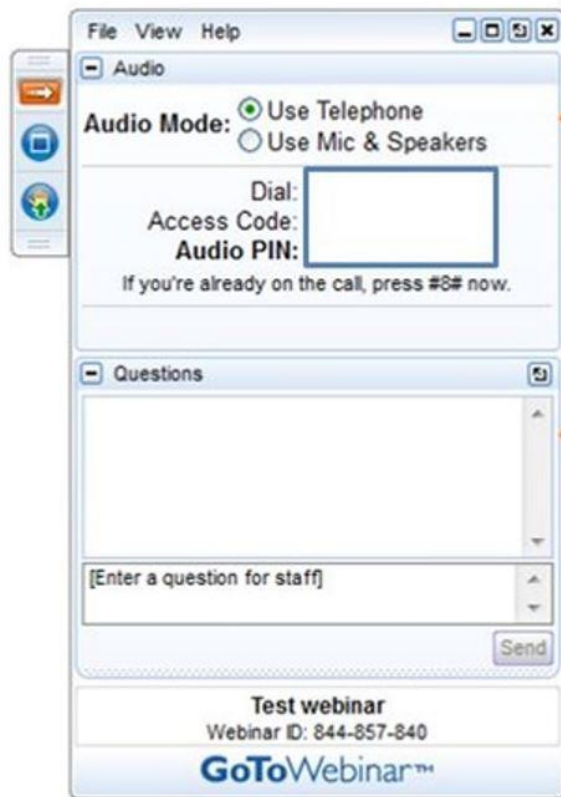


Designing Publicly Supported Solar Loan Programs

January 12, 2017



Housekeeping



All participants are in “Listen-Only” mode. Select “Use Mic & Speakers” to avoid toll charges and use your computer’s VOIP capabilities. Or select “Use Telephone” and enter your PIN onto your phone key pad.

Submit your questions at any time by typing in the Question Box and hitting Send.

This webinar is being recorded.

You will find a recording of this webinar, as well as all previous CESA webcasts, archived on the CESA website at

www.cesa.org/webinars

About CESA



Sustainable Solar Education Project

- Provides information and educational resources to state and municipal officials on strategies to ensure distributed solar electricity remains consumer friendly and benefits low- and moderate-income households.
- The project is managed by the CESA and is funded through the U.S. Department of Energy SunShot Initiative's Solar Training and Education for Professionals program.
- Sign up for the Sustainable Solar mailing list to receive our free monthly newsletter and announcements of upcoming events

www.cesa.org/projects/sustainable-solar



Presenters

Travis Lowder, Energy Analyst, National Renewable Energy Laboratory

Benjamin Healey, Director, Clean Energy Finance, Connecticut Green Bank

Moderator:

