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CLEAN ENERGY
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Memo

To: Connecticut Green Bank Board of Directors

From: Kerry O'Neil, Director of Residential Programs; Kim Stevenson, Associate Director of Multifamily Programs; Ben Healey, Assistant Director of Clean Energy Finance

CC: Bryan Garcia, President and CEO; Bert Hunter, EVP and CIO; Mackey Dykes, VP and COO; Brian Farnen, General Counsel and CLO

Date: December 12, 2014

Re: Role of a Green Bank – Low Income Solar Deployment

The Residential Solar Investment Program (RSIP) is a quintessential green bank model program. Since the start of the program in 2012, subsidies from the Connecticut Green Bank have decreased by nearly 60% per installed kilowatt (i.e., from $1.78/W in 2012 to $0.76/W in 2014), while the deployment of rooftop solar PV has increased by 650% (i.e., 5.5 MW in 2012 to 35.8 MW in 2014). Investment in residential solar PV deployment has gone from $27 million in 2012 to $156 million in 2014. While the deployment of residential solar PV has increased dramatically across Connecticut, harder to reach customer segments such as low income have not been nearly as successful (see Market Analysis of Residential Solar Deployment and Housing Characteristics of Connecticut's Low Income Sector memo of December 12, 2014). This memo provides an overview of the challenges ahead and proposes steps forward under consideration by the staff in order to engage the Board of Directors in a conversation on the role of the Connecticut Green Bank.

INTRODUCTION

The purpose of this memo is to respond to the Connecticut Green Bank (Green Bank) Board of Director's August 2014 request for staff to detail solar deployment in Connecticut's low income communities and discuss strategies to achieve greater adoption among this demographic. This memo will address:

- The level of residential solar deployment in the low income segment
- Defining characteristics of Connecticut's low income housing market
- Overview of current Green Bank initiatives supporting solar for low income residents
- Proposed priorities, strategies, initiatives, and future policies

RESIDENTIAL SOLAR DEPLOYMENT IN THE LOW INCOME SECTOR

As shared with the Board of Directors at the October 17, 2014 meeting, residential solar is predominantly deployed in moderate and higher income communities in Connecticut, as

expected. Higher relative penetration rates are also seen in communities with strong Solarize campaigns. See the December 12, 2014 CGB Board memo "Market Analysis of Residential Solar Deployment and Housing Characteristics of CT's Low Income Sector" (Market Analysis Memo) for a detailed analysis on current solar deployment in the state, broken out by income bands and census tracts.

The Green Bank is making inroads into lower income communities, but there is significant room for improvement. For example, as the table below shows, current solar penetration rates (in terms of kW installed per capita) in lower income communities strongly lag those of middle and upper class neighborhoods:

- Census tracts at < 60% of area median income (AMI) have **1/10th** the kW per capita of tracts at >80% AMI; and
- Census tracts at 60% to 80% of AMI have **1/4th** the kW per capita of tracts at >80% AMI.

Income Level[1]	# of Census Tracts	Population	# of Projects	Projects per Capita	kW Installed	kW Installed per Capita
<60% AMI	179	651,267	257	.00039	1,422	.00218
60-80% AMI	113	518,459	473	.00091	2,950	.00569
>80% AMI	532	2,395,353	6,756	.00282	48,284	.02016
Total	824	3,565,079	7,486	.00210	52,656	.01477

However, the data also confirms that concentrated and targeted marketing and outreach campaigns can lead to higher than average solar penetration in low income communities. To date, six Solarize campaigns have been run in distressed communities: Bridgeport, Enfield, Montville, Torrington, West Haven and Windham. When looking at the kW per capita in these communities compared to the statewide averages there is:

- 27% higher penetration in <60% AMI census tracts
- 21% higher penetration in 80%-60% AMI census tracts
- Across all census tracts in these 6 communities, the penetration was at 95% of the statewide penetration rate, *almost* at parity

To date the Green Bank and its predecessor organization has invested $103.5 million in residential solar incentives. Solar installed in low income census tracts represents about 8% of the total installed to date, for an estimated investment of $8.6 million in solar incentives in low income tracts. Additionally, 2 C-PACE affordable multifamily solar projects have been financed for $400,000.

The data clearly demonstrates that the challenge in front of us is significant – and we need to be strategic, patient, and diligent, and commit to investing the time and resources, if we hope to make a meaningful impact.

[1] Median Household Annual Income statewide is $76,377, for <60% AMI it is <$45,826, for 80%-60% AMI it is $45,826 - $61,102, and for >80% AMI it is >$61,102.

