

Solar for All Task Force Recommendations

Real Estate Subgroup

Rationale Statement

With the passage of the Renewable Portfolio Standard Expansion Amendment Act of 2016, D.C. has one of the most progressive solar energy policies in the country, joining the ranks of other leadership states such as California, New York, and Oregon. The newly enacted legislation requires the District to procure 5% of its electricity – or over 300MW – from solar energy by 2032. This means that 750 acres to 1,500 acres could potentially be covered with solar in the District's 68 square mile radius.

As D.C. looks to implement strategies to help meet its new renewable energy targets and expand solar energy for low income residents, DOEE should create programs that open new opportunities for solar deployment within the District's borders. The real estate sub-committee recommends that DOEE incorporate the following suggestions to ensure that D.C. is well-positioned to meet its new RPS and serve low income customers through the Solar for All program.

Objectives

1. Utilize existing resources to assess opportunities for growth of solar in D.C. on available rooftops, land, brownfields, and canopy space.

DOEE should consider analysis conducted by the Office of People's Counsel, who is evaluating the solar potential of all available real estate in D.C. as part of its value of solar study. D.C. Department of General Services has already done a survey of potential brownfield sites. These efforts, along with resources such as Project Sunroof, will aid in assessing available solar resource in each real estate category (residential, commercial, greenfield/brownfield, and canopies). Building age, building owner, roof condition, and meter(s) type should also be considered.

Sample properties may include commercial buildings, affordable housing, public housing, federally assisted housing, federally ensured housing, D.C. government subsidized housing (i.e. Department of Housing and Community Development, DC Housing Finance Agency, etc.), and LIHTC properties.

2. Increase the amount of eligible rooftop space available for solar.

GRID Alternatives estimates that only 2 out of 10 rooftops that they assess are suitable for solar. Rooftops are otherwise ineligible given poor roof quality, or because they are in need of electrical repairs. The economics related to solving these problems prohibit many District residents from pursuing solar. Given these challenges, DOEE should allow a solar incentive to be

used toward common roof repairs or electrical repairs to increase the number of eligible rooftops for solar. DOEE should look to San Francisco Solar Roof Retrofit Program as a best practice.

Solar development on commercial buildings is limited by rooftop obstructions such as HVAC systems, compressors, mechanical penthouses, mini splits, elevator shafts, and window washing anchors. DOEE should examine this problem closely and think creatively about ways to troubleshoot removing these obstructions. One idea would be a process whereby building owners with high solar potential can apply for grant funds to remove these obstructions or move them elsewhere. This will not only increase the District's solar potential on its biggest rooftops, but also in order to encourage building owners to pursue solar energy.

As part of this effort, DOEE should also analyze the green roof rebate in the context of available solar incentives to determine which is more attractive, and if the green roof rebate discourages building owners from installing solar or if the two can complement each other. Green roof integration, while important to the District's storm water management strategy, is another obstruction that prevents the installation of solar.

Additionally, DOEE should work with Homeowners Associations to ensure homeowners that want solar are able to pursue solar.

3. Make changes to the building code to ensure structures are "solar ready."

DOEE should work with appropriate agencies to make changes to building codes that will ensure that new commercial buildings and canopies will be structurally sound for solar. All new construction should be solar ready/solar enabling. Consider an interagency Memorandum of Understanding as it relates to new affordable housing development.

4. Educate building owners about REC ownership issues.

Confusion over REC ownership, or how to claim the environmental attributes associated with a solar energy system, are a barrier to solar development in the District. This is especially true for the federal government, who owns much of the available rooftop space in D.C., but generates little solar. Building owners like the federal government – as well as buildings trying to achieve LEED status - do not install solar and/or monetize their RECs because they are concerned that they cannot claim the green power.

Education must be done around environmental claims and REC swaps for federal buildings and with LEED. DOEE should also hold education sessions with federal GSA, the Architect of the Capitol, White House Council for Environmental Quality, and others on this topic.

5. Incentivize large real estate owners to install solar.

Electricity savings from solar energy are of very minimal financial importance to large real estate owners with large, sometimes national, portfolios of buildings. While electricity savings are such a small portion of their bottom line, the marketing benefits and brand equity built from installing solar may be another motivation. DOEE should consider marketing incentives for commercial buildings, such as a solar-specific award program (i.e. Solar Champion Awards), or window decals and/or signage that may be placed at the building's entrance to demonstrate that the building is powered by green energy. Another marketing incentive could be a dinner with the Mayor that recognizes these Solar Champions.

The incentives mentioned in pillar two - removing rooftop obstructions - will also accomplish this goal.

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Finance Subgroup

Introduction

The financing sub-group conducted a thorough analysis of the programmatic needs to achieve the goals of the Solar for All Program. After extensive discussion, the group's analysis was narrowed to four primary approaches, for which financial models were developed. After reviewing their analysis the group arrived at a consensus recommendation on a path forward for the program. While there are considerable differences between the models examined, all arrived at the conclusion that the core solar development costs to DOEE over the length of the entire program would not exceed \$171 million dollars. Fundamentally, even considering the need to finance incentives to enable the program to address roof repair and replacement, subscription/client management, incentives to encourage roof owners to participate such as leases, public recognition and awards programs; the costs of workforce development; the costs of an extensive public education campaign; and monitoring and reporting on the program—the total program costs did not exceed \$256 million dollars.

Program Assumptions

In all of the group's models, it was assumed that the District government (or a contracted designee) would consolidate and manage all subscribers into the program—participants would be recruited through LIHEAP first, and subsequently SNAP or other District public assistance programs (see recommendations of customer acquisition team). DC Council members could be given a roll recommending constituents including small businesses and community organizations into the program. We did not include long-term cost savings in the LIHEAP program in our financial analysis nor did we measure considerable community and program benefits beyond end of the program.

