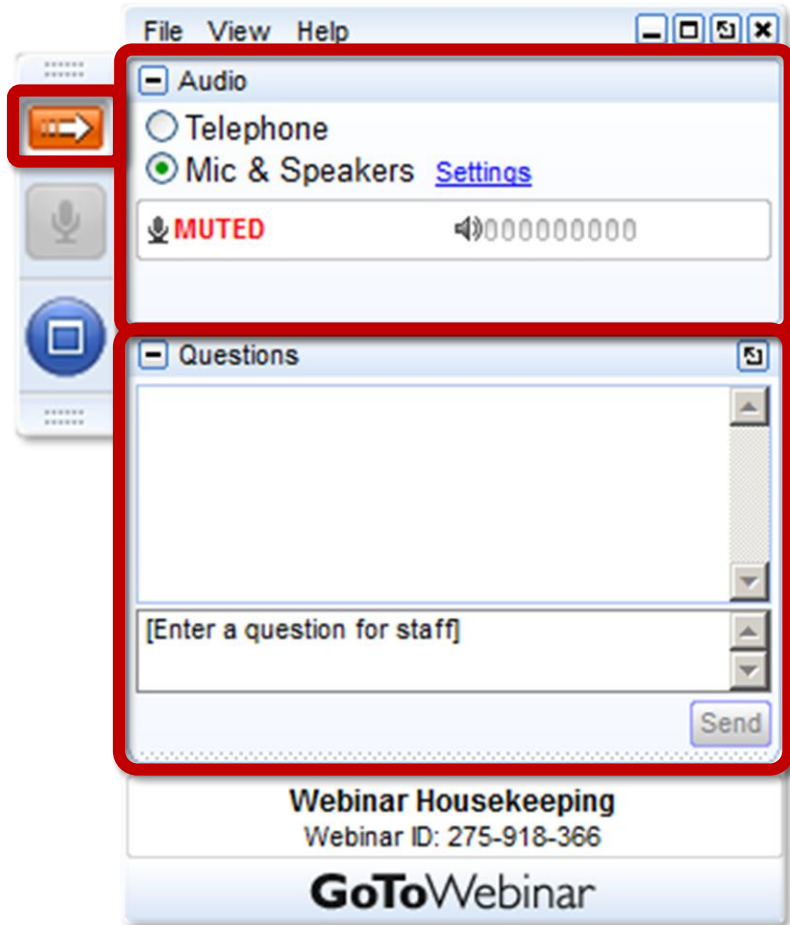


Promising Solar PV Financing Strategies for Low- and Moderate-Income Customers

March 1, 2018



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Celebrating 15 Years of State Leadership

Clean Energy States Alliance



Illinois Department of Commerce & Economic Opportunity



NYSERDA



Office of the People's Counsel
District of Columbia
Advocating, Protecting and Educating DC Consumers



Sustainable Solar Education Project

A project to provide information to state and municipal officials on strategies to ensure distributed solar

- Remains consumer friendly
- Benefits low- and moderate-income households



The project is managed by the Clean Energy States Alliance (CESA) and is funded through the U.S. Department of Energy Solar Energy Technologies Office.



Sustainable Solar Education Project Resources

The project offers a variety of free resources on solar equitability and consumer protection:

- Guides
- Webinars
- Monthly e-newsletter
- In-person workshops



www.cesa.org/projects/sustainable-solar

Promising Solar PV Financing Strategies for Low- and Moderate-Income Customers

- **Lori Bird**, National Renewable Energy Laboratory
- **Jeff Cook**, National Renewable Energy Laboratory
- **Diana Chace**, Clean Energy States Alliance
(moderator)





Unlocking Solar for Low- and Moderate-income Residents: A Matrix of Financing Options by Resident and Housing Type

Jeff Cook and Lori Bird

3/1/2018

Project Objective

- Objective
 - Develop a matrix of the top financing options for various housing types
 - Understand factors that impact effectiveness of financing approaches
- Focus is on 3 common housing types:
 - Single-family Housing
 - Multi-family Housing (2+ units)
 - Manufactured Housing



Background

- Key barriers to LMI resident adoption of solar include:
 - Upfront costs or high cost of participation
 - Homeownership
 - Unsuitable home conditions
- Key factors that influence the effectiveness of financing options for LMI customers:
 - Housing type
 - Renter vs homeowner
 - Federal housing subsidies (e.g., HUD)



