

ACCELERATING SOLAR FOR ALL FINANCING FOR MULTIFAMILY
AFFORDABLE HOUSING IN NORTH CAROLINA

by

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Executive Summary

The North Carolina Clean Energy Fund (NCCEF) has received \$156 million dollars through the Environmental Protection Agency's (EPA) Solar for All (SFA) program to finance the build out of solar projects on single and multifamily affordable housing. This client project focused on developing policy recommendations and building a financial model that will enable NCCEF to more effectively incentivize multifamily housing owners and developers to participate in the SFA program. Since I worked on this project in 2024 when the funding was not yet available, I focused on helping NCCEF build out strong project management systems so that the funding could be quickly and efficiently deployed when it was released in 2025. Additionally, because SFA is a new initiative, it was important to meet with key stakeholders including developers, affordable housing owners, and energy policy experts to identify potential programmatic and funding barriers and develop solutions early on to maximize NCCEF's impact.

I began the process with conducting 20 stakeholder interviews and using these conversations to produce key policy, financial, and program structure recommendations NCCEF should pursue to ensure the SFA funding is distributed efficiently and equitably. I then incorporated these findings into an Excel model that inputs building energy usage and utility rates and outputs the solar project size and cost needed to meet the SFA 20% tenant monthly utility bill savings requirement. Through the interviews and process of building out the PV system size model, I identified key obstacles and developed suggestions NCCEF should consider as it seeks to build a robust process for deploying SFA funds for multifamily affordable housing units.

Key Obstacles:

- 1) HB 589 restricts the number of solar projects that can be leased to less than 1% of Duke Energy's previous 5-year average peak demand. Limiting solar leasing hurts affordable housing owners because it is often a more affordable financing mechanism for installing solar.
- 2) Most multifamily housing complexes are old and inefficient and therefore require substantial financial investments for weatherization and efficiency upgrades before buildings are ready for solar. The state lacks sufficient funds to provide enough efficiency upgrades, which reduces the number of houses eligible for SFA.

- 3) Affordable housing complex owners who fall under the management of the Department of Housing and Urban Development do not pay for utility bills. Since these owners do not directly receive any solar savings, they may not be financially incentivized to participate in SFA.
- 4) Multifamily complexes that have master metering are unable to pass utility savings directly to tenants. These buildings may be ineligible for SFA if they cannot meet the direct 20% savings to homeowners' requirement.

Key Recommendations:

- 1) Policy
 - a. NCCEF should work with policy experts to advocate for increasing the amount of solar leasing allowed under HB 589. This will enable more affordable housing owners to afford to participate in SFA.
 - b. NCCEF should support advocacy efforts around improving Duke Energy net metering rules so that solar projects can generate higher returns when selling back to the grid. This will increase the potential profitability of a project, incentivizing more owners and developers to build solar installations through SFA.
- 2) Financial
 - a. Seek to optimize tax credits to reduce the total project cost as much as possible before additional grants and low-interest loans are added to the finance stack. With tax credits at risk of elimination under the current administration, NCCEF should seek philanthropic dollars to fill this potential funding gap.
 - b. Pursue avenues for providing non-financial direct benefits that equal 20% savings for master meter buildings so they can participate in SFA. This can look like providing free internet or transportation to tenants.
- 3) Program Structure
 - a. Focus initial pilot projects on private and individual metered buildings since these have the fewest regulatory hurdles.
 - b. Enabling joint Requests for Solar Funding Proposals to reduce administrative burdens for housing management that are often understaffed and underfunded. Allowing owners to submit joint requests will make it easier for more housing complexes to participate in SFA.

- c. Partner with iCAST, a weatherization company working with the state energy office, to more efficiently identify buildings ready for solar.

These recommendations will help NCCEF more effectively incentivize multifamily housing owners and developers to participate in SFA and build solar projects that reduce electricity costs for tenants who primarily come from low-income and disadvantaged communities.