In addition, we assumed that all roofs, whether residential, commercial or other sites would be subscribed into DC's community solar program. Therefore, all kWh produced by the program could be flexibly allocated and re-allocated over time. We assumed that some percentage of the build out of the solar PV could be "allocated" by developers to building site owners as payment for use of the site. We calculated all installations participating in the program to have a minimum 10 year contract to provide energy to the program (however whenever possible longer lease lengths should be included in the program). Starting in year 11 the program will need to create an incentive for extending energy production contracts for additional five-year periods in order to encourage as many projects as possible to stay in the program. The costs of these extensions are included in the model.

We assumed that all installations in the program would be required to provide on-line monitoring, and transparent reporting in the program. We also assumed there would be standardized contract elements and communication materials for both subscribers and site hosts.

The detailed assumptions including rate of build out, kWh hours needed to be produced in order to meet program goals, per unit costs for different building classes SREC market projections, and costs of solar estimates are contained within our financial model and are delineated in the attached spreadsheet.

A Phased Approach

The team has concluded that there are great opportunities to highly leverage DOEE Funds to lower program costs and increase the impact and public benefit of the program. Most important many of these interventions are additive but do not need to be phased in all at once. The key is to start immediately and send clear market signals that companies should be making a long-term investment in participating in the Solar-for-All program. As such, we recommend that the program begin with the simplest model and begin exploring additional interventions and adaptive management over time.

Phase I Block: The working group recommends that the implementation of the financing portion of the Solar for All Program should utilize a 25 MW Phase I Block that will likely cover the build out from 2017 through at least 2019,. The Phase I Block will continue until it is exhausted. During 2017 DOEE should begin to, develop additional options including subsequent blocks, and additional enhancements, and additional program elements that can be implemented starting in 2019. This will provide stability and security to the market participants and result in a good start for the program. The Phase I Block program and it's accompanying program management would utilize a majority of the REDF funds that are currently available and a majority of those available in 2018 and 2019.

The PV solar energy systems built under the Phase 1 Block would commit to provide to DOEE all of the output for a period of at least 10 years. DOEE would then allocate the power at no cost to program subscribers. The payment for this would be made upfront when the system is placed in service using the mechanism of a prepaid PPA to simplify the transaction and procurement.

The key to success of this model is to build a steady pipeline of projects with a quick start and a steady build up. This model prioritizes steady market growth over other potential benefits. In this model (based on successful elements of the California CSI program and NY SUN program), blocks of installed capacity have incentive structures that are made available to developers at a set rate until each block is "used up". The Phase 1 Block is constructed to have a base rate and each block will also include adders to promote more expensive construction such as residential LMI households, roofs that need repair etc. To be clear, the Blocks are available until the block is built they do not expire at a specific time-frame.

Once DOEE has purchased the output from a system it would, through a program administrator, provide billing credits for qualifying energy customers through the Community Solar mechanism. In other words, DOEE would not use the power it purchases, but would assign the CREF credits to qualifying residents identified by the administrator. CREA would be the

mechanism to allow the credits to appear on the household electric bill at the CREF credit rate for residential customers. For example, DOEE could purchase power at, for example, 4 cents per kilowatt hour and assign the billing credits to individual District of Columbia residents at the CREF credit rate of approximately 12 cents per kilowatt hour.

For ease in administration of the program, the Block size would be expressed as megawatts of capacity. However, the commitment would be to purchase a certain amount of megawatt-hours per year for each MW of capacity. Thus, using the NREL standard, it would be to purchase approximately 1200 megawatt-hours per year per megawatt of capacity. These expected outputs are expressed in the attached spreadsheet and allow us to accurately predict how many households will be helped by the program each year.

The purchase price and payment terms, would be set at the opening of each block of the program. The committee recommends that a reservation system such as that used in California be used so that private development can know ahead of time the level of advance power purchase contract it can expect for each system. Once reservations adding up to that block of power have been accepted, other system owners can make reservations for the next block. Each new block provides an opportunity to assess program costs, and impact and to adaptively adjust the program to provide the most effective and least cost incentive possible.

This Phase I Block program relies on each system to be owned by a third party owner/ developer and does not involve DOEE in any system ownership, finance, or maintenance. DOEE has a contract to purchase all of the output of these systems and the upfront payment to the system owner is intended to assist the system owner secure financing by providing a credit off-taker of power, removing that risk, and providing the equivalent of an up-front payment to act as a layer of the capital stack that the owner uses to purchase and install the system. The system owner will retain all of the SRECs that the system produces, and will use the revenues from the sale of these to amortize debt, pay expenses, and pay the owner an economic return.

The overall financial modeling of the program envisions five blocks capturing the entire 300 MW over the life of the program. Although the payment mechanism will be made at cents/kwh basis, the equivalent \$/KW installed were modeled and are provided here as a point of comparison. Although we envision a number of different adders to achieve specific program goals and allow the economics to work for a wider variety of real estate—for the sake of simplicity we modeled an average adder of 75 cents.

BLOCK 1: 20 MW Total Size

Base Rate \$1.00/Watt

Note: adders to incentivize additional types of buildings. Such as low income residential households in need of roof repair, specific locations, electrical upgrades, buildings over three

stories, or buildings with complex roofing structures can be built into the program. The adders would range from 15 cents to \$1.00/Watt

Advantages: This model incorporates roof repair and electrical upgrades. The model allows you to create different incentives for different roof types. This is a crude tool but easy to administer. Risk is pushed onto the private sector. The model allows for flexibility and adaptive management in subsequent blocks if there are unforeseen circumstances over time. This program can be adjusted over time. If, for example, the cost of solar drops more quickly than modeled, subsequent blocks can lower the incentive more quickly. The program will build market momentum and business certainty—it creates stability in the market. The program will also mesh well with other efforts to bring value to the program like a centralized customer acquisition pool, a centralized site donation effort, education effort and standardized contracts and monitoring requirements.

Disadvantages: If prices are not set right there will be uneven development among different types of building classes. For example—there may be a lot of development in the commercial sector or very little in LMI residential. Doesn't create economy of scale or aggregation programs for roof acquisition or financing. It is not highly market sensitive and may under or over incentivize the work. It does not provide a hedge against potentially highly fluctuating SREC values.

