



U.S. DEPARTMENT OF
ENERGY

NREL
Transforming ENERGY

 **BERKELEY LAB**



Community Solar Resources for Multifamily Affordable Housing Providers

August 25, 2022

Housekeeping

- This session **is** being recorded
- Type your questions in the Q&A. Questions will be answered at the end of the webinar
- Closed captioning is available. Click Show Captions button to view
- We invite you to introduce yourselves in chat (name and affiliation)
- For technical assistance during the webinar chat with Derek Barylski with NREL

Agenda

1 Welcome and Introduction

2 Overview of the National Community Solar Partnership

3 Presentation of MFAH Resources

Community Solar Project Models for MFAH

MFAH Portfolio Screening Package

MFAH Portfolio Modeling Tool Spreadsheet and User Guide

HUD Utility Allowances Overview and Resident Engagement Tip Sheet

4 Q & A with Presenters

5 Wrap-up and Adjourn

A photograph of a modern two-story townhome. The house features a dark blue accent wall on the left side and a light beige stucco finish on the rest of the upper level. The roof is covered with a series of solar panels. The lower level has horizontal siding and wooden doors with small porches. A black metal railing is visible in the foreground. The house is set on a green lawn under a clear blue sky.

Overview of the National Community Solar Partnership

NCSP Pathway to Success



National Community Solar Partnership (NCSP)



Data Tracking

Sharing the Sun is an annual report, published by NREL, that tracks market trends in community solar.



Collaboration

Partners can access an online community platform, virtual/in-person meetings, webinars and other tools to engage with DOE, National Labs, and each other.



Technical Assistance

Partners have access to resources and direct technical assistance from DOE, National Labs, and third-party subject-matter experts to support local challenges.



Register to join NCSP:

<https://ncsp.solarinyourcommunity.org/registrations/groups/39758>

NCSP Technical Assistance Program

Offered on-demand and at no cost to NCSP partners

Technical Assistance Subject Areas:

Policy,
Legislation,
Regulation

Project
Financing
Analysis

Outreach
and
Engagement
Strategies

Program
Design

Technical
Issues

Learn more and apply:

<https://www.energy.gov/communitysolar/technical-assistance-opportunities>

MFAH Collaborative

- Convened in 2020 to expand access to solar for MFAH residents nationwide by working with providers to identify and overcome barriers to community solar deployment. Active engagement concluded in Spring 2022
- Thirteen MFAH providers from across the U.S. –with portfolios from five buildings to more than 300 –participated in the collaborative
- Participants received technical support from DOE, the National Renewable Energy Laboratory (NREL), Urban Ingenuity (UI), and Stewards of Affordable Housing for the Future (SAHF)
- More information and resources on the NCSP MFAH webpage:
<https://www.energy.gov/communitysolar/multifamily-affordable-housing-collaborative>



Presentation of MFAH Resources

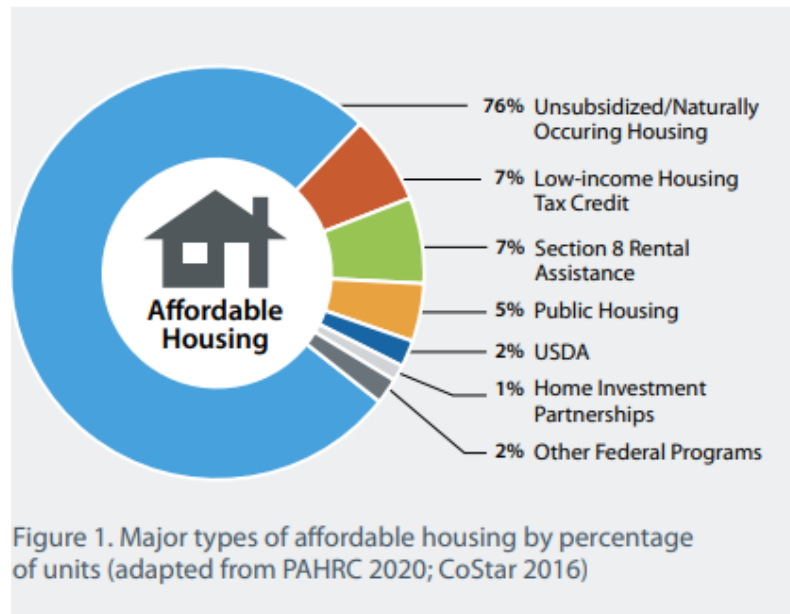


Community Solar Project Models for MFAH

Jeff Cook,
National Renewable Energy Laboratory
(NREL)