I. Process and Deliverables Overview

When I started the Mentored Study in spring of 2024, I first focused on deepening my knowledge of SFA and the broader Greenhouse Gas Reduction Fund (GGRF) that was part of the Inflation Reduction Act (IRA). Since the IRA was passed in late 2022, many organizations did not yet know how to most effectively build a pipeline of solar projects that could be sustainably financed and quickly developed. I spent ample time researching how SFA was set up under the EPA, its funding model, deployment timeline, and compliance requirements. Since my project focused specifically on the multifamily housing side of SFA, I conducted additional research on the requirements multifamily projects had to meet to be eligible for SFA funding.

After this initial research, I then reviewed preliminary funding models that NCCEF had been testing out for single family projects to develop an understanding of what was transferrable to the multifamily model. My next step was to conduct stakeholder interviews with developers, affordable housing owners, and state policy experts to collect qualitative data and insights into how they wanted the multifamily funding model and program to be structured. I spoke with 20 different groups and aggregated key data points on the barriers and program structure needs to make SFA funding deployment successful. To build out the model, I utilized aspects of the SFA single family templates and incorporated Duke Energy rate structures to create a model that outputs a solar project size and cost that meet the SFA savings requirement. I continued to iterate on the model based on feedback from my manager.

My final deliverables included the financial model and a best practices guide with policy and project management recommendations for a new full-time program manager to utilize as they continue to build out the program.

II. Overview of Green Banks and Solar for All

The EPA defines Green Banks as “public, quasi-public, or nonprofit financing entities that leverage public and private capital to pursue goals for clean energy projects that reduce emissions.”¹ Green Banks provide financing to projects and groups that do not receive sufficient funding from traditional financial markets with the goal of creating specific economic development and public health benefits. Because Green Banks are state or non-profit entities,

¹ “Green Banks.” *EPA*, Environmental Protection Agency, 24 Jan. 2025, www.epa.gov/statelocalenergy/green-banks.

they can take on financing risks that capital markets may avoid such as offering loans to customers who do not meet certain credit requirements of other lenders. Some typical financing mechanisms Green Banks use include credit enhancements, loan loss reserves, subsidized loans at lower interest rates, and co-investments with private capital. Through these tools, Green Banks are serving more underserved communities and filling market gaps. The Connecticut Green Bank was the first green bank in the United States, opening its doors in 2011.² Other prominent Green Banks include the New York and DC Green Banks.

NCCEF is a nonprofit “Green Bank” that deploys sustainable financing in North and South Carolina for rooftop solar, battery storage, electric vehicles, and home energy efficiency upgrades. It was established in 2020, and its goal is to direct financing to underserved communities that have historically been left out of the clean energy transition. NCCEF was founded three years ago and is the only Green Bank in North Carolina. Due to the political nature of North Carolina, there was insufficient political will to establish a state green bank, which meant NCCEF had to be founded as a non-profit. It works closely with the NC Department of Energy, private investors, and foundations to finance clean energy projects through grants and loans.

Although NCCEF is not a state entity, it works closely with the NC Department of Environmental Quality and was part of the state’s application to the SFA program. SFA is part of the broader Greenhouse Gas Reduction Fund (GGRF) which is a \$27 billion investment from the EPA to combat the climate crisis. Its primary goals are to reduce greenhouse gas emissions, direct funding to low-income and disadvantaged communities, and mobilize financing from private capital.³ SFA is one of the programs under GGRF that deployed \$7 billion to 60 grant recipients who are using the funding to expand existing solar programs and design new ones for low-income households.⁴ North Carolina received \$156,120,000 in SFA funding as part of the statewide EnergizeNC program.⁵ NCCEF is the primary recipient of this funding, and dollars will flow from the state office to NCCEF. One of the primary requirements under SFA is that a

² “About US - CT Green Bank: Accelerating Green Energy Adoption in CT.” *CT Green Bank*, 6 Sept. 2024, www.ctgreenbank.com/about-us/.

³ “About the Greenhouse Gas Reduction Fund.” *EPA*, Environmental Protection Agency, 13 Feb. 2025, www.epa.gov/greenhouse-gas-reduction-fund/about-greenhouse-gas-reduction-fund.