Recent Green Bank customer segmentation analysis has revealed that going solar resonates with a wide range of income groups and customer profiles, including a customer segment unique to Connecticut that skews older and lower in income. The identification of this specific customer segment is encouraging, as it will support targeted messaging and outreach to a subset of the low income market.

DEFINING CHARACTERISTICS OF CT'S LOW INCOME HOUSING MARKET

Low income housing, defined as units with residents at 80% of area median income or below, represents about 507,000 units or 34% of Connecticut's total housing units. Properties with low income residents run the gamut from single family owner occupied homes, to small and large investor owned buildings. Our analysis shows a clear correlation between lower incomes and high concentrations of renters living in older buildings – predominantly in the core cities, and scattered across the northeastern and northwestern quiet corners of the State.

Connecticut's low income housing market generally falls into the following categories:

- Owner occupied housing (1 to 4 units)
- Naturally occurring affordable rental housing (investor owned small and large properties)
- State funded affordable housing (public and privately owned)
- Federally funded (HUD) properties

As the table below makes clear, nearly 70% of CT's low income residents live in owner-occupied single family homes and small, investor owned multifamily rentals (2 to 19 units). Over half live in single family homes and 2-4 unit rentals. Collectively, this is the hardest of the hard-to-reach markets, in a segment, the low income sector, that is already very hard to serve.

Type of Housing	# of Low Income Households	% of Low Income Households
Single Family Owner-Occupied ("SF OO") Homes	151,493	30%
2-4 Unit Rentals	130,684	26%
5-19 Unit Rentals	67,092	13%
Total SF 00 + 2-19 Unit Rentals	*349,269*	*69%*

Different classes of affordable properties share various important characteristics. For example, smaller rental properties tend to be:

- Concentrated in the urban core (although with a significant disbursement in suburban and rural communities;
- Naturally occurring affordable (i.e. privately owned, non-subsidized);
- Challenged by significant deferred maintenance needs and health and safety issues;
- Operating on thin margins or at a loss, with limited capacity for new debt; and

- Due to tenant paid utilities, unlikely to pursue energy upgrades independently given split incentives, leaving tenants to shoulder hard choices between food, medicine, and heat.[2]

On the other hand, larger properties (50 units and above) as well as State and HUD financed/subsidized properties, feature:

- Better conditions than the smaller, privately owned, non-subsidized properties, due to stronger property management and maintenance budgets enabled by economies of scale, as well as building and other code requirements mandated by Department of Housing (DOH), Connecticut Housing and Finance Authority (CHFA), and Housing and Urban Development (HUD);
- Management and ownership structures better positioned to take advantage of Green Bank programs; and
- Often, master meters (meaning owners pay utilities), particularly for heat and hot water. For master metered properties, owners have a strong incentive to make energy upgrades that will result in utility and maintenance cost savings, and solar can be a particularly attractive investment option.

Overall, with deferred maintenance an overriding issue and property owners who are less well-resourced than the C&I sector, developing projects to a point where they are ready for financing is a huge challenge and requires significant technical support. Thus, this sector requires substantial public investment and grant funding to build out the necessary supporting infrastructure, alongside a nuanced project financing strategy.

Furthermore, given the brutal utility cost burden on low income residents, it is critical that Green Bank-funded programs lower total energy/operating costs and tenant utility costs with high levels of confidence (e.g. guarantees). Solar is a key part of that solution, but care must also be taken to develop initiatives that support the holistic improvement of the building stock.

Comprehensive financing solutions that address deferred maintenance, health and safety, and energy improvements, including solar, all at the same time will be most beneficial.

Additional background on the low income housing market can be found in the December 12, 2014 Green Bank Board Market Analysis Memo.

CURRENT GREEN BANK SOLAR INITIATIVES FOR LOW INCOME RESIDENTS

While the Green Bank has a number of initiatives in place to support development of low income residential solar, they are clearly not sufficient to achieve the same solar penetration levels that moderate and affluent residents currently enjoy. Our strategy has been to target the easiest, most immediate opportunities first, understanding that we will need a sustained and focused effort over the long term to truly make progress in this difficult market segment. Below is a summary of current solar initiatives:

[2] The average low income household owes about $2360 more in annual energy bills than it can afford to pay - http://www.operationfuel.org/wp-content/uploads/Connecticut-2014-HEAG-Final.pdf