Community Solar and Multifamily Affordable Housing Overview

- MFAH Market
 - Unsubsidized affordable housing (naturally occurring)
 - Publicly supported multifamily housing
- 5,000 MW of community solar across 2,000 projects
 - 200 serve some low-income customers (26,000 LMI households)
- Opportunities
 - LMI multifamily households: 166.7 terawatt hours of potential
 - 10,000 MWs of technical potential on public housing



Key Barriers to Affordable Housing Solar Deployment

- Financing challenges
 - Refinance
 - Recapitalize
- Split incentives
 - Master-metered
 - Individually metered
- Utility Allowance Structures
 - Direct/indirect benefits of solar
- Capacity of MFAH providers

Box 1. Possible Indirect Solar-Related Benefits for LMI Residents of Multifamily Housing

- Improved operation and maintenance of existing property
- Increased resident services (e.g., job training, after-school programs, legal services)
- New property amenities (e.g., free or improved broadband)

Community Solar Project Models and Considerations from the Field

Solar hosting

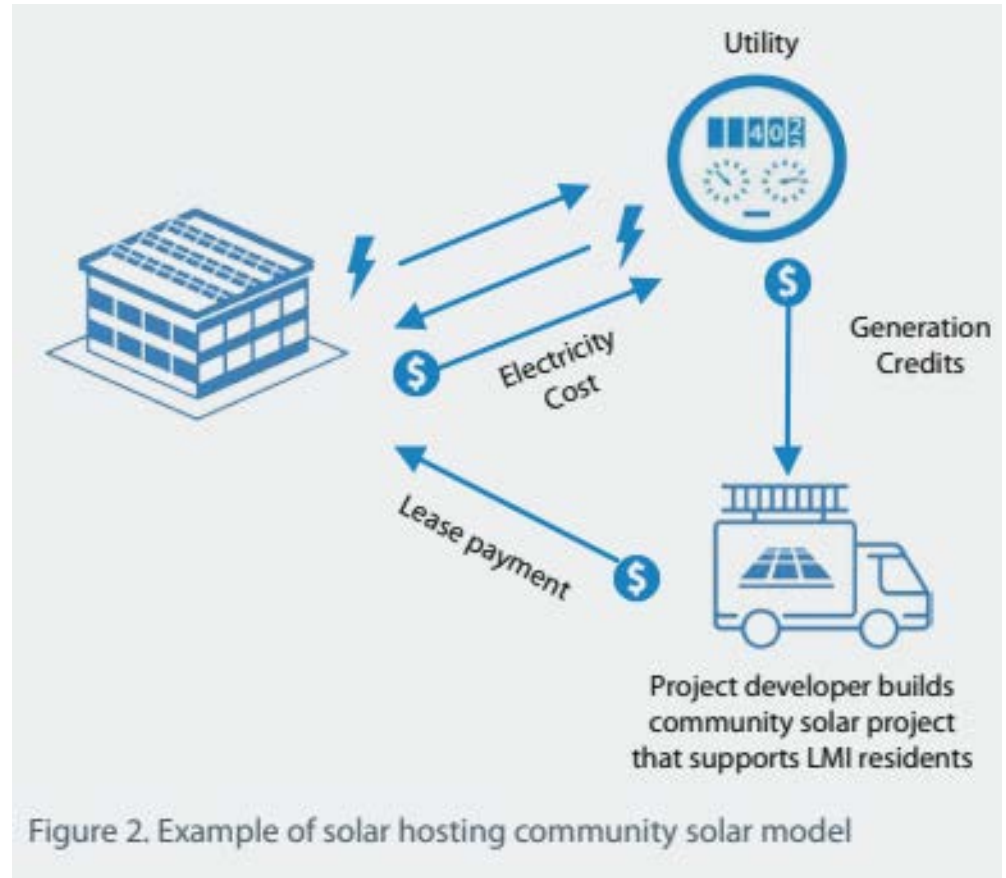
Utility-partnerships

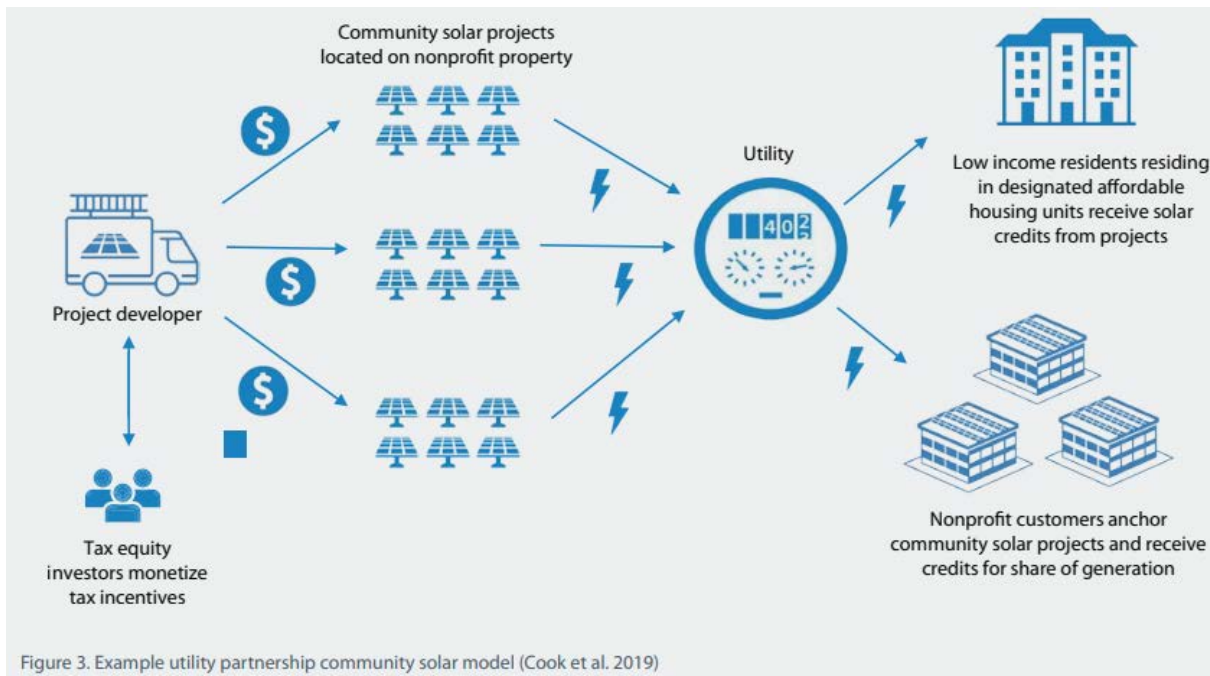
New construction/rehabilitation

Self-built, off-site community solar

Solar Hosting

- Capacity: Minimize capacity challenges
- Financing/Split Incentives: Lease payments offset operation expenses
- Consideration: roof-related O&M activities and site selection.