⁴ *Ibid*

⁵ “Solar for All.” *EPA*, Environmental Protection Agency, 13 Mar. 2025, www.epa.gov/greenhouse-gas-reduction-fund/solar-all.

solar project must save households at least 20% on their electric utility bill. This can either be a direct benefit on their bill, or if the household does not have an individual bill, can be a direct non-financial benefit.⁶

III. Stakeholder Interview Qualitative Findings

I conducted 20 stakeholder interviews to understand the primary needs and obstacles for financing and building SFA projects at multifamily housing complexes (see Exhibit 1 in Appendix for full list of interviewees). These stakeholders are bucketed into 3 main groups: Developers, Public Housing Authorities, and Energy State Offices and Non-Profits. The qualitative findings are summarized below.

Developers

One of the biggest barriers facing developers who want to build solar projects for multifamily housing groups is that they do not have multifamily complexes approaching them because historically these clients have not been able to afford the cost of rooftop solar. One of the key ways SFA solves for this issue is providing bridge loans so that clients can have a lower upfront cost and pay the remaining total costs over a longer period at the same time as they are receiving monthly utility bill savings.

Another key opportunity that came up in the interviews was the need for more developers to be licensed lessors. This would enable additional developers to offer a leasing model which is often more affordable for housing owners because it prevents them from having to make large upfront capital investments. Rather, the housing owners can pay a monthly lease charge which is financially more accessible. However, under House Bill 589, only 1% of Duke Energy's previous 5-year average peak demand can be under a leasing model. This means the total number of solar projects eligible for leasing is constrained to a very small number of kilowatts.⁷ Additionally, only 12 companies are registered lessors in North Carolina.⁸ For more developers to be able to participate in SFA, the state legislature needs to amend HB589 and increase the percentage of projects that are eligible for leasing.

⁶ "Frequent Questions about Solar for All." *EPA*, Environmental Protection Agency, 25 Feb. 2025, www.epa.gov/greenhouse-gas-reduction-fund/frequent-questions-about-solar-all.

⁷ Fox, Sydney. "Unlocking the Potential of Solar Leasing in North Carolina." *NC Sustainable Energy Association*, 3 Dec. 2024, www.energync.org/blog/unlocking-the-potential-of-solar-leasing-in-north-carolina.

⁸ "North Carolina House Bill 589." *NC Sustainable Energy Association*, 26 Nov. 2024, www.energync.org/north-carolina-house-bill-589/.

If this barrier can be overcome, developers are in an opportunistic position to take full advantage of SFA funding. During one of the interviews, NC Solar Now which is a renewable energy development company talked about how they view affordable housing projects the same as commercial projects in terms of risk and financing requirements. This means that most developers should be excited to build multifamily housing projects once SFA dollars are available and if they can offer solar leasing options.

Public Housing Authorities

Public multifamily housing owners face three key barriers in being able to take advantage of the SFA program. The first is staff inertia and understaffing, which makes it difficult to have sufficient human capital to plan and manage a SFA project. The second is most publicly owned multifamily housing complexes are old and inefficient, which means they require massive and expensive upgrades before solar can be installed on the roof. Third, most public housing complexes are run under the Department of Housing and Urban Development (HUD). Since HUD pays the utility bills, owners of the multifamily housing units are less incentivized to install solar because they do not directly see any savings. Since the first challenge is difficult to address without a larger analysis of how to improve federal and state funding for public housing, I will primarily focus on solutions for the second and third barriers.

One solution to the energy inefficiency problem that came out of these interviews was having an energy performance contract done for all multifamily housing buildings and tying the funding to SFA. This means a multifamily housing complex could use SFA funds to pay for an energy assessment and for the efficiency upgrades. Interviewees also encouraged housing owners to take advantage of the Department of Energy's Electrification program which provides funding to install things like heat pumps and central air conditioning. Another solution is enabling piggybacking in Requests for Proposals, meaning Public Housing Authorities (PHAs) can do a joint solar project procurement process rather than independent procurement. By aggregating proposals, more PHAs would submit project requests. The policy experts also recommended starting with the large PHAs in North Carolina that include Durham, Raleigh, Greensboro, Winston-Salem, and Charlotte because they have the most staffing and funding and would have the highest likelihood of being able to successfully participate in SFA. Once NCCEF has completed successful pilot programs in the large PHA areas, it could then use these learnings to effectively develop projects in more rural and underfunded housing geographic locations.