Financing Option Tradeoffs

- Financing options can have key tradeoffs that may be important to policymakers:
 - Cost to taxpayers
 - Upfront cost barrier
 - Deployment potential
 - LMI customer benefits

Financing Option	State Administration Considerations		LMI Market Considerations		
	Ease of Implementation	Potential for External Investment ^a	Up-Front Cost Impact	Resident Benefit	Market Potential
Bulk Purchasing	●	●	○	○	○
Capital Refinancing	●	●	●	◐	○
Crowdfunding	●	●	●	●	○
Direct Cash Incentives	○	○	●	●	●
Solar Hosting	●	●	●	○	◐
Low-Interest Loans	○	◐	●	◐	◐
LIHEAP/WAP ^b	○	◐	●	●	●
Net Metering	◐	●	○	●	●
On-bill Financing	◐	●	●	●	◐
PACE	◐	◐	●	◐	◐
Production Incentives	○	○	○	●	●
Tax Incentives	○	○	○	◐	◐
Third-party Leasing/ESA	◐	●	●	◐	●

^a External investment may come from a variety of actors such as the federal government, local governments, philanthropies, or the private sector.

^b Low-Income Home Energy Assistance Program/Weatherization Assistance Program



Summary Financing Matrix

- Financing options vary for:
 - LMI residents
 - Building owner or developer

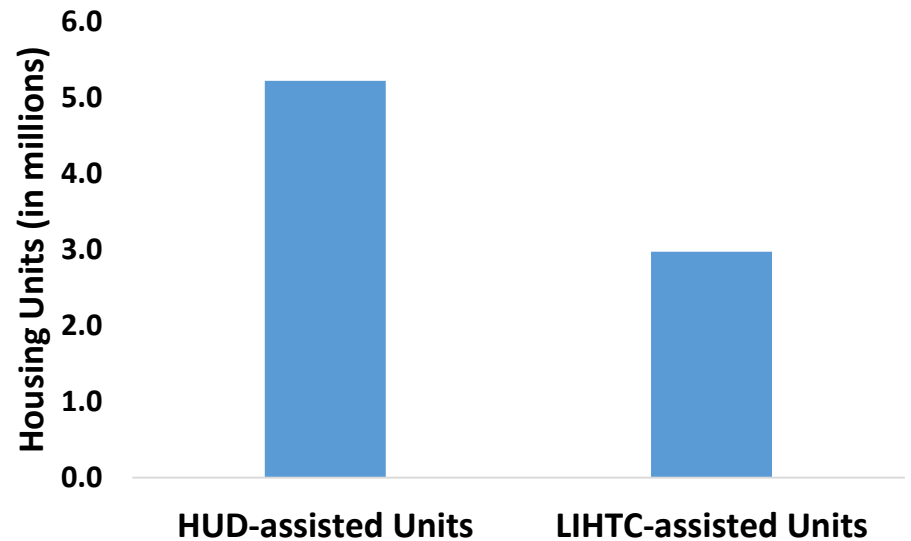
Financing Option	Single-Family Housing (Owner-Occupied)	Multifamily Housing Provider	Manufactured Housing Provider	Any LMI Tenant or Homeowner (Community Solar)	Community Solar Developer
Bulk Purchasing					
Capital Refinancing					
Crowdfunding					
Direct Cash Incentives					
Solar Hosting					
Loans					
LIHEAP/WAP ^a					
Net Metering					
On-bill Financing					
PACE					
Production Incentives					
Tax Incentives					
Third-party Leasing/ESA					

^a Low-Income Home Energy Assistance Program/Weatherization Assistance Program

Top Financing Options by Housing Type

Federally-supported Housing Considerations

- Federal subsidies can influence the financing options available to LMI residents
- Federal assistance is available across housing types
- Subsidies can impact:
 - Benefits to residents
 - Approvals needed
- Most federal support is provided by:
 - U.S. Department of Housing and Urban Development (HUD)
 - The Low Income Housing Tax Credit Housing (LIHTC)