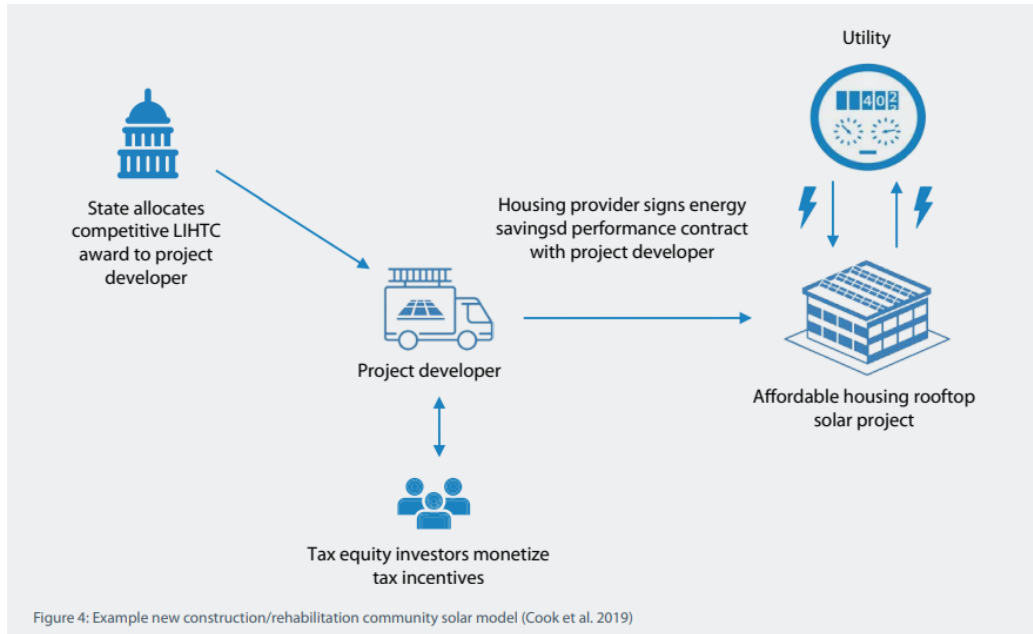




Utility Partnerships

- Capacity: utility-managed subscribers
- Financing/Split Incentives: utility financed, direct bill credits.
- Consideration: MFAH provider does not benefit

New Construction/Rehabilitation



- Capacity: solar can be incorporated into already planned construction.
- Financing: solar can be incorporated into many financing models
- Direct or indirect solar benefits can be deployed

Self-built Off-site Community Solar

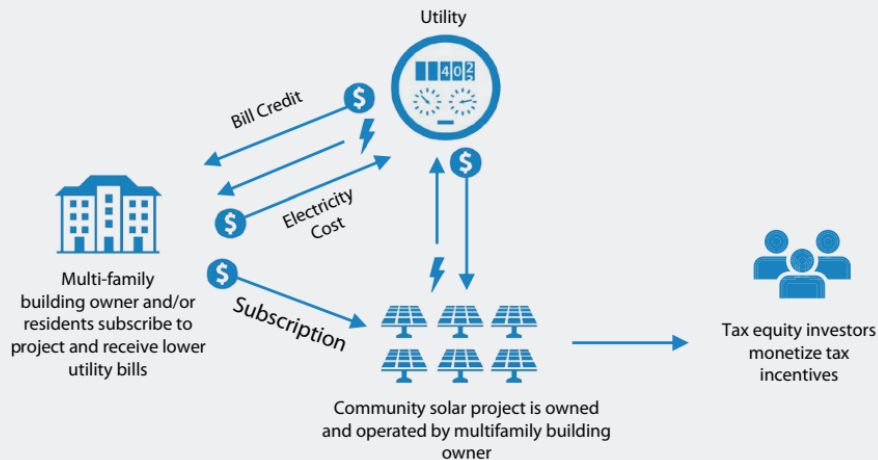


Figure 5: Example of self-built off-site community solar model (Cook et al. 2019)

- Financing: partnerships with investors
- Split incentives/Utility allowance: direct or indirect benefits can be deployed
- Capacity: significant expertise required

Link to Resource

- Community Solar Project Models for MFAH
<https://www.nrel.gov/docs/fy22osti/82966.pdf>
 - Issue brief that summarizes the current MFAH market and challenges to community solar adoption and ends with a discussion of four community solar models that address solar adoption and barriers faced by MFAH providers and households.