To address the issue of incentive misalignment for HUD owned properties, interviewees recommended piloting SFA projects with privately owned affordable housing units. This solves the incentive issue because the owners would receive the benefits of lower utility bills and be able to pass those savings on to their residents. Also, privately owned units have fewer regulatory restrictions and would likely be easier and faster to work with.

Energy State Office and Non-Profits

Through conversations with staff from the State Energy Office and environmental non-profits, I identified additional funding avenues that can help pay for weatherization and energy efficiency upgrades. For example, the State Energy Office has formed a partnership with iCAST which is a nonprofit that does home energy efficiency upgrades at reduced costs. Through this partnership, the state plans to provide weatherization improvements to around 1,400 houses. NCCEF should partner with iCAST to pitch SFA when they are conducting the upgrades because these houses would be ideal partners for rooftop solar. The state should also pursue supplemental weatherization funding from the Department of Health and Human Services, NC Housing Finance Agency, Blue Cross Blue Shield, and Duke Energy. For SFA to be most successful, NCCEF needs to work with the state energy office to ensure there is ample funding to do energy efficiency upgrades for multifamily homes. Otherwise, there may be an insufficient housing stock to use all the \$150 million in solar project funding.

Another key barrier that came up in conversations with energy policy non-profits is the issue of master metering buildings and the difficult of passing on utility savings to tenants. Multifamily housing complexes with master metering have one meter for the entire building. This means it is difficult to know how much each unit is individually using and therefore you cannot easily pass on the 20% savings directly to tenants because the housing owner pays the utility bill. Additionally, it is too expensive to change the system to individual meters. To solve for this savings requirement barrier, interviewees suggested using non-direct financial benefits that would be comparable to the utility bill savings. Some examples included offering community benefits such as free Wi-Fi, job training workshops, free transportation shuttles, or on-site healthcare services. It is unclear if these types of benefits would be allowed under EPA guidance, but they are worth investigating as means to include master meter buildings in SFA projects.

Summary

These interviews provide key insights into financial, policy and project structure mechanisms that can enable NCCEF to most effectively use SFA dollars for multifamily housing. In addition to deploying capital, NCCEF should work with partners to advocate for more leasing capacity and state weatherization funding. It should also explore initial partnerships with private housing owners and work with the EPA to get non-direct financial benefits approved.

IV. Financial Model Overview

Model Overview

The second key project deliverable involved building an Excel financial model that enables the user to determine what size solar project is required to achieve the SFA 20% tenant savings requirements and how much this system would cost. Based on the solar (PV) system size inputs, the model outputs total electricity savings and project costs for a multifamily (MF) affordable housing unit solar installation. The intended audience for this model is affordable housing owners and solar developers. The goal is that NCCEF can use this model in meetings with housing owners and developers so they can get an initial idea of how much the system would cost and the type of financing stack needed to develop the project. This can help NCCEF get buy-in more quickly and start deploying financing at a faster speed. To use the model, the user can change the following input levers: the MF unit's average kWh usage, PV system size and estimated PV costs. The user can utilize either the individual or master metered tab depending on how the unit's electrical billing system is set up.

Model Assumptions

The model assumption sources are found in Exhibit 2. Utility rate assumptions are found in Exhibit 3 and come from Duke Energy's website.

- *Solar Irradiance*: Solar Irradiance is similar across all parts of the state. Therefore, we use solar irradiance from the middle part of the state (Durham) to represent average irradiance.

- *Tenant Electricity Bills:* A typical household uses 1,000 kWh per month and spends \$140 (Duke Energy Carolinas) or \$152 (Duke Energy Progress) a month on their electric utility bill. Solar for All funding requires 20% savings of this total bill.
- *Cost Inputs:* Most MF units fall under Duke Energy Progress or Duke Energy Carolinas territory. Therefore, we use Duke Energy Rates for the inputs (rates from spring 2024 when I completed project).⁹
- *Enabling Upgrades Costs:* Based on SFA requirements, enabling upgrades cannot exceed 20% of the total project cost

Model Inputs

The model requires four main types of inputs: PV System, MF Property Characteristics, Utility Rates, and Property Energy Usage.