Federally-supported Housing by Type

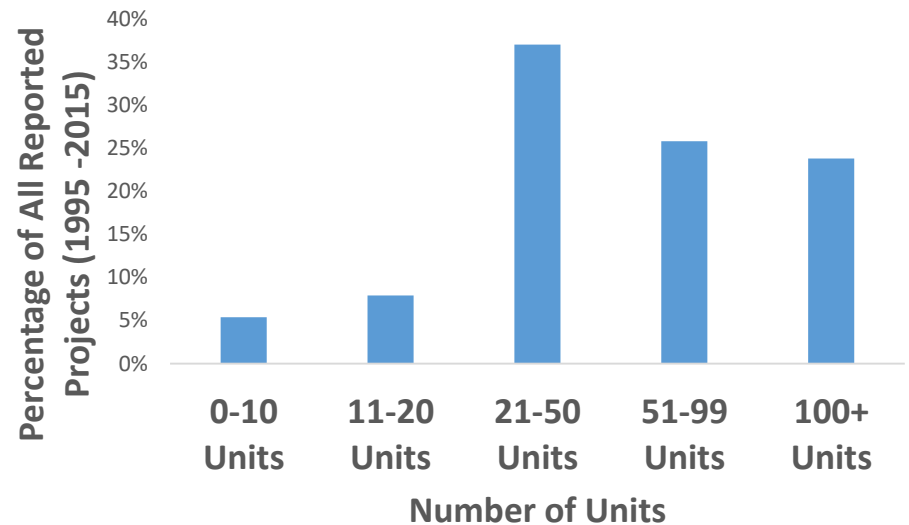
Considerations for HUD-subsidized Housing

- HUD Programs
 - Public Housing
 - Project-based Rental Assistance
 - Tenant-based Rental Assistance
- Key barriers to solar adoption
 - HUD approval may be required
 - Building metering
 - Individual metering
 - Master meeting
 - Utility allowance methodology
 - Asset-based
 - Community-based
 - Site-specific