Nate Hausman, Project Director, Clean Energy States Alliance





Publicly Supported Solar Loan Programs: A Guide for States and Municipalities

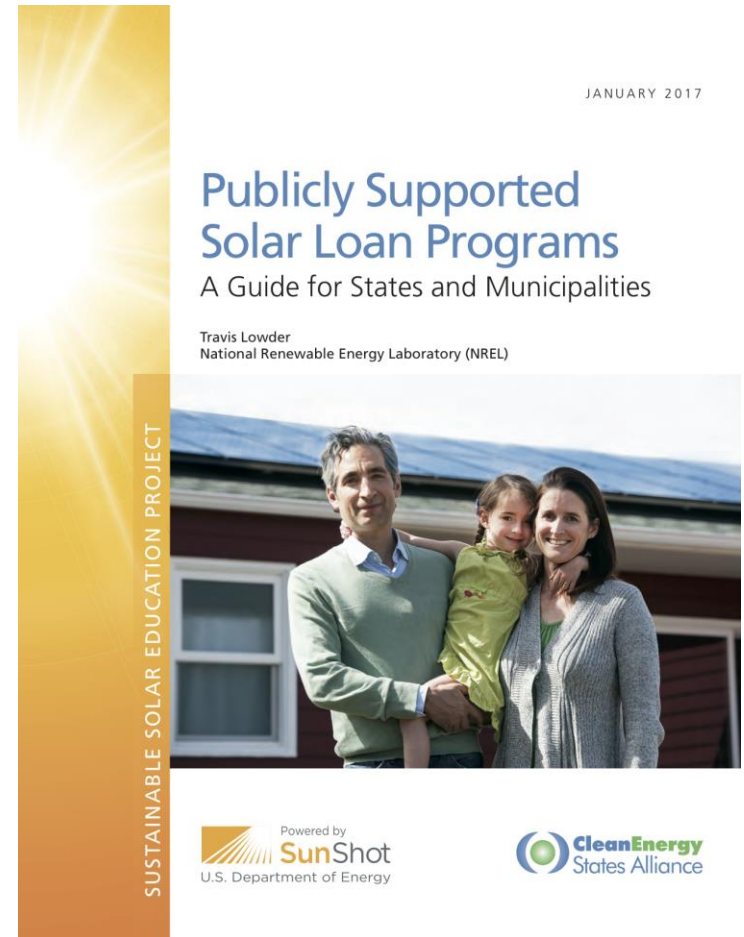
Travis Lowder

National Renewable Energy Laboratory

Thursday January 12, 2016

Why This Guide

- Residential solar is a growing economic sector
 - >50% annual growth 2010 – 2016
 - Employs over 100,000 people
- State and local governments have been, and will continue to be pioneers in clean energy deployment
- Education of officials is critical