PV System Inputs:

The two most important inputs in this section are the PV system size and the enabling upgrades cost. Because SFA has the 20% tenant savings requirement, the project must be large enough for the MF complex to reach this savings goal based on its energy usage. One of the key barriers to meeting this PV system size is the MF complex roof or ground space may be too small to be able to build a large enough solar project. Additionally, efficiency upgrades cannot exceed 20% of the projects total cost. If the unit requires efficiency upgrades that cost more than this allowance, the project may not be viable. Therefore, it is critical that the state provides additional funding for weatherization and efficiency upgrades to supplement SFA dollars.

PV System Inputs		
Irradiance (kWh/month)		119.08
PV System Size (kW DC)		80
Solar install cost (\$/watt)	\$	2.50
Actual Enabling Upgrades Cost	\$	500.00
<i>Maximum 20% enabling upgrades allowance</i>	<i>\$</i>	<i>40,100.00</i>

⁹ “North Carolina Index of Rate Schedules.” *Duke Energy, LLC*, 1 Oct. 2024, www.duke-energy.com/_/media/pdfs/for-your-home/rates/electric-nc/ncschedulers.pdf?la=en.

Multifamily Property Inputs

The most important input is the 20% monthly savings goal which is dependent on whether the MF unit is in DEP or DEC territory. This savings goal is what drives the solar system size required to meet SFA funding rules.

Multifamily Property Inputs		
# of 1 Bedrooms		2
# of 2 Bedrooms		2
# of 3 Bedrooms		2
Total # of Units		6
Household 20% monthly savings	\$	30.43

Cost Inputs

These cost inputs come from DEC or DEP's retail rate structure which are subject to change based on rate hearings with the North Carolina Public Utility Commission. One of the key barriers to reaching the monthly savings goal is that Duke Energy has a Minimum Monthly Bill. If monthly energy usage falls below a certain point, the customer must pay an extra charge to cover Duke Energy's fixed costs. Since the solar project will reduce the MF unit's monthly utility bills, this minimum monthly bill makes it even more difficult for the project to meet the SFA savings requirement since any savings are offset by this minimum charge.

Cost Inputs		
Retail rate (\$/kWh)	\$	0.11
Excess Production Avoided Cost Rate (\$/kWh)	\$	0.03
Non-Bypassable Charge (\$/kW)	\$	0.67
Minimum Monthly Bill DEC per month	\$	28.00
Basic Facilities Charge	\$	14.00
Retail rate for Minimum Bill (\$/kWh)	\$	0.04
Volumetric Rider	\$	-

Property Energy Usage

Listed below are monthly kWh usage for units based on the number of bedrooms. If a MF complex has a Master Meter system, the model uses the property energy usage assumptions multiplied with the MF Property Inputs to calculate the average monthly kWh usage for all units in the building. This total building kWh usage is used to calculate the 20% savings that then impact the PV system size required to reach this savings goal.

Property Energy Usage Assumptions

Multifamily Individual Units		
	Yearly Usage (kWh)	Monthly Usage (kWh)
1 Bedroom	5,000	417
2 Bedroom	7500	625
3 Bedroom	10,000	833

Model Outputs

From these inputs described above, the model then outputs three key values: net metering monthly excess electricity production, whether the project meets the savings goal, and the total project cost.

Net Metering Monthly Excess Electricity Production

The first line is calculated by multiplying the monthly kWh usage by bedroom type times the number of bedroom types in the MF building. The electricity production is calculated by multiplying the PV system size by the irradiance. The excess production is the difference between the two values above. If the system produces more electricity than the building uses, then the solar system will produce excess electricity. This value is important because it impacts whether the solar system can take advantage of net metering and whether it will have to pay a minimum monthly charge.

System Savings and Costs Outputs	
Average monthly usage all units (kWh)	3750.00
System Monthly Electricity Production (kWh)	9526.67
Net Metering Monthly Excess Electricity Production (kWh)	5776.67

Meets Monthly Savings Goal

To calculate whether the project meets the monthly savings requirement, the model must first calculate the total utility cost for the complex and the savings available after the project loan payment. To find the monthly utility cost, the model uses the monthly usage and electricity production outputs in combination with the Duke Energy retail charges and net metering rates. If the net metering rates exceed the retail charges, the MF building essentially has a \$0 monthly bill.