Phase II: Program Enhancements

The Financing team expects that there will be program costs, and market evolutions that are not anticipated in this initial analysis. Thus, for example, as the program evolves the program may need to provide a “bonus incentive” for a particular type of roof or location that provides a large potential for the program but is more challenging to implement. However, the flexibility of the Block program would allow DOEE to effectively push out a robust program with a reasonable budget.

In addition, there may be significant additional financing and program interventions that could be explored that would provide significant opportunities to provide greater economic leverage or economies of scale in delivering the program. Several of these Phase II enhancements are discussed below.

SREC Escrow

There is a strong consensus with the team that this intervention could be highly complementary to the Phase I Block program described above, and could provide significant additional leverage to the Phase 1 Block Program. The SREC Escrow could be implemented in year two or three. In this model, DOEE or a designated third party would take REDF funds and put them into an escrow account. The account would hold funds based on the amount of MW built. It would act as a backstop to SREC payments to guarantee a floor on prices if they dropped below said floor. Solar developers contributing to the Solar for All Program would therefore have a guaranteed

minimum price for their SRECs over time. This would allow them to use future SREC revenue (which is considerable) as a source of upfront financing for the program.

The team believes that this program would make projects much easier to finance, requiring less developer risk capital and making a greater pool of lenders available. As a result, this would allow the government to potentially reduce subsequent Block incentives for a net decrease in program costs and a higher leverage of private sector investment at better terms without slowing the pipeline. If SREC prices are steady the costs of this program could be negligible. After the Phase 1 Block program is established, it should be possible to determine a SREC backstop price that provides certainty of revenue while staying below the maximum SREC prices that may be obtainable. For example, providing a constant backstop price of \$300 per SREC for 10 years may be below the average price in the market's range of SREC values. Such a price could "cost" DOEE very little. Yet it could have great value in getting financing while still allowing project owners to keep the SRECs from the projects and sell them on the market for higher amounts if available.

The committee envisions that the payments to the escrow reserve for a pool would be made based on the next 12 months' SREC payment needed. DOEE would replenish the backstop reserve at the beginning of the next year, if it has been used and depending on how much is needed for the next year. If the backstop reserve is used in any year the reserve would have a first call on any excess SREC revenue from the projects in future years until the amount used from the reserve is repaid.

Advantages: This intervention would significantly decrease costs to developers that currently must take significant discounts between expected revenue from SRECs and the amount of money they can borrow against future SRECs revenue. This intervention works similarly to a loan loss reserve because it de-risks SREC revenue - one of the most significant value streams in the DC Solar market. This may be the most effective market mechanism of those analyzed by the team in terms of costs to program compared to MW produced. Assuming SRECs stay close to projected values, the approach would create significant opportunities to reinvest into the program. Each year's unused allocation could be carried over, to decrease the quantity of new funds needed in the subsequent year. The program is open to multiple developers and investors. DOEE/DC Government's interest would be aligned to have a strong SREC market, decreasing the risks to the Solar for All Program overall. The program could integrate seamlessly with a Block program.

Disadvantages: Would probably require a third party such as a CDFI or Green Bank to manage the program. Establishing such an entity would take time. On its own, doesn't include or differentiate costs for roof repairs, types of real estate or locations. May include significant program administration costs. May add complexity to the program and require more extensive communications, outreach and monitoring. The cost of program overall is difficult to predict at this time as it could vary considerably depending on the strength of the market..

The Central Financing Model

While the team was unable to reach a consensus on this model we have provided it here for your consideration. The government or designated third party such as a Green Bank entity would coordinate tax equity and debt financing for developers to install solar in addition to the SREC Escrow intervention described above. This entity would also become the owner of solar projects at the end of a seven-year financing period, and would be responsible for coordinating maintenance, insurance, and other operational responsibilities. The same entity could potentially pass along assets to a community-controlled entity, possibly a cooperative, to continue operating projects over the long term.

The model assumes an annual procurement process to identify tax equity investors and debt providers. The size of the investment pools for a block or annual allocation is significant, so Solar for All would be able to attract the lowest-cost tax equity investors and lenders. It may be possible for a central third party entity – a large bank, for example – to coordinate all debt for the pool, allowing lenders of many sizes to participate in Solar for All. Preliminary analysis of this model (attached) shows total costs for 15 years of this model are \$144 million. Our model shows an additional \$283 million of SREC revenue not required for debt service is also generated. The ownership of this \$283 million is unclear as it is generated in the first seven years of project operations, primarily under legal ownership of tax equity investors, who would flip ownership to another legal entity after five years.

Advantages: Uniform PPA for all participants and single point of responsibility for long-term operation, maintenance and monitoring of solar energy systems. Allows significantly greater aggregation for tax equity investors and debt providers, which could result in significant cost reductions due to greater economies of scale. Allows much greater reinvestment of SREC revenue and provides a clear path to long-term community ownership of solar projects for the entire life span of the solar panels and potentially beyond. Allows small local solar installation companies that do not have access to financing to participate in the marketing. Central financing entity could learn from innovations occurring in the private sector in DC and other locations and innovate financing as it evolves.

Disadvantages: Directly competes with private sector solar developers and small investors in the financial sector, allowing fewer finance players for Solar for All. Requires government administration of financing and asset management currently offered in the private sector, which may pose significant legal and contracting questions. Will have higher overhead costs to provide the same services as other private sector PPA companies.

PROGRAM ADMINISTRATION AND OTHER NON-INSTALLATION COSTS

The finance team has taken a very preliminary look at the program administration costs in order to model the total costs of the program. It is assumed that once the other Solar for All sub-groups have completed their recommendations this section may have to be significantly revised.

A. Subscription/Client Management: Our assumption is that the DC Government will manage this. They will house this function within the LIHEAP office and/or other programs serving low and moderate-income households. The assumption is there maybe a large investment in the first year to set up the CRM to track program participants and work out intake policies within the existing program-- but after that a relatively skeletal staff can handle checking income status, entering people into the program and managing customer complaints and questions. 300k/year? (See customer acquisition recommendations) upfront costs and annual costs to be broken out.