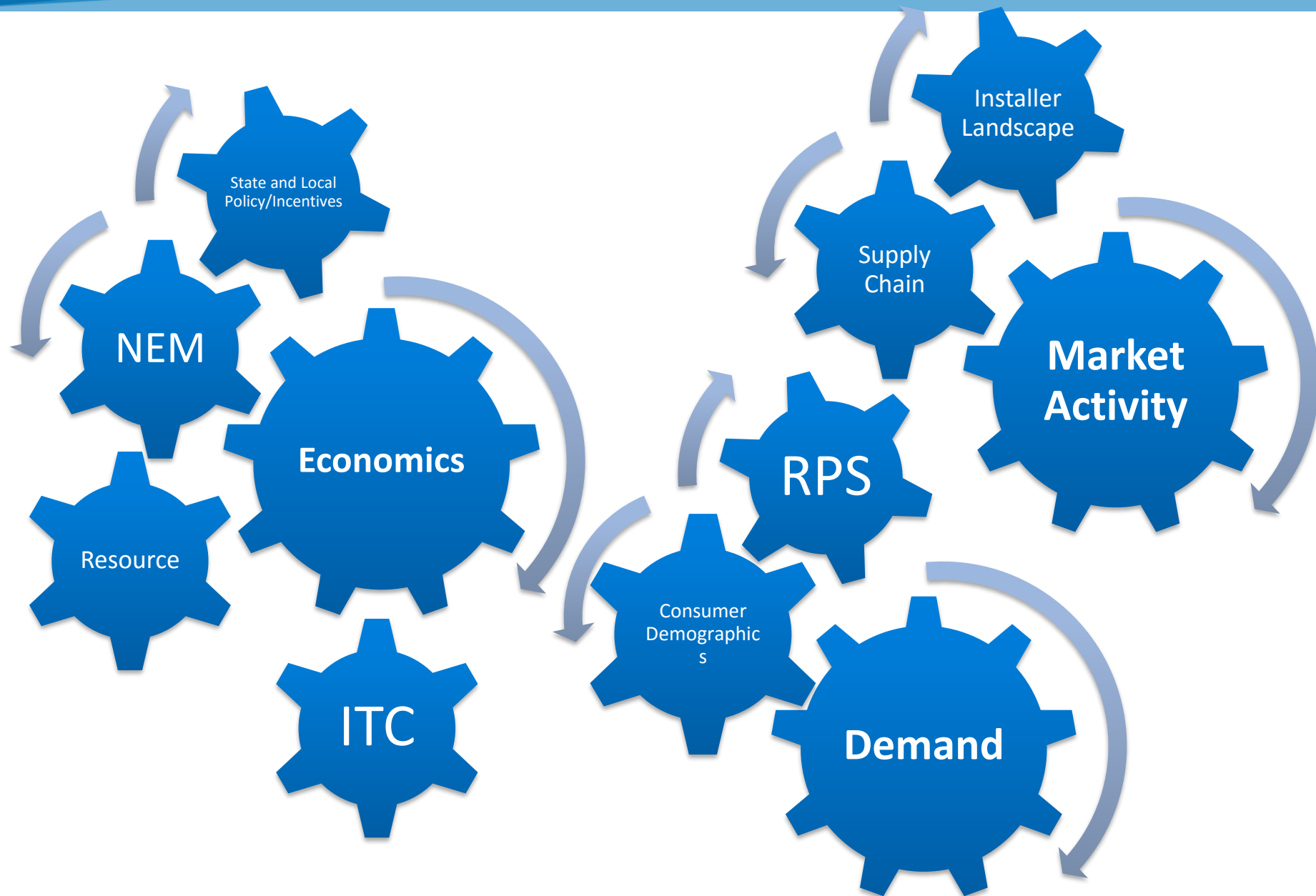
I. Preliminary Assessment

- Existing Financing Options
- Market Infrastructure and Demand
- Policy and Incentive Framework
- Funds

What's the Existing Market?

	Financing	Description	Lender	Term (years)	Interest Rates for High FICO Borrowers	Security Interest
Third-Party Ownership	Solar Lease	Contract whereby solar company retains ownership of system and host pays a fixed monthly fee for use of the solar equipment	TPO* Provider	Typically, 20	NA	Solar assets (i.e., the system) or unsecured
	Power Purchase Agreement	Contract whereby solar company retains ownership of system and host pays a per kWh charge for energy produced by that system	TPO Provider	Typically, 20	NA	Solar assets (i.e., the system) or unsecured
Public Programs and Private Lenders	Solar-Secured	A loan made to a borrower exclusively for the purchase of a solar system	Bank, CU** Other capital provider	5–20	2.99% +	Solar assets (i.e., the system) or unsecured
	Title I (HUD)	90% government-guaranteed loan secured by second lien on home	Program-approved Lenders	10–20	3% +	Lien on real property (second mortgage)
	203(b) & 203(k) Mortgages (HUD)	Federal Housing Authority-Insured mortgage (203[b]) and second mortgage (203[k]) that allow for additional principal amounts to finance energy-related upgrades	Program-approved Lenders	Up to 30	Varies	Real property
	On-Bill Mechanisms	Cost of energy upgrades are amortized via an additional line item on customers' electric bill	Bank, Utility, State	≤15	As low as 0%	Utility bill
	Home Equity	A loan or line of credit against the value of a home-owner's equity. Also called a 2nd mortgage	Bank, CU	≤30	4% +	Lien on real property (second mortgage)
	Fannie Mae HomeStyle Renovation Mortgage	A mortgage issued through approved lenders that allows for a 15% increase in the home's "as-completed" appraisal value for home upgrades, including solar	Bank, CU	15 & 30	Varies; adjustable rates available	Real property
	PACE***	A loan made via a property tax assessment and amortized through property tax bill	Bank, Municipality, Other capital provider	≤20	8% +	Tax lien

What's the Existing Market?



Funds

- System benefit (e.g. mill) charges on utility ratepayer bills
- Alternative compliance payments from state RPS/REC program
- State general funds
- State or local appropriations for specific agencies (e.g. green bank or clean energy fund) that do not come out of the general fund
- Utility payments resulting from lawsuit settlement
- Repurposed ARRA funds

II. Program Design and Implementation

- Choosing the Credit Enhancement
- Administration and Agency Architecture
- Stakeholder Engagement, Program Partners, and Vendors
- Product Specifications
- Implementation

Credit Enhancements

Mechanism*	Leverage	Cost**	Complexity	Examples (see Section 4)
LLR	+++	\$--\$	Low	Milwaukee Shines, UVA PowerSaver
IRBD	++	\$--\$\$\$	Mid	Mass Solar Loan, UVA PowerSaver
Direct Payments	+	\$--\$\$\$	Low	Mass Solar Loan
Warehousing	++ - +++	\$\$\$	High	Connecticut Green Bank
Sub. Capital	++ - +++	\$--\$\$\$	Mid-High	Connecticut Green Bank

* All rankings are relative to the selected instruments and do not include mechanisms that have not been discussed here.