While a \$0 monthly bill is of course beneficial, what is most important in the outputs is to determine whether the post loan payment monthly savings exceed the 20% savings requirement. Since most buildings have master meters, the model calculates the savings at a building rather

than individual unit level. The required monthly savings is found by multiplying the \$30.43 savings per month by the total number of units in the building. The actual monthly savings is calculated by multiplying the solar system monthly production by the retail rate and summing with the net metering production multiplied by the excess production avoided cost rate. The first component in this equation represents the utility bill the building avoided by producing its own electricity. The second component represents money the solar system made by selling the excess electricity back to the grid.

Since the solar system requires a monthly loan payment (principal and interest), the savings post loan payment must still exceed the 20% requirement. In the example below, the monthly loan payment calculated in a separate model tab is \$1,261. Therefore, the monthly savings is $\$1,462 - \$1,261 = \$200$. Since there are six housing units in this building, the per household actual monthly savings is $\$200 / 6 = \33.45 which exceeds the required \$30.43. This means the solar project size meets the savings requirement.

Net Retail Utility Bill	\$	-
Customer and Distribution Energy Charge to Minimum Bill		168.49
System Non-Bypassable Charge	\$	53.60
Basic Facilities Charge	\$	14.00
Volumetric Riders	\$	-
System Monthly Minimum Bill	\$	-
Net Metering Monthly Excess Credit	\$	196.41
Total Monthly Utility Cost for Complex	\$	-
Required Annual Savings for Entire Complex	\$	2,191.10
Required Monthly Savings for Entire Complex	\$	182.59
Total Actual Yearly Savings	\$	15,424.80
Total Actual Monthly Savings	\$	1,285.40
Savings available after loan payment (principal + interest)		24.08
Per Household Actual Monthly Savings	\$	4.01
Per Household Monthly Savings as % of total bill		13%
Meets Monthly Savings Goal?		No

Total Solar Project Cost

Once the model user has determined the solar system size required for the savings goal, they can then analyze the total project costs listed below. The Solar Cost is calculated by multiplying the PV System size (kw) by the \$/watt install cost. The enabling upgrades cost is dependent on the energy efficiency assessment of the building and any required improvements. The Total Project cost is the summation of the two costs. The model then takes this total project

costs and in a separate tab calculates the monthly loan payments dependent on various inputs like loan term years, tax credit availability, credit rating and interest rate.

Solar Cost	\$ 200,000.00
Enabling Upgrades Cost	\$ 500.00
Total Project Cost	\$ 200,500.00

Model Benefits

The goal of this model is to give developers and affordable housing owners a high-level estimate of what they should expect to pay or make from this potential solar project, and it enables NCCEF to determine whether it meets the SFA savings requirements. NCCEF can use this model in initial partner conversations to gauge interest and identify barriers to participation, which will enable them to more quickly solve project design flaws and start building a bigger pipeline of potential projects. The model's overall goal is to support NCCEF in quickly and efficiently deploying SFA funding by giving key partners a baseline view into key project attributes, costs and potential utility savings.

Recommendations for Additional Model Capabilities

There are additional capabilities that can be included in the model to make it even more useful for NCCEF. I included these recommendations in my final deliverable for the new, full-time program manager to consider incorporating. These additional capabilities include:

- Add a toggle for taking the tax credit and build into the amortization table.
- Build out an amortization table for the different credit ratings
- Incorporate a bridge loan into the financing structure.
- Create a version for cooperatives and municipal utility territories
- Create a pro-forma for site specific solar projects based on the model.

Additionally, the model owner should continue to watch for changes in Duke Energy's rate structures and update the model as necessary.

V. Key Project Recommendations

Recommendations for how to most effectively deploy SFA funding for MF buildings fall into three buckets: policy, financial and program structure. These recommendations come from the stakeholder interviews and process of building out the financial model.