MULTIFAMILY PROGRAMS	
Solarize State Sponsored Housing Portfolio (SSHP)	CGB-CHFA partnership that targets state funded multifamily housing. Four CGB-qualified installers are currently working with upwards of 30 properties, representing some 1,200 affordable units across the state, to help them go solar.
Programs for Clean Energy Upgrades, Including Solar:	
CHIF LIME Loan	Unsecured loan funding low income, multifamily energy upgrades, including solar installations
Credit Enhancement RFP	For multifamily energy upgrades including solar
C-PACE for Multifamily	Funds solar and other energy upgrades
MacArthur Foundation	CGB has been approved for a $5M program related investment (PRI) to support the low income, multifamily sector.
OWNER OCCUPIED & SMALL INVESTOR-OWNED PROGRAMS	
Residential Solar Investment Program	Incentives for residential solar PV
Solarize CT	Municipal-led community outreach initiative targeting owner occupied homes. The following distressed communities have participated and, as a group, have seen higher penetration rates than the statewide low income penetration rates for solar: Bridgeport, Enfield, Montville, Torrington, West Haven, and Windham[3]
Housing Development Fund's Cozy Home Loan	Low income loan product for homeowners in Fairfield, Litchfield and New Haven counties, supports solar and energy upgrades and health and safety measures
Residential Solar Financing RFP	Releasing in December 2014, will allow CGB to solicit proposals focused on underserved solar markets including low income populations and credit-challenged consumers. Several potential respondents have shown eagerness to originate and finance solar projects among lower FICO customers, and one potential respondent includes a leasing company that is specifically focused on the low and moderate income market
INFRASTRUCTURE DEVELOPMENT INITIATIVES	
Solar Customer Market Segmentation Analysis	Developing messaging for key segments, including "Prudent Yankees" which skews towards lower income
Owner Technical Support/ One Stop Process	Building capacity through partner New Ecology, Inc.
CHFA-CGB Collaboration	MOU / demo program to inform programmatic approaches
DOH-CGB Collaboration	Strategic discussions for programmatic collaboration/ pilot
Interagency Collaboration	CHFA, DOH, HUD, CHIF, then DPH, DEEP, Utilities
National Engagement	With thought leaders and implementers to learn from others

[3] These 6 communities have seen a 27% higher penetration in the <60% AMI census tracts and a 21% higher penetration in the 80%-60% AMI census tracts than the state averages.

POTENTIAL FUTURE POLICIES AND INITIATIVES

In order to make significant progress on penetration of solar into low income communities, there are a range of new policies and initiatives that should be considered, in addition to the early stage activities already underway. These are outlined below and intended to spark a conversation as to potential future areas worthy of Green Bank focus and dedicated resources.

- **Potential New Legislative Policies Needed**
  - **SHREC** – establish a Solar Home Renewable Energy Credit (SHREC) - a sustainable source of revenues to meet the overall growing market demand is critical if the Green Bank wants to offer tiered incentives to low income residents
  - **Community (or shared) solar** with a low income carve-out
  - **Benchmarking** of energy usage for affordable multifamily buildings to establish best prospects for investment and **Energy Opportunity Assessments/ Audits** to define work scopes that will deliver highest return on investment
  - **Clean energy utility allowances** – establish a clean energy utility allowance that incents owners of properties with tenant paid utilities to invest in energy upgrades and achieve utility cost savings that will benefit both owners and tenants
  - **Sub-metering policy** – this is a medium-term goal, but one necessary to achieve true scale in this market given the prevalence of low income residents in rental properties with tenant paid utilities
  - **Community Reinvestment Act (CRA) advocacy** - National advocacy around expansion of CRA credits for low income and clean energy specifically – American Council for an Energy Efficient Economy ("ACEEE") is pursuing this. State advocacy and outreach to Banking Commissioner and Connecticut Bankers Association – would be ideal to have Banking Commissioner provide guidance to lenders signaling importance of investing in clean energy in CRA-eligible and distressed communities

- **Potential New Green Bank Policies**
  - Over the next year, explore setting a specific target for low income solar (e.g. install XX MW of solar by 20xx date for low income, etc.)
    - President Obama's call for 100 MW of solar on HUD properties has demonstrated setting targets can focus attention and catalyze activity
    - Regardless, SHREC and community solar policies **must** be in place to achieve any scale in the low income segment
  - Over the next year, modify Residential Solar Investment Program (RSIP) incentives to support low income
    - Current RSIP structure restricts incentives to owner-occupied residences; SHREC policy would have no such restriction and would support investor owned 1-4 unit residences
    - Explore feasibility of tiered incentives for low income; questions include how to operationalize, and when to implement (e.g. after we get SHREC, or at Step 7; perhaps keep low income at Step 5 when we move to Step 7)