** Cost indicates the likely expenditure level at which the program achieves its deployment goals.

Loan Loss Reserve (LLR)

- A fund set aside to provide backstop to a portfolio of loans
- Functions as a guarantee against defaults

Mechanism*	Leverage	Cost**	Complexity	Examples
LLR	+++	\$ - \$\$	Low	Milwaukee Shines, UVA PowerSaver

Interest Rate Buydown (IRBD)

- A payment to a lender as compensation for a reduction in borrower interest rate
- Effectively amounts to a reduction in credit risk for the lender and does not result in any change in the actual cash payments it will receive over the life of the loan.

Mechanism*	Leverage	Cost**	Complexity	Examples
IRBD	++	\$\$ - \$\$\$	Mid	Mass Solar Loan, UVA PowerSaver

Direct Payments

- In addition to IRBDs, credit enhancement funds can be paid directly to any of the parties for the purpose of reducing the upfront system price, though not necessarily the interest rate
- In this sense, the credit enhancement functions more like a grant or a direct financial incentive

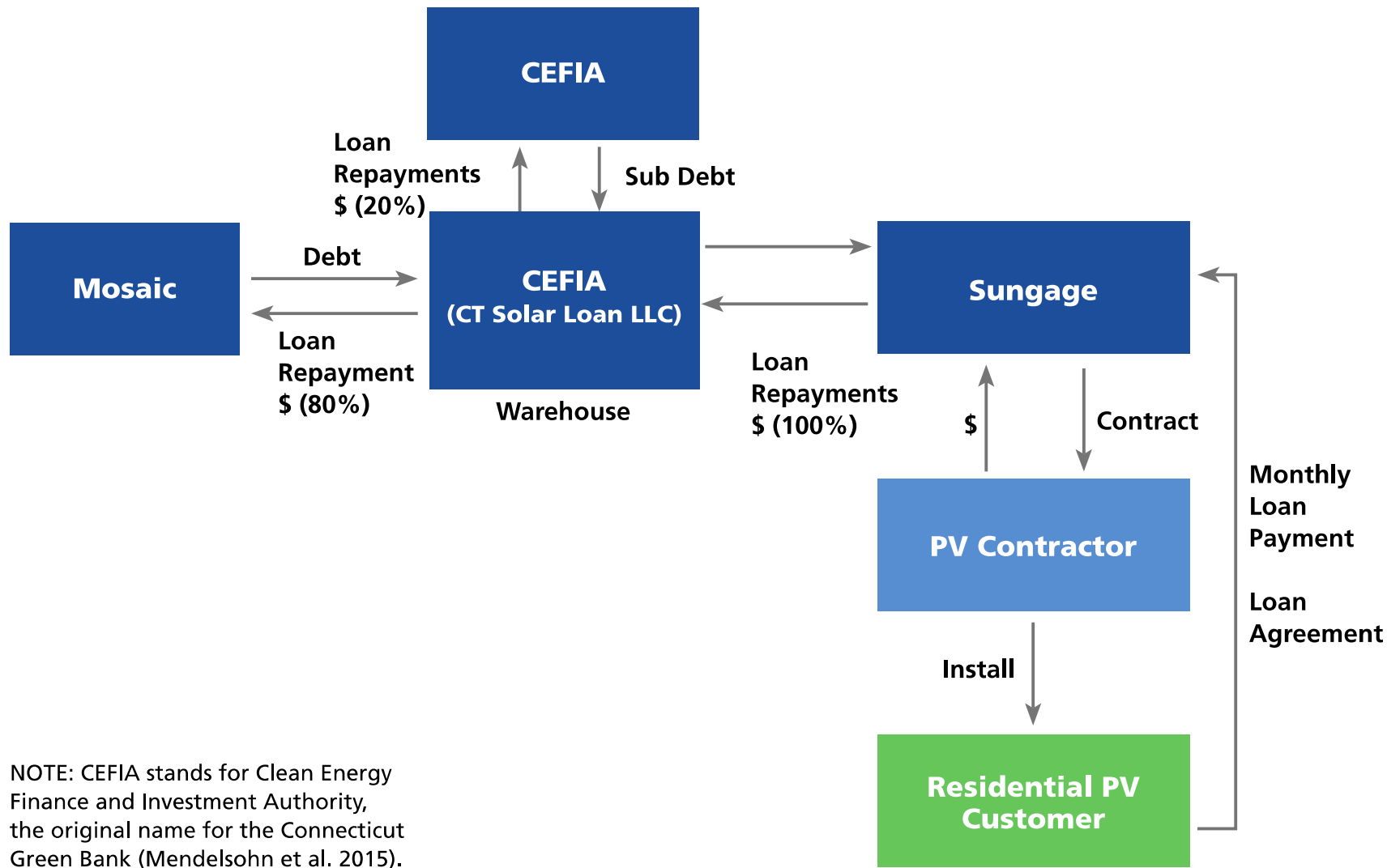
Mechanism*	Leverage	Cost**	Complexity	Examples
Direct Payments	+	\$\$ - \$\$\$	Low	Mass Solar Loan