Policy

One of the best ways to increase monthly savings for tenants is to improve North Carolina's net metering rules so that solar projects that generate excess electricity production can earn more revenue when selling back to the grid. The state's net metering rules changed in 2023 and become more restrictive, meaning consumers with rooftop solar started to earn less for each kWh of electricity produced.¹⁰ This makes it more difficult for homeowners to afford rooftop solar because the system's revenue generation potential has decreased. Similarly for MF buildings, a project would be more financially appealing and viable if it could earn more revenue through net metering. Therefore, NCCEF should support its partners in advocating for better net metering regulations.

Another necessary key policy change includes increasing the number of solar projects that can be leased. NCCEF should advocate for changes to HB 951 so that a larger percentage of electricity demand in Duke Energy territory can be met through leased solar farms. Since leasing is often more affordable for MF buildings, this would enable more participants in SFA.

Finally, the state needs to provide more funding for weatherization and efficiency upgrades. Even though SFA allows 20% of project costs to go towards upgrades, there will be MF buildings that will require more funding to fix aging infrastructure before it is qualified for rooftop solar. If NCCEF can help the state build up a larger funding pot for these upgrades, there will be a bigger stock of MF buildings eligible for SFA projects. This will help ensure NCCEF uses every dollar of SFA funding.

Financial

When building out the model, it became clear that tax credits are vital to helping projects meet the 20% savings goal. Tax credits help lower the monthly loan payments, which increases total utility savings each month. Solar projects are often cost prohibitive for public housing authority and MF owners, especially considering these agencies are already severely underfunded. Even with SFA grants that help subsidize solar costs, many MF owners will require tax credits so that they cannot afford the monthly loan payments and so that their tenants will receive 20% savings on their bills. With increased uncertainty around whether tax credits will go

¹⁰ Abele, Matt. "2023 Update on Net Metering in North Carolina." *NC Sustainable Energy Association*, 30 Mar. 2023, www.energync.org/blog/2023-update-on-net-metering-in-north-carolina/.

away under the Trump Administration, NCCEF should start pursuing philanthropic dollars to bridge this gap if tax credits are eliminated.

Another key financial consideration is that for a small building of 6 units, the minimum solar project required to meet the savings goal is around 90 kW. This size solar installation can cost about \$225,000. NCCEF can consider this as an example of a baseline project cost that will only increase with larger MF building sizes. In initial conversations with affordable housing owners, NCCEF should gauge whether this baseline cost is financially viable or whether owners will require grants in addition to tax credits to afford monthly loan payments. If many owners say \$225,000 is unattainable, NCCEF will then be able to develop more refined finance stacks that include equity, loans, subsidies, grants and tax credits to best meet the owners' financial capabilities.

Program Structure

To quickly start deploying SFA funding, NCCEF should start with private MF building owners because they will likely have the best financial incentives to participate. This will enable NCCEF to get more projects successfully off the ground before trying to build projects at publicly owned complexes where the savings incentives are misaligned due to HUD oversight. Additionally, NCCEF should pilot solar projects with individually metered MF buildings. Since the monthly savings go directly to individual units, NCCEF can more easily meet the savings goal. Starting with simpler projects will allow NCCEF to build strong program foundations before addressing more financially complicated projects. With master metered buildings, NCCEF should continue to explore how to provide non-direct financial benefits to tenants so that master meter buildings can more easily meet the monthly savings requirement.

Finally, NCCEF should work with partners to create more efficient program operation processes. For example, it should partner with iCAST to identify weatherized homes that are great candidates for rooftop solar. Additionally, NCCEF can work to enable joint RFP applications so that understaffed MF building owners can reduce the application time barrier by filing jointly with other interested parties.

Pursuing these policy, financial and program structure recommendations will make it easier and more efficient for NCCEF to quickly deploy SFA funding to MF buildings.

VI. Current Political Climate and Implications for Solar for All

Since completing my Mentored Study with NCCEF, SFA has come under attack by the Trump Administration and its future remains uncertain. When Trump came into office in January of 2025, he immediately froze GGRF funding. As a result, organizations could not access their funds on the EPA online portal, causing chaos and restricting awardees' ability to deploy their congressionally approved funding. Although SFA has been unfrozen and funds are accessible again, it is unclear whether the freeze will be reinstated. The two other GGRF programs that are still frozen are now being litigated and it is unknown how long this process will take and when the funds will become available again. With the Trump administration's antagonism towards clean energy, it is likely they will continue to threaten SFA funding. As a result, there has been a decline in hiring for SFA administrative roles and a slowdown of getting dollars out the door.