B. Education: This is a rather large task that will include outreach to building owners, potential subscribers in the program, solar developers/installers and rate-payers. It will require extensive coordination with government, utility, non-profit and private sector plays. Outputs will include designing and implementing a marketing plan for the program, website, development of FAQs, and other on-going efforts. see education sub-committee recommendations) 250k/year?

C. Monitoring Program and Reporting: This task will require getting real production data and real client data from program participants, Program monitor will need to set up data protocols with program participants, analyze data and prepare an independent annual report to be shared and disseminated with the public that includes program impact and lessons learned and recommendations for program changes including incentive changes or adaption's to program design. Our assumption is that this should be a third party contract \$150k/year.

D. Marketing: Even though each solar developer would be responsible for finding and negotiating terms at all of their building sites, We assume that a centralized marketing program available to all developers and program participants to recognize, recruit and support site donations to the program can greatly increase the efficiency of the program. This third party entity would work with commercial, government, residential and non-profit sites. They would explain and trouble shoot for potential site donors. They would create a recognition or awards program for site donors. They would develop a marketing program to reward and encourage site donation. \$250k/year

E. Workforce Development: Our assumption is that local job training will be an essential element of success. \$1.3 million average annual costs. (see workforce development subgroup)

Solar for All | Financial Model Narrative

The financial model consists of 2 main components; total solar cost and additional program costs. The solar cost (main sheet) is the cost of providing solar to 100,000 households to cut their electricity cost by 50% by 2032. The additional costs are those necessary costs to achieve these energy saving targets including workforce development, customer acquisition and management, roof and electrical upgrades to older properties, and program management and O&M fees.

SOLAR COSTS

Assumptions were made by the Finance sub-group to calculate the cost needed to achieve the program goals. These assumptions are listed on top of the sheet, including average electricity consumption by LMI household, consumption reduction overtime due to energy efficiency, base utility rate, rate increase overtime, base solar cost/Watt, cost reduction overtime, SREC base rate, and SREC rate decline over time. These assumptions are soft-coded in the model to be adjusted, changed, or used in what/if analysis.

Target Market

This segment of the model calculates the annual electricity consumption, annual utility rate, and total electricity cost for the total LMI target market (100,000 households) based on the assumptions created.

Saving Goals

This segment calculates the annual cost-saving sub-goal leading up to 50% saving in 2032; starting with 0.5% in year one and ramping up gradually to 50% in year 16. Annual electricity saving (KWh) and annual cost saving are calculated based on the ramp-up goals and the assumptions listed above.

Solar PV Installed

The annual amount of solar energy installed in MW is calculated based on the desired annual electricity saving goals in KWh taking into consideration the regional efficiency rate of 1,200 KWh/KW installed. Then the cost of this annual solar PV target installed is calculated based on the assumptions of base cost/Watt and cost decline overtime due to technical and business efficiencies.

The program targets and costs are divided into 5 phases with each phase running for 3 years, the objective of this phased approach is to provide continuity and program stability to developers and participants beyond the traditional tactical 1-year programs.

ITC & SREC Rebates

The solar installation costs calculated above are gross costs. A number of rebates are available to developers to reduce the installation costs including ITC & SRECs.

ITC is calculated based on the current Federal laws e.g. 30% in years 2017-2019, 26% in 2020, 22% in 2021-2023, and 10% thereafter. A factor of 1.1 is applied to these rates to allow of depreciation and other concurrent Federal incentives.

The SREC values are calculated over the 16-year length of the program. For the purpose of this model, a conservative base rate of \$300 was assumed for 10 years with annual 20% rate decline thereafter.

Rebate Needed

The ITC and SREC's alone won't cover the solar installation cost. Therefore, an additional funding source is needed to fill the gap. This funding gap is requested in a form of rebate, the way this rebate is calculated in the model is based on a simple formula: gross solar cost - ITC - SREC's. However, the mechanism this rebate is recommended to be paid by the District government is in a form of pre-paid PPA of \$0.05/KWh or 10-15 years, which equates to the funding gap identified above.

The annual rebate varies based on a number of factors; for phase 1 it is estimated at \$1.75, which will go down in subsequent phases as SREC values decrease and system sizes increase.

ADDITIONAL COSTS

Additional program costs are calculated in separate sheets/models and aggregated at the bottom of the solar sheet. The assumptions and calculations of these additional costs are detailed in their prospective sheets.

Workforce

The number of new jobs was calculated based on the man/year resources needed to deliver 1 MW of solar. The cost of training solar resources is estimated based on a combination of course study and hands-on training on actual solar installation projects, based on GRID model.

Customer Management

The model includes cost assumptions for client acquisition, subscription management, education, and support. These costs are estimated per household and then aggregated annually based on annual goals.

Upgrades

Roofs and electrical upgrades are calculated based on the assumption that 50% of the solar installed would be on LMI single family and multifamily buildings, the other 50% are commercial buildings and community solar. Another assumption is 50% of these LMI buildings need upgrades.

Other Costs

Other program costs such as Operations and Maintenance (O&M) and program administration fees are estimated based on a percentage of total solar cost

All additional costs allow for setup/startup cost, which needs to be added to Year 1 of the program.

Customer Acquisition Subgroup

The following organizations participated in the Customer Acquisition Subgroup of the Solar for All Task Force:

- Office of the People’s Counsel
- Community Power Network/DC Solar United Neighborhoods
- Grid Alternatives Mid-Atlantic
- Interfaith Power & Light (DC/MD/VA)
- DC Fiscal Policy Institute
- Pepco
- Coalition for Nonprofit Housing and Economic Development (CNHED)
- Groundswell
- DOEE staff

The following sections summarize the Customer Acquisition subgroup’s final comments and recommendations for identifying the universe of customers who can benefit from the Solar for All program and proposing ways to facilitate and maintain customer participation in the program. We incorporate by reference information about LIHEAP and WAP

DEFINITIONS

- “Monthly Electricity Bills”: We note DOEE Staff’s November 1 memo which maintained that for purposes of implementation of the Solar for All program, this metric should literally be based on “electric bills.” The Customer Acquisition subgroup remains concerned that limiting the program to customers who receive monthly bills from Pepco would prevent many low-income residents living in master-metered buildings and others from being able to benefit from solar. Given that a significant number of residents live in master-metered buildings, our subgroup recommends the following compromise on this definition:
 - o For those who receive monthly bills, the goal will still be achieving a 50% reduction in the monthly bill. For those who do not receive a monthly electricity bill, the goals will be to achieve a 50% reduction in their energy consumption.
- “Households”: We are pleased that DOEE agrees with our interpretation of this term.