Warehousing

- A fund that purchases and pools assets with the intention of “selling them down” to another entity later (e.g. as a securitization)
- Financial intermediary service normally provided by well-capitalized private sector entities

Mechanism*	Leverage	Cost**	Complexity	Examples
Warehousing	++ - +++	\$\$\$	High	Connecticut Green Bank

Warehousing



Subordinated Capital

- An investment, usually from a public entity, that is “subordinate” to a private investor
- The subordinated capital is first in line to bear default risk and last to be paid back from cash flows

Mechanism*	Leverage	Cost**	Complexity	Examples
Sub. Capital	++ - +++	\$\$ - \$\$\$	Mid - High	Connecticut Green Bank

Administration and Agency Architecture

- Who will administer?
 - Existing agency
 - New agency
 - Green Bank
 - Program partner
- Consider costs, FTE requirements
- Consider necessary infrastructure
 - Web platform
 - Program participant vetting
 - Application clearinghouse and document processing

Stakeholder Engagement

- Needs assessment for:
 - Program Partners (banks, credit unions, fincos)
 - Solar installers (vendors)
- Program design options
 - What works? What doesn't?
 - What design frameworks will encourage participation?

Implementation

- Approvals
 - What level of government sign-off?
- Accountability and transparency
 - Success metrics
 - Public feedback
- Duration
 - At what point does the government step back and allow the private market to take over?
- Marketing
 - How are consumers being notified of the program?

III. Case Studies

Loan Program*	Type of Support	Initial Support Fund	Tenor	Max Interest Rate	Max Principal Amount	Program Administrator	Lender/ Originator
Mass Solar Loan	LLR, direct payments (income-based), IRBD	\$30 million	Lenders must offer 10-year term, but otherwise discretionary up to 20 years	WSJ Prime + 2.75% (fixed)**	\$60,000	MassCEC	13 partner banks and credit unions
CT Solar Loan	Warehouse LLR, subordinated debt	\$5 million	15 years	6.49%		CT Green Bank	Sungage Financial
UVA Community Credit Union PowerSaver	IBRD, FHA-insurance	\$100,000	Up to 15 years	4.99%	\$35,000	UVA Community Credit Union	UVA Community Credit Union
City of Milwaukee Solar Loan	LLR	\$100,000	Up to 15 years	WSJ Prime + 1.50% (fixed)	\$20,000	City of Milwaukee	Summit Credit Union

* All loan terms are current as of the publication of this guide except for the CT Loan, which is no longer available.

** This is the maximum "gross" interest rate, though because of the IBRD, the ultimate interest rate to the borrower is less.

www.nrel.gov





CT Solar Loan

January 12, 2017

1st Green Bank in US

Mission and Goals



Support the Governor's and Legislature's energy strategy to achieve cheaper, cleaner, and more reliable sources of energy while creating jobs and supporting local economic development

