerships

- Low interest
- Unsecured loan
- 40+ measures (EE and RE)
- 580+ FICO, 50% DTI (waived for 680% FICO, offered through CDFI)
- 25% of loan for health and safety upgrades

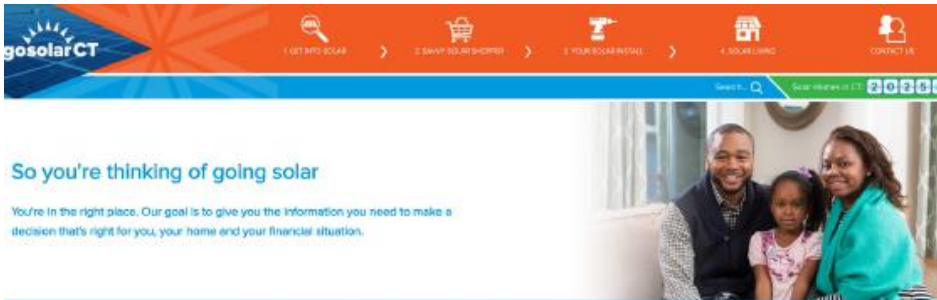


- **Solar PV Progress** – 835 installations in 17 months for 5.8 MW of solar PV deployment
 - ✓ \$55-\$100 solar PV lease payment/month for 20 years
 - ✓ 71% of contracts are LMI*
 - ✓ 62% of customers move forward (suitable)
- **Energy Efficiency Progress**
 - ✓ 99.9 % of households installing solar PV undertake Direct Install EE measures
 - ✓ 66% of households also undertake “deeper” energy efficiency projects* (e.g., insulation, thermostats, etc.) through \$10 ESA payment/month for 20 years
- **Community Campaigns** – in Bridgeport, Hartford, New Haven, New London
- **Jobs** – 62 current CT based Employees



GoSolarCT

Resources for CT Homeowners



Identifying The 4 Key Steps in Your Solar Journey

<p>1 Get Into Solar</p> <p>Understand the specifics of what's involved in making solar work for your home.</p> <p><i>Click for more information on how to get into solar.</i></p>	<p>2 Savvy Solar Shopper</p> <p>Select a qualified contractor and understand your financing options when comparing quotes.</p> <p><i>Click for more information about being a savvy solar shopper.</i></p>
<p>3 Your Solar Installation</p> <p>Learn more about the process of getting a solar system installed.</p> <p><i>Click for more information about solar installation.</i></p>	<p>4 Solar Living</p> <p>Now that you've gone solar, here's what you need to know.</p> <p><i>Click for more information about solar living.</i></p>



Innovative financing models continue to propel the residential solar market in Connecticut to reach new heights. Throughout 2016, the Green Bank received over 6,000 new applications for 51 MW. To date, nearly 170 MW of residential solar PV have been approved through the Residential Solar Investment Program, bringing our state over one half of the way toward the new goal of 300MW by 2020. The three most popular financing models are homeowner **purchase**, solar **lease** and solar **power purchase agreements** (PPA).



Bringing Green Energy Home

More than **22,000 CT homeowners** have gone solar!

Homeowner Purchase	Solar Lease	Power Purchase Agreement
<p>Solar PV systems may be purchased in cash or through a loan. The average solar loan term ranges between 15 to 20 years with flexible rates. After the payback period, solar...</p>	<p>With a solar lease, a third party developer owns and maintains the solar PV system. Lease terms range from 15 to 25 years, during which the homeowner pays a series of fixed or escalating payments...</p>	<p>With a solar PPA, a third party developer owns and maintains the solar PV system. PPA terms range from 15 to 25 years, during which the homeowner pays a fixed or escalating rate per kilowatt hour for energy...</p>

- **GoSolarCT.com** is an informational resource that provides unbiased guidance for Connecticut residents throughout their solar journey – before, during and after installation.
- **Solar Market Spotlight** is a quarterly snapshot of the residential solar market in Connecticut.