Portfolio Screening Package

Robin Burton,
National Renewable Energy Laboratory
(NREL)

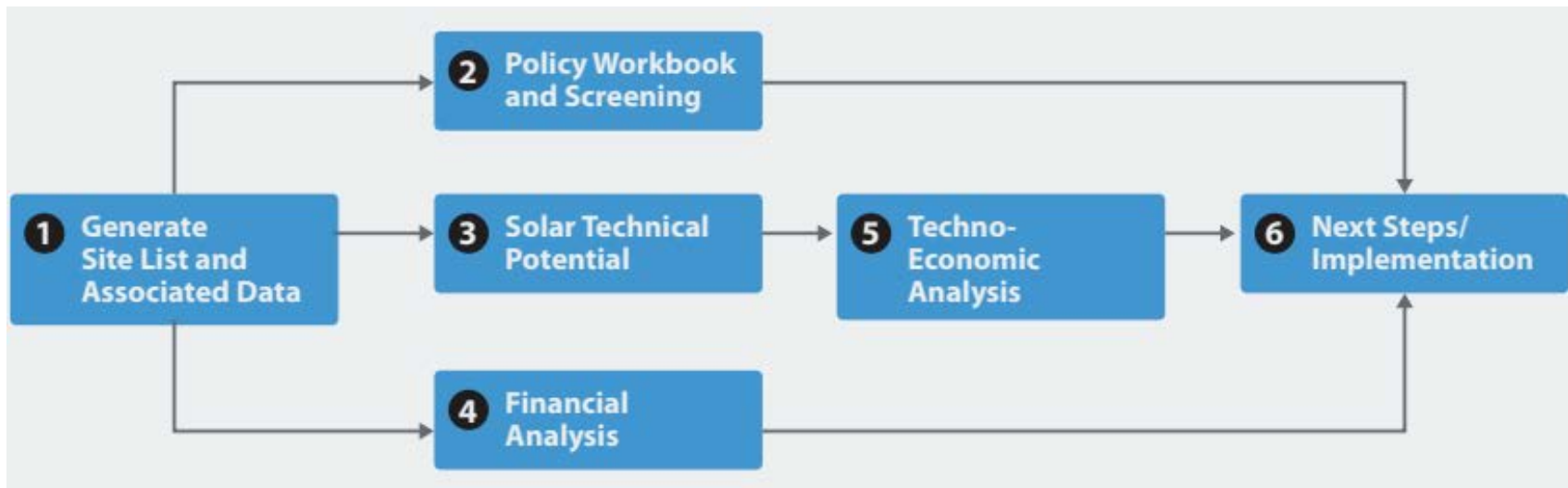
Portfolio Screening Package Includes Three NREL Resources

1. Portfolio Screening Approach Fact Sheet and Case Study
 - Describes overall approach, steps involved, and examples of how it was applied to technical assistance engagements with two MFAH Collaborative members
 - Authors: Tyler Orcutt and Robin Burton, NREL
2. Portfolio Screening Workbook
 - Excel-based resource of state-level policy and incentive landscape related to community solar development for the MFAH sector
 - Authors: Tyler Orcutt and Robin Burton, NREL
3. Techno-economic Analysis using REopt
 - Step-by-step guide for MFAH providers on how to use NREL's REopt model to evaluate cost-optimal solar and storage system sizes and dispatch strategies for prioritized properties in their portfolios
 - Authors: Amanda Farthing and Emma Elgqvist, NREL

Portfolio Screening Approach

- Purpose: Enable MFAH providers to take a data-informed approach to identifying and prioritizing buildings in their portfolios that are most amenable to community solar development.
- Two primary use cases:
 1. Look across MFAH property portfolio to determine maximum number of community solar candidate sites to take advantage of economies of scale.
Overarching questions include:
 - What is the total community solar opportunity across my portfolio?
 - For which properties is community solar development economically viable?
 2. Identify a few highest-priority sites within an MFAH portfolio where it makes the most sense to get started or continue with solar project development.
Guiding question:
 - Which are the priority properties for community solar development within my portfolio, and where are they located?