- o “to include single-family homes, individually-metered residences, and master-metered multifamily buildings. All affordable housing complex/building construction projects are included. The term includes owned units and rental units.
- “Small local business”: We are pleased that DOEE agrees with the spirit of the definition we originally proposed. The Customer Acquisition subgroup would like to offer the following amended definition:
 - o “Private, worker, community or cooperative ownership; at least 50% locally owned with a maximum of 500 employees (a metric set forth by the U.S. Small Business Administration); Decision-making authority is vested in the local owners and not subject to conditions dictated remotely; the business has a limited geographic range. The term includes CBEs and minority-owned businesses.”
- “Nonprofits”: We are pleased that DOEE agrees with our interpretation of this term.
 - o “Any 501c3 entity operating in the District of Columbia. Term should be interpreted broadly. However, priority should be given to organization serving low-income populations.”
- “Seniors”: We are pleased that DOEE agrees with our interpretation of this term.
 - o “Individual senior citizens (persons 65 or older), as well as commercial or non-profit senior-serving entities.

COMMUNITY SOLAR

- One more assumption that our and other subgroups would like to add is that all participants in Solar for All would become participants in community solar. In essence, Solar for All would effectively be a community solar initiative.

ACQUIRING CUSTOMERS

- LIHEAP should be a primary intake mechanism for placing low-income customers in the queue for the Solar for All program
 - o Similar to the way that the Weatherization Assistance Program acquires customers, there could be a simple box to check on the initial LIHEAP application indicating interest in participation in Solar for All.
 - o The box on the application would be accompanied by a concise, clear and “encouraging” description of Solar for All and ability to reduce their energy burden
 - o DOEE or a Third Party Contractor would immediately follow up with the LIHEAP/Solar for All applicants with solar education programs and materials.

- o Additionally, their buildings/properties with applicants reside would be immediately be placed in a solar readiness queue (for community solar)
- o While LIHEAP would be the primary intake process, other programs such as RAD and SNAP should be utilized for informing residents about Solar for All.
- For those District consumers who may not be eligible for these programs but fall within the 80% AMI Solar for All eligibility requirement, information about the program can be distributed to various categories of community organizations and institutions such as churches, schools, ANCs, civic associations etc. A robust marketing plan should be developed to reach these consumers.
- Establish partnerships with DC government agencies (e.g., OPC, Office of Tenant Advocate, DCRA etc.) and non-profit organizations (Salvation Army, Habitat for Humanity DC, YMCA/YWCA etc.) for dissemination of information to consumers about SFA.
- o DC government agencies would be responsible for regularly distributing information to their constituents about Solar for All.

CUSTOMER MANAGEMENT

The Customer Acquisition subgroup reiterates our concern that it is critical that the SFA Program should run 12 months continually throughout every month of each year. We believe it is absolutely essential that Solar for All be managed by one central entity that would be the “go to” organization for customer education, customer care and program administration. Centralizing Solar for All program management will reduce the potential for customer confusion, will facilitate standardized information and will likely keep program administration costs low – making for more efficient implementation of the program. We recommend that there be a cost assessment of Solar for All customer acquisition and management.

(Note: Grid Alternatives estimates that the cost will be \$.50/Watt which will likely decrease as the program grows. However, we welcome any analysis that the Finance Subgroup has done on this issue)

SOLAR FOR ALL PROGRAM MONITORING

The Customer Acquisition subgroup further believes that it is imperative that independent, external, third-party contractor monitoring of the performance of the Solar for All initiative be arranged sooner rather than later.

Consumer Education Subgroup

This sections contains the Solar for All Consumer Education Subgroup's:

- Recommended Education Program Objectives;
- Program recommendations;
- Additional questions for DOEE's consideration; and
- Recommended list of Frequently Asked Questions.

Education Program Objectives

1. Inform target groups how to participate in the program;
2. Encourage transparency and accountability of the program;
3. Help the general public to understand why the District Government is investing resources in the program, including: energy democracy, increased equity, and addressing climate change;
4. Motivate individuals to take action beyond the scope of the program; and
5. Successfully engage the target populations.

Program Recommendations

1. Provide an overall explanation and the legislative authority for the Solar for All program

Recommended language: The Renewable Energy Portfolio Standard Act of 2004 ("The Act") requires the District of Columbia to generate energy from renewable sources to decrease its overall carbon footprint. The Act was recently amended in 2016 to include a Solar for All Program within the DOEE "to increase the access of seniors, small local businesses, nonprofits, and low-income households to the benefits of solar power. The Program shall reduce by at least 50% the electric bills of at least 100,000 of the District's low-income households with high energy burdens by December 31, 2032."

2. Establish a holistic approach.

The Customer Education Subgroup recommends that DOEE adopt a holistic approach in both acquiring and managing consumers, as well as monitoring program results that includes education and follow up.

3. Provide a definition of solar energy and explanation of how it works.

Solar power is energy from the sun that is converted into thermal or electrical energy. Solar energy is the cleanest and most abundant renewable energy source available, and the U.S. has some of the richest solar resources in the world.

4. Explain the various ownership options.

- Purchase
- Lease
- Solar Garden Subscriptions

5. Establish and Demonstrate the Interconnection Timeframe.

Ensure consumers are aware that the interconnection process takes approximately 12 weeks. Include a graphic of the timeline that is easily understood.