Support for Multifamily Property Owners

Technical Assistance

Pre-Development Loans

Project Financing

Multifamily Programs - What we do



We help multifamily housing building owners:



**Save money
on energy**



**Increase
property value**



**Improve
occupancy rates**



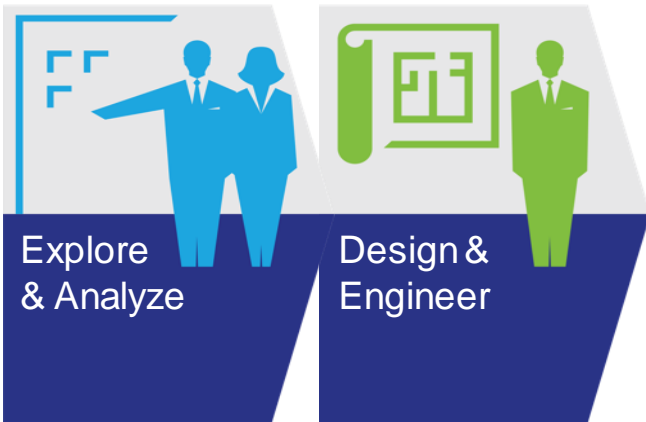
**Improve comfort
and safety**



Resources to Get You Started on the Right Path



Pre-Development Resources



Benchmark CT

- Free energy benchmarking resource



Sherpa Loan

- Designated service provider
- Standardized process & fee schedule



Navigator Loan

- Client managed contractor(s)
- Customized technical services



www.ctgreenbank.com/multifamily

Energy Upgrade Financing



Project Financing



LIME

- Low Income Multifamily Energy
- Affordable
- Unsecured



Solar

- Solar projects only
- Commercial solar lease



C-PACE

- Commercial Property Assessed Clean Energy



Gap Financing

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



www.ctgreenbank.com/multifamily

Affordable Multifamily Impact to Date



Partnership with CHFA – solar on 10 housing authorities supporting 1,300 rental units:

- Bristol, Brookfield, Colchester, Gales Ferry, Manchester, Middlefield, Newington, Trumbull, Wethersfield, Windsor Locks

Partnership with Capital for Change on LIME loan – 18 efficiency and solar projects supporting 1,292 affordable rental units

- Bridgeport, Chester, East Hartford, East Windsor, Farmington, Granby, Hartford, Manchester, Middletown, Milford, New Haven, Stamford, Thompson, Waterbury, West Hartford, West Haven

Support for Business Owners, Not-For-Profits, Municipalities & Schools

C-PACE

& Solar Lease Program

What is C-PACE?



100% low-cost, long-term financing for cost saving energy upgrades

Paid back over time via property assessment; remains with property

Energy cost savings create more competitive property

Assessment structure allows costs to be passed through to tenants

C-PACE provides building owners with:

1. Confidence
2. Control *and*
3. Comfort

Commercial-PACE DEEP Retrofits



- 82 cities and towns and opted into the program – over 85% of the market
- 200+ contractors trained
- 20 qualified capital providers
- 17 mortgage lenders have provided consent
- \$40 million warehouse – \$25 million in deals approved
- 33 transactions approved (\$700 K average size) – saving between 40-50% energy consumption
- **Sold \$30 million – first securitization of commercial energy efficiency projects**

paceSETTERS

PACESETTER: Brandon and Bob Winters, President, Energy Capital

C-PACE FINANCING: 0%

ENERGY SAVINGS: 10-15% over the life of the upgrade

RELOCATED SAVINGS: \$1.5M over the life of the upgrade

Be a **paceSETTER**. Get started at C-PACE.com

energy CT **cpace**

paceSETTERS

PACESETTER: Davis Giv, President and CEO and Greg Robinson, Director of Operations