Portfolio Screening Steps



Portfolio Screening Steps

| Step | Guiding Question | Step Details | Results | Tools |
|-------------------------------------|---|--|--|---|
| 1. Data Gathering | What does my portfolio of MFAH buildings look like? | Create a list of all buildings in the organization's portfolio, including each site's street address and state. Pull data from portfolio manager if applicable. | Identification of total number and geographic distribution of sites in portfolio | ENERGY STAR Portfolio Manager |
| 2. Policy Screening | What does the policy environment look like in the states or cities where I have properties? | <p>The policy screening workbook assigns one of four values to each state:</p> <ul style="list-style-type: none"> • Positive • Neutral/Positive • Neutral/Limited • Limited <p>Assign each site's value according to state the site is located in. Prioritize sites located in Positive and Neutral/Positive states.</p> | Priority site list narrowed by policy environment | Policy Screening Workbook |
| 3. Solar Technical Potential | Is there good rooftop solar potential where I have properties? | Using NREL's system modeling tools, such as PVWatts, calculate maximum PV system size and annual generation for each site selected in Step 2. | Priority site list narrowed by policy environment and solar technical potential | PVWatts |

Portfolio Screening Steps

| Step | Guiding Question | Step Details | Results | Tools |
|-----------------------|--|--|--|--|
| 4. Financial Analysis | <p>What business models are available for one site?</p> <p>How can we finance building solar on multiple sites within our portfolio?</p> | <p>For single-site business model evaluation:</p> <p>Assemble data points to evaluate financing options for rooftop or community solar for a single site. Using Urban Ingenuity's decision-making matrix, evaluate the economics of multiple business models, including direct ownership, joint ventures to monetize tax credits, and third-party ownership.</p> | Matrix of business models and financing options available at single sites and/or for a full portfolio approach | UI Portfolio Modeling Tool |
| | | <p>For portfolio analysis and pooled financing:</p> <p>Identify your goals for a portfolio of projects (e.g., do you want to own your assets? What business models make the most sense to you?)</p> <p>Construct a pool of sites within your portfolio. Information from previous steps can be used to inform which geographies and sites are best suited for solar development through a pooled approach. Input data from each site into a model to evaluate different business models for the pool of projects in order to maximize economic outputs and benefits to tenants.</p> | | |

Portfolio Screening Steps

| Step | Guiding Question | Step Details | Results | Tools |
|------------------------------------|---|---|--|--------------------------------|
| 5. Techno-Economic Analysis | <p>Does it make simple economic sense to build a solar system at one of those locations?</p> <p>How could a solar PV system increase resilience at these sites?</p> | Using NREL's REopt tool, determine optimal system sizes, electricity generation, total life cycle cost of electricity, net present value, capital cost, and other metrics for each site on the prioritized list from Step 3. Scenarios could include economic vs. resilience objectives, different financing mechanisms, maximum vs. optimal system sizing, and sensitivities on cost and other inputs. | <ol style="list-style-type: none"> 1. Detailed results for each prioritized site (from Step 3) of where solar and/or battery storage can provide cost savings, resilience benefits, and emissions reductions 2. Prioritized list of sites where solar and/or battery storage can provide cost savings, resilience benefits, and emissions reductions | REopt Web Tool |
| 6. Implementation | How do we get to construction? | Identify the key next steps, pitch to third-party investors (as appropriate), and address outstanding needs to get from this evaluation to construction. | Final list of ideal sites for solar development with corresponding financing options, business models, and energy capacity estimates | |

Portfolio Screening Workbook Contents

| | |
|--------------------------------------|---|
| 0. Intro and Methodology | Describes methodology for developing the workbook and an explanation of how this workbook ranks states based on their solar policy landscapes |
| 1. State Ranking | Synthesis of scoring values: Ranking of each state by current policies, portfolio distribution across rankings |
| 2. Policy Summary | Matrix of current and active policies that impact MFAH community solar development at the state level. Feeds into scoring tabs to provide a high-level view of the MFAH community solar policy landscape by state |
| 3. Policies | A 'snapshot in time' of all current and active policies that impact MFAH community solar development at the state level. Must be updated as policies change |
| 4. Electricity Rates | Average retail electricity price, net metering values, and SREC values; obtained from EIA |
| 5. Scoring | Breakdown of how each state performs in various policy categories, synthesized in State Ranking tab |
| 6. Advanced User Instructions | Step-by-step instructions for assessing a building portfolio using this workbook |
| 7. Property List | List of properties for advanced users, typically exported from Portfolio Manager |