6. Clarify Third Party Verifier Responsibilities.

- Serve as the go-to or “one-stop” entity that provides standardized education to the consumer at or before the point of sale.
- Explain who does what – DCRA/Pepeco/PSC.
- Provide a definition of Net Metering, along with an easily understood flowchart of the net metering process.
- Explain pricing and consumer choice.
- Provide initial and follow-up consultations at 60 – 90 days and 9 months.
 - o Site visit
 - o Savings realized
 - o Problem resolution
 - o Billing issues/questions

7. Explain the impact of solar on the environment, emissions, and employment.

8. Ensure that the Solar for All education efforts dovetail with DOEE’s existing Energy Efficiency and Weatherization efforts and leverages District agencies and other organizations to disseminate information about the programs.

9. Monitor and Communicate Program Results

Monitoring and consistent dissemination of program results and accomplishments is an essential element for program success. Metrics to report on include the following:

- Dollars saved
 - KWh produced (what does a kWh translate to?)
 - kWh saved
 - Reductions in CO₂, SO₂, NO₂
 - Annual reporting on number of LIHEAP disconnects per year
 - Energy consumption reduced
 - Solar jobs filled and job trainees brought online
 - Movement toward achieving 5% program goal (annual percentage reporting)
 - Number of households impacted
 - LIHEAP – Number of persons applying and number of disconnections
10. Ensure all elements contain consumer friendly language.
 11. Education, Monitoring and Communication efforts need dedicated staff and funding.
 12. Create a standalone website that would allow consumers to learn about the Solar for All program, facilitate the online intake process, and allow consumers to provide feedback and ask questions of DOEE.
 13. Engage representative groups

Representative groups include: small and local business associations, non-profits, senior citizen representatives (i.e., Office on Aging) and other civic organizations to participate in and collaborate on the program, to include DOEE's service intake services.

14. The group recommends that Consumer Education Plan be a flexible or living document that accommodates change as necessary and reflects the concerns of the different target groups.

Additional Questions for DOEE's Consideration

1. Will the task force limit its outreach to printed materials or be inclusive of other channels?

There needs to be an engagement strategy, which will coincide with customer acquisition efforts. Recommendations include:

- Pop-up display tables at District community events throughout the 8 Wards
- Hands-on consumer education sessions during the day, evenings, and weekends to accommodate various work schedules
- Collaboration/partnership with business organizations, Mayors Office of Community Relations and Services (MOCRS) and other District Government agencies,
- a stand-alone website,
- Social media (e.g., Twitter, Facebook),
- DOEE intake services, and
- Small business associations and community association meetings (e.g., Ward, ANC). These community groups should be able to further disseminate the information.

2. What does a well-educated constituency look like?

May overlap with acquisition group benchmarks.

3. How do we get to that target number (of 100,000)?

Recommendation – amendments that make the number more feasible. However, the message must be communicated regardless of the number.

4. Will recommendations about energy efficiency awareness and weatherization to be included?

The materials should contain specifics about energy efficiency literacy.

5. Should the task force efforts include job training?

The Consumer Education Subgroup recognizes that a workforce development subgroup has been created since the original recommendation.

6. Can a useful app be developed to disseminate program information or track District program milestones and homeowner metrics after installation?

7. What are the opportunities for embedded media? As a normal business practice, the community solar projects in play include ribbon cuttings, but it should be a part of the recommendations. This area may overlap with other groups.

8. What are the ideas and concerns about a standalone website?

o Having a standalone site is preferable to the content being included on an already crowded DOEE website. If on the DOEE website, there is no guarantee that content will receive

priority placement to prevent consumers getting lost searching deep links to find the message/program.

- o Dedicated staffing – who manages content and social media for effectiveness and efficiencies.
- o A website can be useful for value and tracking purposes.
- o How will the dedicated website be financed?
- 9. What is the universe of potential customers?
 - o SNAP, LIHEAP, RAD, and WAP
 - o How big are these lists?
 - o What overlap exists between the lists? A customer opportunity assessment would be useful to understand overlaps and what low-income consumer may be overlooked
- 10. Include a list of FAQ's in the consumer education program materials.

Recommended List of Frequently Asked Questions

OWNERSHIP

- What are the types of ownership?
- Who owns the electricity produced under the various types of ownership?
- What are the benefits of each type of ownership?
- What happens if I sell my home?
- When selling my home, should I seek a green appraiser who is knowledgeable about solar electric installation to obtain accurate valuations?
- Will the system increase the value of my home?
- Can a lien be placed on my home if I do not own the system?
- For a solar community garden, does it matter where the system is located?

FEDERAL TAX CREDITS

- What federal tax credits are available?
- When am I eligible for the Federal Tax Credit (up to 30% of the cost of the system)?

SOLAR RENEWABLE ENERGY CERTIFICATES (SRECs)

- What are SRECs?
- Who owns the SRECS?
- How do I use the SRECS?
- Under what circumstances can ownership of the SRECs transfer?
- What is the process for transferring SREC ownership?
- Are there any associated fees for the SRECs ownership transfer?
- What are the terms/conditions for transfer?

SYSTEM INSTALLATION AND MAINTENANCE

- How do you know if your system is working?
- What to do if your system is not working or your bill doesn't go down after the solar is installed.
- What safety practices and installations procedures must be followed?
- Who is responsible for all maintenance, monitoring and upkeep?
- Does the same company that installed the system provide the maintenance?

ENERGY PRODUCTION AND SAVINGS

- How much money can I expect to save?
- How much energy should I expect my solar energy system to produce?

CONTRACT PROVISIONS

- How is the projected annual solar output computed?
- Who calculates the projected annual solar output?
- How are the projected savings computed? [PVWATTS or KWH?]
- What type of warranty is included?
- Do I have to pay maintenance fees?
- Who bears the risk when the project experiences unexpected problems?
- What are the remedies if performance projections are not met?

- Is it the owner, subscriber or, finance company's responsibility to rectify the problems?
- Who actually owns the system on my premise?
- Who is responsible for all maintenance, monitoring and upkeep?
- Who is responsible for removal and replacement of the solar energy system in case the roof needs to be repaired or replaced?
- What is the period in which I may rescind my contract?
- Are my contract terms negotiable?
- Who do I contact for any follow up issues?
- What happens if my solar provider goes out of business?