C-PACE FINANCING: 0%

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Be a **paceSETTER**. Get started at C-PACE.com

energy CT **cpace**

CT Solar Lease 2



CT Solar Lease 1 – nation’s first residential PV financing program to combine ratepayer funds with private capital to leverage federal incentives

CT Solar Lease 2 (“SL2”)

- Residential
- Commercial:
 - Municipalities & Public Schools
 - Non-profit organizations*
 - Community Centers / YM-YWCAs
 - Private / Charter Schools
 - Houses of Worship
 - “Mid-market” commercial entities*
 - CRE: Office buildings, shopping centers / retail
 - Heavy to light industrial
 - Etc!!

\$75 MM
CLOSED
7.5:1

usbank

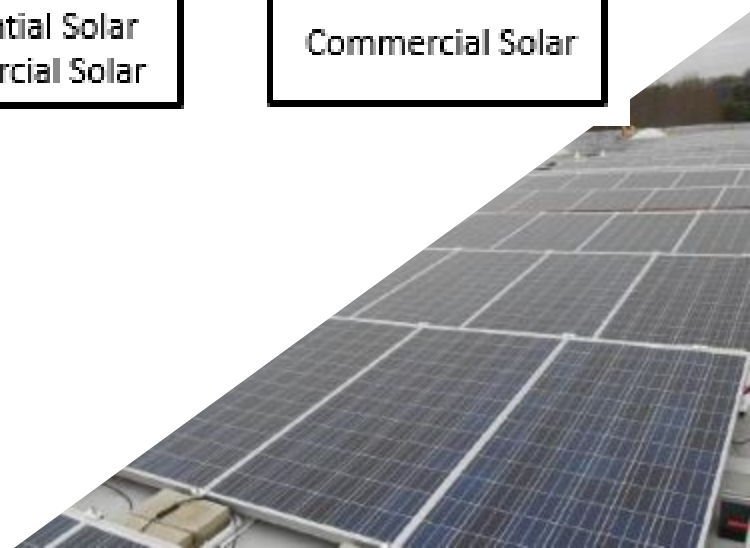
KeyBank Webster Bank

Residential Solar
Commercial Solar

\$60+ MM
OPEN
6:1³

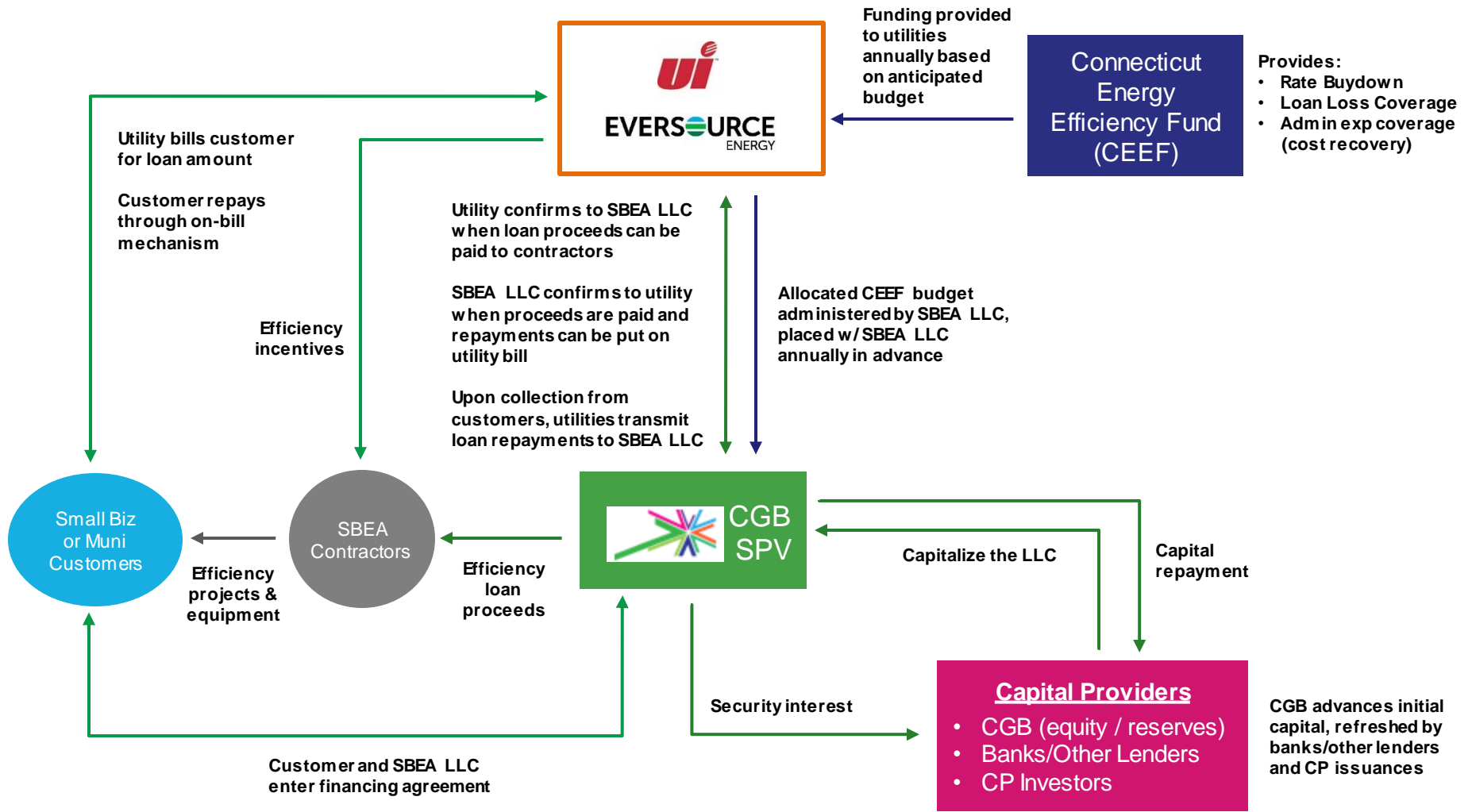
ONYX

Commercial Solar



SBEA Program Funding Structure

(Small Business Energy Advantage)



Lead by Example

Energy Savings for State Facilities



Opportunity

- State owns or leases nearly 4,000 buildings – at least 1,100 state buildings are sizeable and use significant amounts of energy
- An estimate of annual energy consumption in state buildings placed it at \$200 million annually and 4.1 trillion BTUs
- Energy savings could reach \$40 to \$60 million in annual savings on energy costs



Details

- DEEP developed standardized energy savings performance contract program – which municipalities can use as well – 13 qualified ESCO's and technical and financial support
- \$83 million of projects identified – CVH (\$33 MM – GO Bonds), DMV (\$5 MM – GO Bonds), and DOC (\$45 MM – CGB Green Bonds)



Bridgeport Fuel Cell Park

Utility-Scale Clean Energy Projects



- \$125 million 15-MW project
- Created nearly 140 jobs – construction, manufacturing and servicing
- Rehabilitated a former brownfield producing tax revenue for the city
- Distressed municipality
- Technology manufactured in Connecticut
- 2nd largest fuel cell power plant in the world
- Reduce over 85,000 tons of CO2 emissions
- **CTGB provided "back levered" financing to developer to attract buyer for the project (buyer demanded a cash reserve fund for O&M)**

CHP Projects

Micro Grids



- Section 103 of PA 11-80 (grants, loans, or PPAs)
- Several CHP projects in development – Norwalk Hospital, Wesleyan University, and Brown's Farm (Stamford)
- System efficiency > 50%
- Produce onsite clean energy – electricity and heat
- Long-term PPA's, virtual net metering, and other policies
- **CTGB to provide subordinated debt to attract equity, tax equity, and senior lenders**