Despite these setbacks, there are two key reasons I believe SFA will survive. First, SFA funding is going towards all fifty states. Republican states applied for this funding and since the economic impact of federal money can be 3-5 times that of the initial investment, these states will experience negative economic outcomes if SFA funding is eliminated.¹¹ Therefore, it is in the best interest of Republican representatives to advocate for keeping SFA funding available to support the economic activity in their states. Second, energy demand is growing rapidly, primarily due to AI and data centers. Over the next 5 years, US electricity demand is expected to grow 16%, which is exponentially larger than the <1% annual increase from the past 20 years.¹² The United States needs all the power it can generate, which means it also needs to rely on solar for grid stability, reliability and national security. Although it makes economic sense to preserve SFA, the Trump Administration is an irrational actor, and it is therefore unclear whether economic benefits will outweigh an anti-clean energy political agenda.

Regardless of SFA's uncertain future, the program is currently unfrozen and NCCEF should continue to work diligently to deploy SFA funding as quickly as possible to increase its impact across North Carolina and lower the energy burden for low-income and disadvantaged communities.

¹¹ Plunk, Elise, and Halle Parker. "Solar for Y'all' Faces Hazy Future in Louisiana." *Louisiana Illuminator*, 18 Mar. 2025, lailluminator.com/2025/03/18/solar-for-yall-faces-hazy-future-in-louisiana/.

¹² Copley, Michael. "U.S. Electricity Demand Is Set to Explode. That Will Make It Harder to Cut Climate Pollution." *NPR*, NPR, 17 Jan. 2025, www.npr.org/2025/01/16/nx-s1-5251454/electricity-demand-data-centers-climate-change-natural-gas-fossil-fuel#:~:text=Over%20the%20next%20five%20years,over%20the%20past%20%20years.

Appendix

Exhibit 1: List of Stakeholder Interviews

Name	Organization
Mickey Fanney	Southern Energy Management
John Froelich	Self-Help Credit Union
Ben Justus	Self-Help Credit Union
Laurie Colwander	Southern Energy Management
Ravi Mohltra	iCAST
Lindsay Rosenfeld	NC Housing Finance Agency
Lauren Westmoreland	Stewards for Affordable Housing
Evan Becka	Pisgah Energy
Katie Clifford	NC Solar Now
Will Nichols	Solar Equity NC
Steve Morgan	Clean Energy Sol
Geoffrey Barton	Mountain Housing Opportunities
Vincent Potter	NC Clean Energy Technology Center
Matthew Davis	State Energy Office
Brian Coble	Advanced Energy
Lisa Manuel	Advanced Energy
Ethan Blumental	NCSEA
Laura Combs	Eagle Solar and Light
Chris Miraglia	Durham Housing Authority
Daniel Brookshire	Southern Environmental Law Center

Exhibit 2: Model Input Sources

Sources	Links
Solar Irradiation: PV Watts (NREL)	PV Watts Calculator
Target Monthly Bill Savings: Estimate 20% savings based on average monthly utility bill. Sources from Duke Energy News	DEC DEP
Bridge Rate: Southern Energy Management:	Southern Energy Article
PV Pricing Guide Tab: info from Pisgah Energy's Evan Becka	
Average Property Energy Usage: info from Southern Energy Management's Jacob Hauser	
Utility Rates and Riders: net metering bridge rates	DEC DEP
Average kWh monthly usage: Electricity Local	Electricity Local Article

Exhibit 3: Duke Energy Utility Cost Inputs

Utility Cost Inputs									
Utility Region	Retail rate (\$/kWh)	Excess Production Avoided Cost Rate (\$/kWh)	Non-Bypassable Charge (\$/kW)	Minimum Monthly Bill per month	Basic Facilities Charge	Retail rate for Minimum Bill (\$/kWh)	Household Average Utility Bill	Household 20% Monthly Savings	
DEC	0.11431	0.035	0.29	22	14	0.021482	\$ 140.33	\$ 28.07	
DEP	0.11431	0.034	0.67	28	14	0.04493	\$ 152.16	\$ 30.43	

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