SYSTEM FINANCING

- Who finances the system under the various ownership options?
- What are the financing options?
- Are there any District of Columbia solar financing programs?
- What does the lease payment cover?
- Will the lease payments increase over time?
- Does my lease payment include interest charges? If so, how is the rate determined?

ENVIRONMENT AND ECONOMIC DEVELOPMENT

- How does this program help reduce the District's carbon footprint?
- How will the program create sustainable jobs with living wages?
- What will be the frequency of communication about the program overall and its cumulative impacts? We recommend creating a dashboard for the program that includes updates in KW installed, and the CO2 impact. It should be available online.
- Should we provide a general statement on positive environmental impact (may be difficult to quantify, given that electricity is not generated within the District)?

Workforce Subgroup

Overview:

The Renewable Portfolio Standard Expansion Amendment Act (“RPSEAA”) recently approved in DC has goals to increase the city’s RPS to 50% and install 300MW for 100,000 low-income residents by 2032. In order to effectively reach the Solar for All goal of reaching 100,000 low-income households, creating a diverse workforce program with a scalable training model will assist the District in implementing the new law. The District’s laudable vision and intent for clean and efficient energy consumption and generation creates a sizeable market opportunity and offers the city the opportunity to achieve multiple sustainability goals: (a) effectively implement this legislation, along with other related sustainability mandates (energy efficiency and stormwater management, for example) (b) by engaging the sizeable number of DC residents needing access and success in opportunity pathways, such as Opportunity Youth and Returning Citizens.

The “RPSEAA” coincides with the Federal Government’s Workforce innovation and Opportunity Act, the most significant rewriting and reauthorization of Federal Workforce Legislation since the introduction of the Workforce Investment Act was introduced in 1998.

The Workforce subgroup suggests that DOEE work closely together with other DC agencies dedicated to creating opportunity pathways for all DC residents. In many ways, the task will be to see if this market initiative can integrate with the City’s requirements and workforce efforts. These efforts are being led directly by the Mayor through DMGEO, DMPED and Directors at _____. The work is being led by the Workforce Investment Council Staff in conjunction with a Board led by business interests reconstituted in July 2016. The major differentiators in the new workforce initiatives that make the integration of these two efforts potentially symbiotic are:

- Demand-driven workforce solutions
- Offer entry level opportunities for opportunity youth and other disenfranchised populations WITH an attainable career pathway (1)
- Encourage Innovation in workforce solutions

Through this collaborative effort, the City can design and incorporate a citywide workforce program that introduces sustainable solar careers and pathways, targets the communities that we’re impacting and utilizes partnerships with local job training organizations. Included below are recommendations for programming, target population, and possible barriers.

Program Goal

To create a sustainable career for approximately 3,500 people in the workforce program in order to help achieve the installation requirements for the Solar for All program.

Projections

Saving 50% of electricity cost for the 100,000 low to medium income households would equate to 300 MW of solar installed over the next 16 years. This target would need the resources of 10,000 person/year across multiple skill levels. Assuming an average career retention rate of 3 years per individual, the estimated jobs that need to be created are 3,344 over the length of the program, with 200 new jobs every year. Solar careers with high demand during this timeframe will include installation, sales, logistics and customer service. Please see the Solar for All Jobs Estimate and Solar for All Workforce Costs Estimate created by GRID Alternatives Mid-Atlantic in the appendix of this document.

Please note that these projections offer an initial perspective on the implementation of the plan, with a projected built timeframe. If these recommendations or approach is approved, we recommend that a more rigorous evaluation of DEMAND PROJECTIONS taking into account certain considerations (many of which already discussed by the group and raised / considered by the other subgroups). For example, evaluate the impact of important but competing mandates such as Storm Water Management.

Objectives

The workforce subgroup suggests that the program should:

Target the communities being served

- The workforce program can be a pathway to foster economic development in the communities that we're serving by targeting subgroups within these communities to introduce solar as a viable career, train a workforce, and provide job placement and entrepreneurial support. Target demographics should include trainees with a range of skill sets including but not limited to at-risk youth, college students, returning citizens, and experienced solar professionals.

Establish partnerships with job training providers, local business and universities

- To achieve RPS goals, DOEE should utilize job training providers, local businesses and universities as professional resources to develop a solar mentorship program. DOEE should collect data on: best practices, barriers to employment, average training time length, assessment protocols, quality assurance, program costs per trainee and stipend amounts. Ninety percent of Mid-Atlantic solar employers say that it's either somewhat or very difficult to hire local employees. Focusing on quality assurance by strengthening the quantity and quality of the workforce should be a continuous effort. These entities can provide valuable information needed to create an adequate and intentional workforce program that empowers job trainees while executing program goals.

Develop a training structure

- Based on information provided by partner entities to DOEE, we recommend that the solar mentorship program should use feedback to:
 - o Partner with local job training organizations to provide cross-training for target populations in solar and energy efficiency
 - o Incorporate the use of digital tools to ensure more optimal and scalable learning
 - o Incorporate other education and training concepts used widely in other levels of training and identified as far more important than skills learning for continued success, such as emotional intelligence, learning agility and mindfulness (which could be even more important in workforce populations exposed to trauma)
 - o Place trainees with local businesses and trained professionals to learn additional skills necessary to sustain a career in the solar industry.
 - o Provide trainees with skills certification and transferrable skills in order to progress in their careers
 - o Prepare trainees for NABCEP certification
 - o Mandate employers to hire a certain percentage of trainees from the program similar to the Single Family Affordable Solar Housing (SASH) program in California
 - o Decide on a tracking process similar to a case management system that will monitor trainees' progress, attendance, retention and provide support throughout the program
 - o Create an innovation hub to support entrepreneurship in solar and renewable energy
 - o Develop an assessment or survey for trainees and program partners to give feedback on the program
 - o Be scalable and adaptable so that it meets the Solar for All program requirements throughout the length of the program