- **Potential New Capacity Building Initiatives**

- Even with appropriate legislative and Green Bank policies in place, addressing the low income solar opportunity is primarily a DEMAND challenge. To that end, two key areas should be explored:
  - Develop a sustainably funded model for technical support/owner's agent services for the low income multifamily market, with a specific emphasis on 1-20 unit investor owned properties
  - Pilot targeted outreach models – since the majority of Connecticut's low income residents live in owner occupied single family homes and small multifamily rentals, innovative community-based outreach models will need to be developed, with a focus on partnering with social service and other agencies serving this demographic (e.g. Operation Fuel, housing and aging service agencies, municipal community development departments, etc.), drawing on our experience in the state with Solarize and the Neighbor to Neighbor Energy Challenge (and their work with local fuel banks), and work from around the country (including other neighborhood/block outreach models, employer-assisted models, municipal-led neighborhood revitalization initiatives)

- **Potential New Financing Products**
  - There are a variety of targeted financing products that would ultimately be needed to address the low income solar market, including financing structures for investor-owned 1-4 unit and small multifamily (5-20 units) properties, community solar, the HUD - CDBG Sec. 108 Loan Guaranty program for solar (for municipalities), an acquisition/rehab mortgage product that supports solar, a solar + storage warehouse facility for affordable multifamily (multi-state exploration going on now), and portfolio-based approaches for local lenders active in the affordable multifamily sector

STAFF PRIORITIZATION OF MARKET INITIATIVES

Although we have made inroads, we still have much to learn regarding how to address the low income sector and overcome penetration barriers. Over the next year, we plan to focus on our full plate of current initiatives and hone in on the most promising approaches, then work to scale them up in the following years. Below are our proposed sector priorities:

Initiative	Partner(s) / Approach	Description
1	DOH, CHFA Med-Large Rentals	• Engage with DOH CHAMP applicants on energy upgrades as part of broader capital improvement plans • Expand Solarize SSHP model for solar • Establish clean energy benchmarking / energy assessments/ standards / utility allowances for state funded housing to help drive demand and enable successful financing
2	Solar Financing Companies, via Residential Solar RFP	• Expect to partner with at least one fast-growing solar leasing company focused on low and moderate income customers with subordinated debt investment • Pursue strongest proposals addressing credit challenged and/or low income customer population

	Owner Occupied 1-4, Potentially Small-Med Rentals	
3	Targeted Community Campaigns, with Housing Development Fund, Solar Financing Companies Owner Occupied 1-4	• Promote Cozy Home Loan product with local mini campaigns (via agencies like Operation Fuel) focused on bundling solar with other upgrades (efficiency, health & safety) • Run Solarize-style campaigns in communities / neighborhoods, when new partners are identified via the Solar RFP • Test messaging for "Prudent Yankee" customer segment (applicable to owner-occupied single family market, ~ 30% of low income residents in the state).
4	HUD Med-Large Rentals	• Go beyond current EPC model (restricted to largest public housing authorities) to establish a model for self-performing energy performance contracts, rather than working with 3rd party ESCOs, allowing excess savings to be reinvested in the properties
5	DOH, Municipalities, CDCs/CBOs, Developers, and Local Lenders Naturally Occurring Small-Med Rentals	• Initial focus on this challenging market will be analysis and development of a strategic plan with key partners, including DOH, municipal community development offices, utilities, and lenders in this sector • Significant outreach, technical support and education are needed to support owners (and funders) in this market. Goal is to build on existing housing renovation and revitalization initiatives. Key partners will be municipal housing and community development departments, funded by federal HOME and CDBG dollars, as well as local CDCs and other community based organizations

CONCLUDING COMMENTS

The low income market for solar, and energy upgrades more generally, is extremely challenging. The Green Bank will need to be strategic, patient, and diligent, and commit to investing time and resources, if we hope to make a meaningful impact on the penetration of solar in low income communities in Connecticut. This segment will require a level of support traditionally not seen in our other Green Bank initiatives, including funding at a higher level (with lower leverage ratios); budgeting for programmatic and marketing initiatives; and dedicating other resources, including potentially additional staff or partnership support. Staff is ready, willing, and excited to develop a budget to support this work, based on Board of Director feedback and guidance.