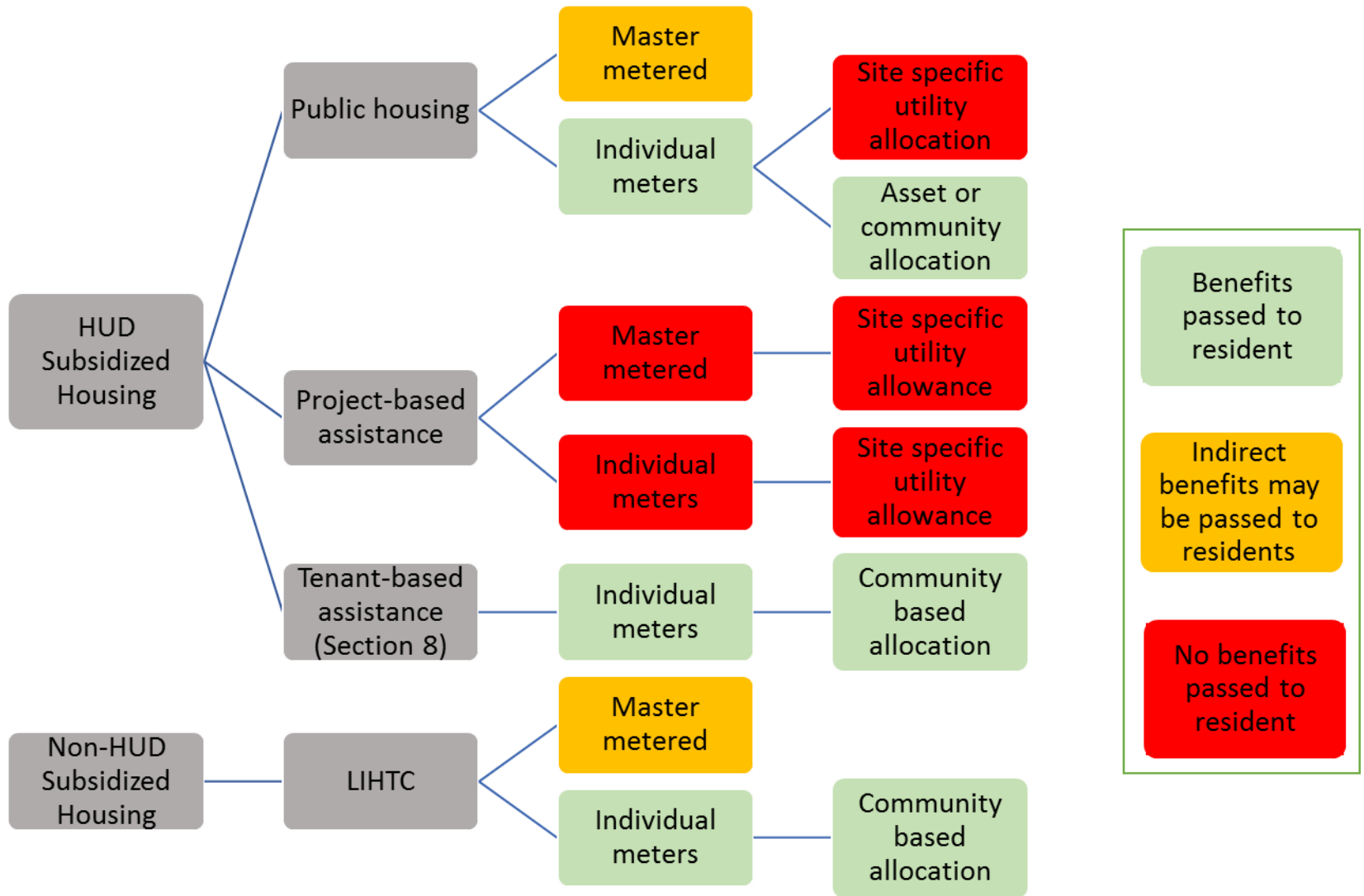
Considerations for LIHTC Housing

- LIHTC housing is NOT regulated by HUD
 - No HUD approval necessary
- Individual metering is prevalent
- Utility allowances typically use community-based methodology



LIHTC Housing Size Characteristics from 1995 – 2015

Options for Solar Procurement in Federally Supported Housing and Potential Benefits to LMI Residents



Single-family Housing

Single Family Homes (Detached)

- Key Challenges
 - Homeownership
 - Building condition
- Owners
 - On-site: available
 - Off-site: available
- Renters
 - On-site: limited
 - Off-site: available



Top Financing Options for Owner-occupied Homes

- LIHEAP/WAP
 - Colorado Rooftop Solar Program
- Direct Cash Incentives
 - California Single-family Affordable Solar Housing
- On-bill Financing
 - Ouachita Cooperative in Arkansas
- Loans
 - Massachusetts' Solar Loan Program
- Third-party Leasing/ESA
 - PosiGen in Connecticut



Multi-family Housing

Multi-family Housing

- Key Challenges
 - Landlord approval requirements
 - Building Metering
 - Mass metered
 - Individually metered
- Landlord
 - On-site solar: available
 - Off-site solar: available
- Resident
 - On-site solar: limited
 - Off-site solar: limited



Top Financing Options for Multi-family Housing Providers

- Capital Refinancing
 - Anecdotal evidence
- Third-party Leasing/ESA
 - Denver Housing Authority
- LIHEAP/WAP
- On-bill Financing
- PACE
 - California has launched a PACE pilot



Manufactured Housing

Manufactured Housing

- Key Challenges
 - Ownership structure
 - Home AND lot
 - Roof suitability
- Landlord
 - On-site solar: available
 - Off-site solar: limited
- Resident
 - On-site solar: limited
 - Off-site solar: available



Top Financing Options for Manufactured Housing Providers

- LIHEAP/WAP
 - Eligibility uncertain for ground-mounted systems
- Third-party Leasing/ESA
- Direct Cash Incentives
 - Vermont McKnight Lane Project
- Tax Incentives
 - Huntington Shorecliffs in California
- PACE
 - Huntington Shorecliffs in California