Solar for All Jobs Estimate

Solar for All																	
Jobs																	
Variable Assumptions																	
Installers / MW	10				Outreach / MW				5				Administration / MW				4
Technicians / MW	4				Logistics / MW				6				Management / MW				1
Engineers / MW	2				Customer Support / MW				3				Finance / MW				3
Project Mgmt / MW	3				Career rotation (years)								3				
Target Market																	
LMI Electricity consumption (MWh)	700,000	686,000	672,280	658,834	645,658	632,745	620,090	607,688	595,534	583,623	571,951	560,512	549,302	538,316	527,549	516,998	
SFA Saving goals - Annual (%)	1%	2%	2%	2%	3%	3%	3%	3%	3%	3%	4%	4%	4%	4%	4%	5%	
SFA Saving goals - Cumulative (%)	1%	3%	5%	7%	10%	13%	16%	19%	22%	25%	29%	33%	37%	41%	45%	50%	
Energy Saving goals - Annual (MWh)	7,000	13,720	13,446	13,177	12,970	12,822	12,693	12,581	12,486	12,400	12,321	12,249	12,183	12,122	12,066	12,014	
Annual Solar PV Install (MW)	5.8	11.4	11.2	11.0	10.8	10.6	10.4	10.2	10.0	9.8	9.6	9.4	9.2	9.0	8.8	8.6	
Scope of Work (man/year)																	
Installers	58	114	112	110	108	106	104	102	100	98	96	94	92	90	88	86	
Technicians	23	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	
Engineers	12	23	22	22	21	21	20	20	19	19	18	18	17	17	16	16	
Project Mgmt	18	34	34	33	33	32	32	31	30	30	29	28	28	27	26	26	
Outreach	29	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	
Logistics	18	34	34	33	33	32	32	31	30	30	29	28	28	27	26	26	
Customer Support	18	34	34	33	33	32	32	31	30	30	29	28	28	27	26	26	
Finance	3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
Administration	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
Management	6	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	
Total SoW (man/year)	239	469	459	450	442	434	426	418	410	402	394	386	378	370	362	354	
Unique Jobs Created																	
Based on career rotation ratio above, the unique number of jobs needed to deliver this goal is																3,344	

Solar for All Workforce Costs Estimate

Solar for All Workforce																	
Variable Assumptions																	
Installers / MW	10				Outreach / MW				5				Administration / MW				4
Technicians / MW	4				Logistics / MW				6				Management / MW				1
Engineers / MW	2				Customer Support / MW				3				Training cost/job				7,000
Project Mgmt / MW	3				Finance / MW				3				Career rotation (years)				3
Target Market																	
LMI Electricity consumption (MWh)	700,000	686,000	672,280	658,834	645,658	632,745	620,090	607,688	595,534	583,623	571,951	560,512	549,302	538,316	527,549	516,998	
SFA Saving goals - Annual (%)	0.5%	2%	2%	2%	2%	3%	3%	3%	3%	3%	4%	4%	4%	4%	4%	5%	
Savings Goals - Cumulative (%)	1%	3%	5%	7%	10%	13%	16%	19%	22%	25%	29%	33%	37%	41%	45%	50%	
Energy Saving goals - Annual (MWh)	3,500	13,720	13,446	13,177	12,970	12,822	12,693	12,581	12,486	12,400	12,321	12,249	12,183	12,122	12,066	12,014	
Annual Solar PV Install (MW)	2.9	11.4	11.2	11.0	10.8	10.6	10.4	10.2	10.0	9.8	9.6	9.4	9.2	9.0	8.8	8.6	
Scope of Work (man/year)																	
Installers	29	114	112	110	108	106	104	102	100	98	96	94	92	90	88	86	
Technicians	12	23	22	22	21	21	20	20	19	19	18	18	17	17	16	16	
Engineers	6	12	11	11	10	10	9	9	8	8	7	7	6	6	5	5	
Project Mgmt	9	18	18	17	17	16	16	15	14	14	13	13	12	12	11	11	
Outreach	15	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	
Logistics	18	34	34	33	33	32	32	31	30	30	29	28	28	27	26	26	
Customer Support	18	34	34	33	33	32	32	31	30	30	29	28	28	27	26	26	
Finance	3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
Administration	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
Management	6	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	
Total SoW (man/year)	120	469	459	450	442	434	426	418	410	402	394	386	378	370	362	354	
Unique Jobs Created																	
Solar-specific jobs	31	122	120	117	115	113	111	109	107	105	103	101	99	97	95	93	
Professional Jobs	9	34	34	33	33	32	32	31	30	30	29	28	28	27	26	26	
Total Jobs	40	156	153	150	147	145	143	141	139	137	135	133	131	129	127	125	
Annual Solar Training Cost (\$ million)	0.2	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
Setup cost (3% of program cost)	0.9																

1. Below is the full definition of a Career Pathway, taken from WIOA Sec. 3 (Def. 7)

CAREER PATHWAY.—The term “career pathway” means a combination of rigorous and high-quality education, training, and other services that—

(A) aligns with the skill needs of industries in the economy of the State or regional economy involved;

(B) prepares an individual to be successful in any of a full range of secondary or postsecondary education options, including apprenticeships registered under the Act of August 16, 1937

(commonly known as the “National Apprenticeship Act”; 50 Stat. 664, chapter 663; 29 U.S.C. 50 et seq.) (referred to individually in this Act as an “apprenticeship”, except in section 171);

(C) includes counseling to support an individual in achieving the individual’s education and career goals;

(D) includes, as appropriate, education offered concurrently with and in the same context as workforce preparation activities and training for a specific occupation or occupational cluster;

(E) organizes education, training, and other services to meet the particular needs of an individual in a manner that accelerates the educational and career advancement of the individual to the extent practicable;

(F) enables an individual to attain a secondary school diploma or its recognized equivalent, and at least 1 recognized postsecondary credential; and

(G) helps an individual enter or advance within a specific occupation or occupational cluster.

DRAFT