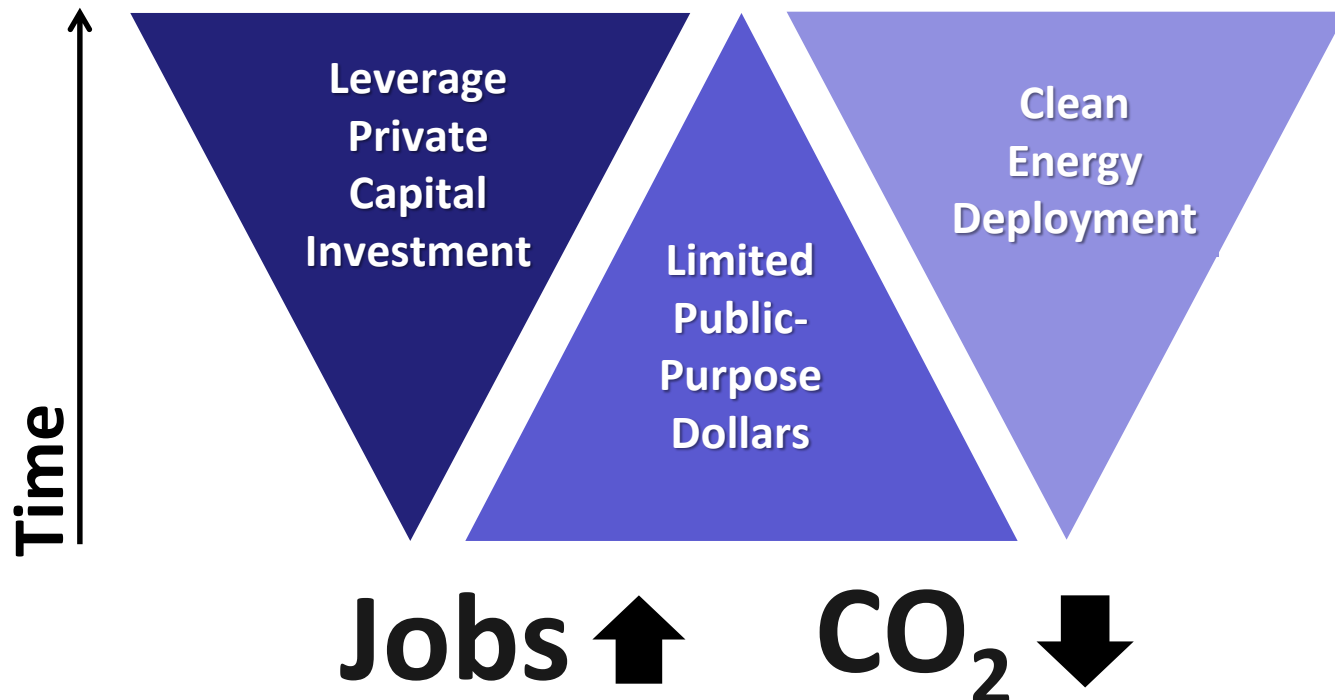
- Attract and deploy private capital to finance the clean energy goals for Connecticut
- Leverage limited public funds with multiples of private investment, returning and reinvesting public funds for further clean energy deployment
- Develop and implement strategies that bring down the cost of clean energy in order to make it more accessible and affordable to consumers
- Support affordable and healthy buildings in low-to-moderate income communities by reducing their energy burden and addressing health and safety issues

Connecticut Green Bank



Model and Role

- The quasi-public model leverages the power of markets to advance policy goals and create a social good.
- The role of a green bank is simple; attract and deploy private capital investment in cleaner and more reliable sources of energy so that *clean energy* is more accessible and affordable to consumers



Connecticut Green Bank

Model and Role



- **Quasi-public organization** – created by PA 11-80 and successor to the Connecticut Clean Energy Fund
- **Focus** – finance clean energy (i.e. renewable energy, energy efficiency, and alternative fuel vehicles and infrastructure)
- **Balance Sheet** – approximately \$120 million in assets
- **Support** – supported by a \$0.001/kWh surcharge on electric ratepayer bills (about \$10 per household per year) that provides approximately \$27-30 MM a year for investments, RGGI about \$5 MM a year for renewable energy, federal competitive solicitations (i.e. SunShot Initiative) and non-competitive resources (i.e. ARRA-SEP), private capital, and private foundations