New England Hydropower

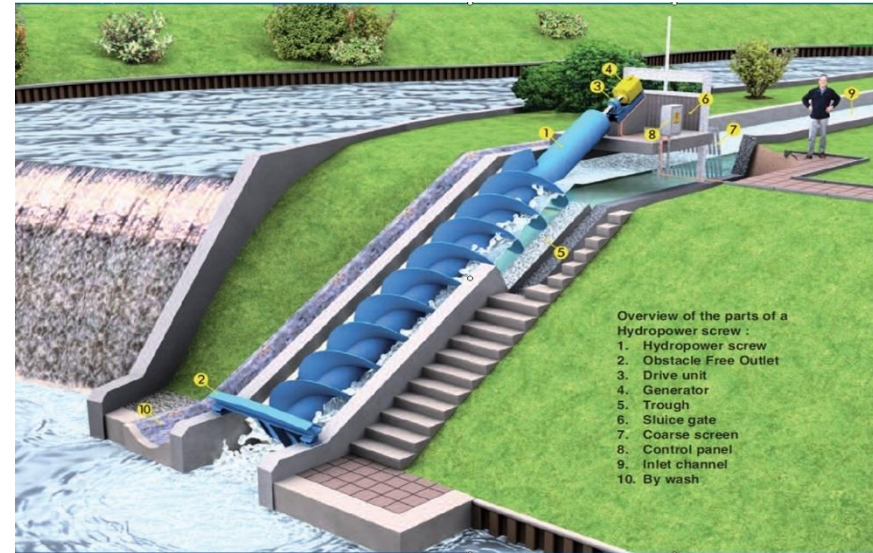
Run of the River Hydro

Overview – Meriden, CT

1. Unlock potential for small hydro in CT
2. Using established technology widely deployed in Europe (Archimedes Screw Generator)
3. Discounted electricity for the City while using VNM credits and ZREC

Details

- From Operational Demonstration (2011) to project finance with CREBs – working capital (Webster Bank), construction financing (First Niagara), and Green Bonds (Bank of America)
- 193 kW hydro-electric facility, producing about 1,000 MWh (equal to 115 homes)
- 30-year PPA with option to extend 10 additional years
- Ability to replicate throughout New England



Grid of the Future

Cleaner, Cheaper and More Reliable



Identify Improvement Location



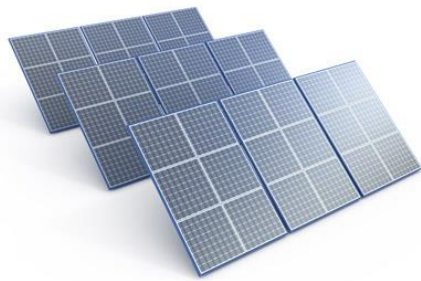
Individual Home Energy Score Assessment



Individual Solar PV Remote Assessment



DER System Planning



EE

RE

DR/RTT

Storage/EV

Green Bank Movement

Green Bank Movement

CT Leadership Nationally and Globally



MOTHERBOARD

VICE

How Green Banks Could Save the World



By Meredith Rutland Bauer
November 28, 2016

With environmental groups worried that a Donald Trump presidency could slow the implementation of renewable energy in the US, some clean energy advocates are turning to green banks for funding.

GREEN BANK NETWORK



NRDC
NATURAL RESOURCES
DEFENSE COUNCIL



**coalition for
green capital**



GREEN BANK ACT OF 2016

S 3382

HR 5802

Trump Infrastructure Plan



Working with ACORE, CDFA and others

Include clean energy transmission, distribution, and generation as infrastructure and grid modernization is key

Advocate for inclusion of an infrastructure green bank patterned after Green Bank-style financing (i.e., financing that leverages public resources to mobilize private investment in infrastructure)

Public Private Partnerships



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GREEN BANK SM

INNOVATE EDUCATE ACTIVATE ACCELERATE

Thank you!

Questions?

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