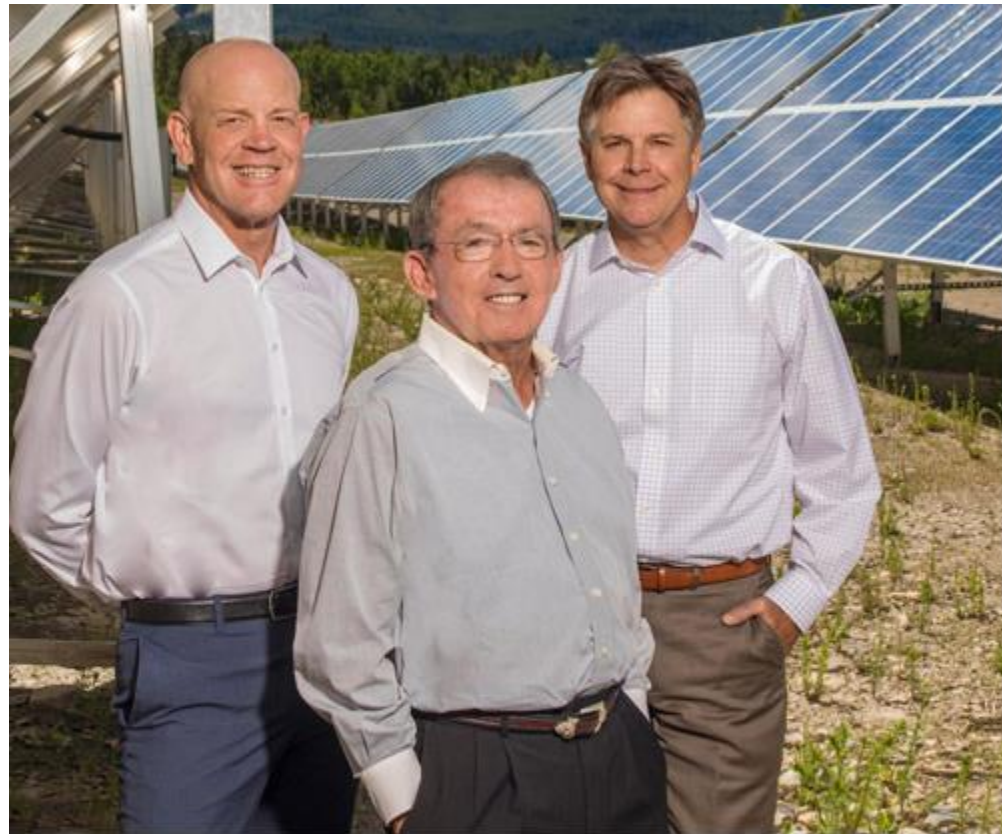
Community Solar

Community Solar Financing Options for Residents

- On-bill Financing
 - Green Valley Power Cooperative in Colorado
- Loans
 - Massachusetts Solar Loan Program
- Direct Cash Incentives
 - Rhode Island: \$500 grant for LMI customer participation
- Tax Incentives
 - Alpine Bank in Colorado
- LIHEAP/WAP



A Touchstone Energy® Cooperative 



Thomas Davidson, Summit County commissioner; Tim Braun, Clean Energy Collective director of public affairs; and Bob Young, founder and chairman of Alpine Bank at the community-owned Breckenridge Ullr Solar Array.

Community Solar Financing Options for Developers

- Direct Cash Incentives
 - Colorado LMI community solar demonstration projects
- Production Incentives
 - Massachusetts SREC-II program
- Tax Incentives
 - New Market Tax Credit
- Crowdfunding
- Net Metering



Financing Matrix Revisited

- Top financing options
 - LIHEAP/WAP
 - Direct Cash Incentives
- Caveats
 - The most appropriate financing is context-specific
 - Financing packages can be especially attractive

Financing Option	Single-Family Housing (Owner-Occupied)	Multifamily Housing Provider	Manufactured Housing Provider	Any LMI Tenant or Homeowner (Community Solar)	Community Solar Developer
Bulk Purchasing	◐	◐	◐	◐	◐
Capital Refinancing	◯	●	◯	◯	◯
Crowdfunding	◐	◐	◐	◐	●
Direct Cash Incentives	●	◐	●	●	●
Solar Hosting	◐	◐	◐	◐	◯
Loans	●	◐	◐	●	◐
LIHEAP/WAP*	●	●	●	●	◯
Net Metering	◐	◐	◐	◐	●
On-bill Financing	●	●	◯	●	◯
PACE	◐	●	●	◐	◯
Production Incentives	◯	◯	◯	◯	●
Tax Incentives	◯	◯	●	●	●
Third-party Leasing/ESA	●	●	●	◯	◯

* Low-Income Home Energy Assistance Program/Weatherization Assistance Program

Questions

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One Year In – Energy Storage Proves its Worth in Sterling, MA

Wednesday, March 7, 1-2pm ET

The Status of State Grid Modernization Efforts

Friday, March 9 , 1-2pm ET

Valuing Resilience: Exploring the Role of Solar+Storage in Grid Outages

Wednesday, March 14, 1-2pm ET

New Financing Options for Solar+Storage in Low-Income Communities

Thursday, March 29, 1-2pm ET

Read more and register at www.cesa.org/webinars