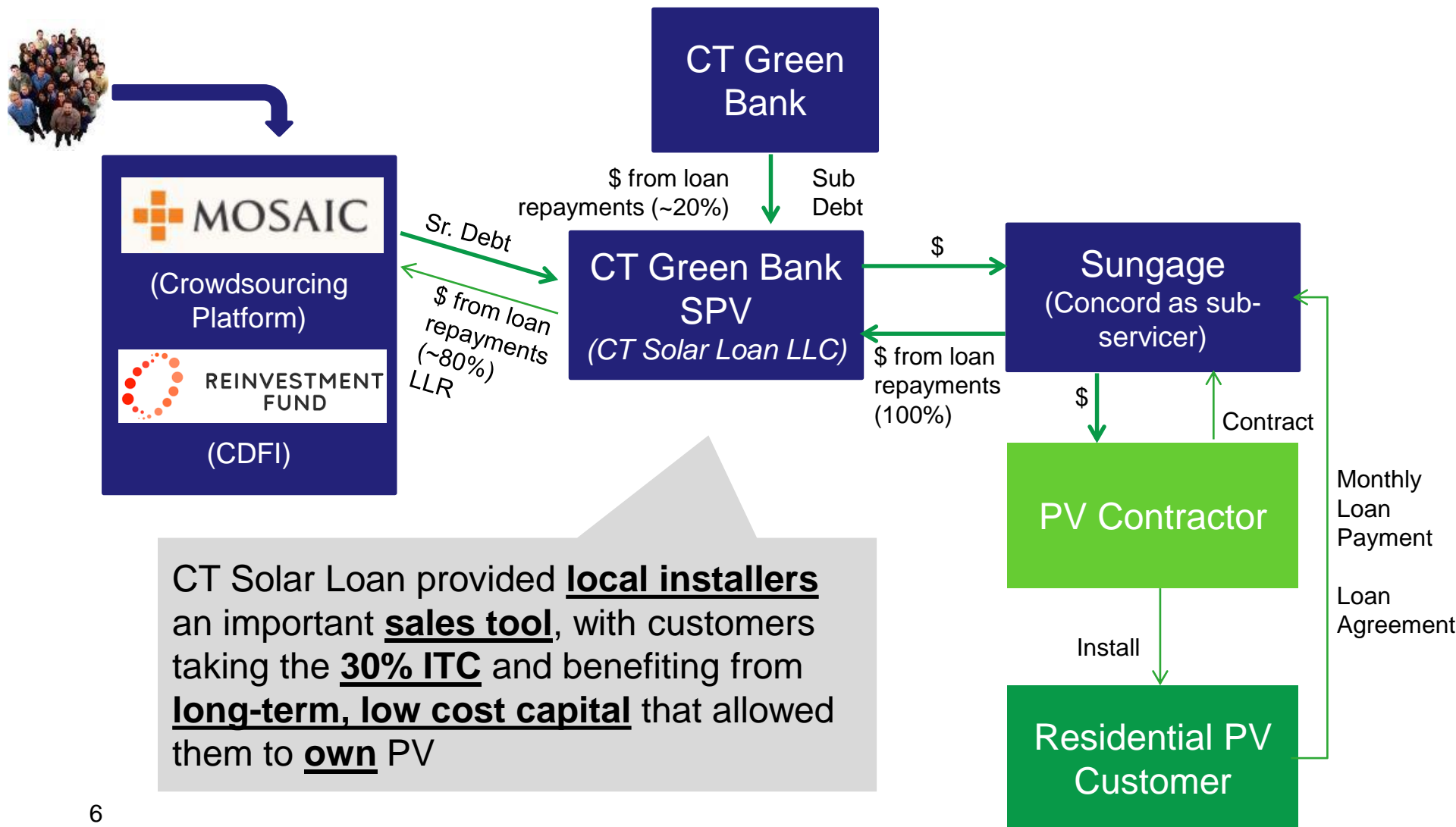
CT Solar Loan



The Stout Family
Newtown, CT

CT Solar Loan

Basic Financial Structure



CT Solar Loan provided **local installers** an important **sales tool**, with customers taking the **30% ITC** and benefiting from **long-term, low cost capital** that allowed them to **own** PV

CT Solar Loan

Approach:

1. Enter a market
2. Bring product to scale
3. Graduate product / partner
4. Repeat

Example: CT Solar Loan



Mosaic and Connecticut Team Up On Crowd Funding of Residential Solar



Mosaic has partnered with Connecticut Green Bank and Sungage Financial to package loans made to homeowners...

Michael Puttre (February 2014)



Sungage Financial Secures \$100 Million for Solar Loan Program



Following its participation in the CT Green Bank solar loan program, the Boston startup is aiming to expand residential solar loans on the East Coast.

Edgar Meza (November 2014)

\$5MM Crowdfund + CDFI → \$100MM Private

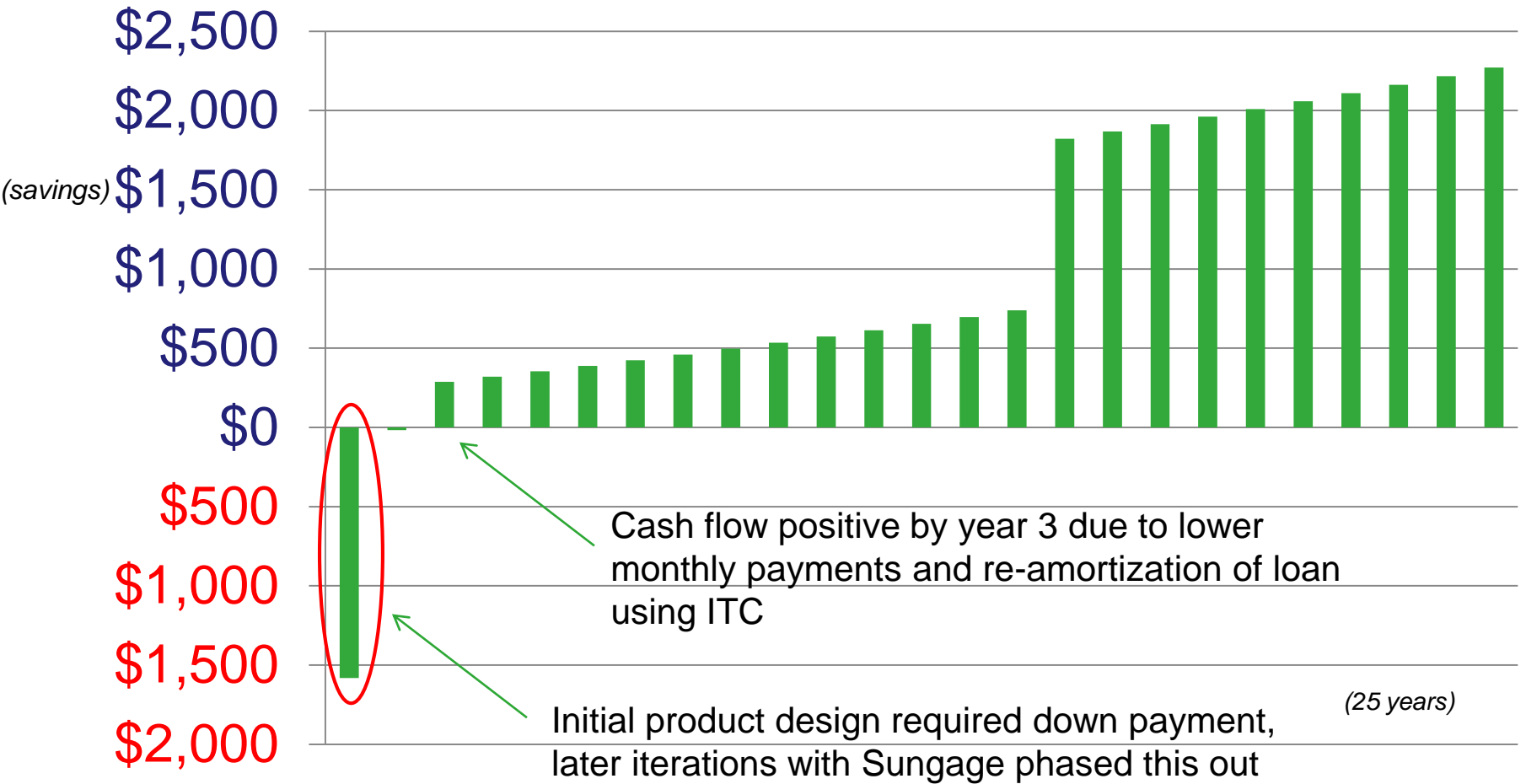
CT Solar Loan Program Specifics



Loan Terms	Terms and Conditions
Interest Rate	6.49% per year
Term	15 years
Down payment	Evolved to a zero-down payment product
FICO Score	≥ 680
Re-amortization	Yes, via use of ≥ 80% of ITC proceeds
Assignability	Yes, so long as new homeowner meets credit criteria of CT Solar Loan

CT Solar Loan

Annual Cash Flows



Thank You

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