Policy Summary Matrix

| State <input type="text"/> | Net Billing <input type="text"/> | Net Metering (Standard retail rate) <input type="text"/> | Net Metering (Aggregate) <input type="text"/> | Net Metering (Virtual) <input type="text"/> | Performance Based Incentive <input type="text"/> | Viable SREC Market <input type="text"/> | LMI Incentive/C ve-Out <input type="text"/> | CS Incentive/C ve-out <input type="text"/> | Multifamily Incentive/C ve-Out <input type="text"/> | PACE Financing <input type="text"/> | Other Supplemental Programs and Funding Sources <input type="text"/> | % Supplementa l Policies |
|----------------------------|----------------------------------|--|--|--|--|--|---|--|---|--|--|--------------------------------|
| AK | | X | | | | | | | | | X | 20% |
| AL | | | | | | | | | | | X | 20% |
| AR | | X | X | | | | | | | | | 0% |
| AZ | X | | | | | | | | | | X | 20% |
| CA | | X | X | X | X | | | | | X | | 20% |
| CO | | X | X | X | | | X | X | | X | X | 80% |
| CT | | X | X | | | | X | | X | X | X | 80% |
| DC | | X | X | X | | X | | | | X | X | 40% |
| DE | | X | X | | | X | | | | | X | 20% |
| FL | | X | | | | | | | | | X | 20% |
| GA | | X | | | | | | | | | | 0% |
| HI | | X | X | X | | | | | | | X | 20% |
| ID | | X | | | | | | | | | X | 20% |

Scoring

The scoring tab translates the policy summary matrix into numerical scores:

| Assessment Factor | Scoring Value | Scoring Mechanism |
|---|---------------|--|
| Net Metering mechanism | 25 | Sliding scale from virtual (highest) to standard (lowest) |
| Net Metering treatment of net excess generation | 25 | Sliding scale from at-or near-retail rate to avoided cost rate |
| State-issued performance-based incentives | 20 | Binary, program or no program |
| Supplemental financial incentives: Explicit CS programming LMI and MFAH carve-outs Bond, grant, loan, tax programs | 20 | Sliding scale based on number of supplemental categories met |
| SREC Market | 10 | Binary, market or no market |
| Maximum score | 100 | |

| Category | Scores |
|------------------|--------|
| Positive | 70-100 |
| Neutral/Positive | 50-69 |
| Neutral/Limited | 20-49 |
| Limited | 0-19 |

User Instructions

MFAH housing providers can use this workbook to assess their multi-state portfolios for enabling policy landscapes:

1. Copy building list into Property List tab (most providers will use Portfolio Manager)
2. Update the Policy Summary, Policies, and Electricity Rates tabs to ensure up-to-date information
3. Refresh and review scoring and state ranking tabs to identify the number of buildings in each state category

| Category | Scores | Total Properties |
|------------------|--------|------------------|
| Positive | 70-100 | 5 |
| Neutral/Positive | 50-69 | 14 |
| Neutral/Limited | 20-49 | 16 |
| Limited | 0-19 | 16 |

| State | Score (out of 100) | Policy Category | Total Properties |
|-------|-----------------------|------------------|---------------------|
| MA | 86 | Positive | 1 |
| CA | 74 | Positive | 1 |
| IL | 72 | Positive | 1 |
| MN | 71 | Positive | 1 |
| VT | 71 | Positive | 1 |
| MD | 68 | Neutral/Positive | 1 |

Example Portfolio

Techno-Economic Analysis Using REopt

- **Purpose of this step:** Conduct more detailed analyses for a select number of sites to assess how distributed energy resources (DERs) such as solar plus storage can help meet your goals
- **Tool:** REopt (<https://reopt.nrel.gov/tool>) is a free techno-economic optimization model that determines DER sizes and dispatch strategies that minimize the life cycle cost of energy at a site
- **Example questions that REopt can help answer:**
 - What size solar PV system will result in the most energy bill savings at this site?
 - What size solar-plus-storage system would be needed to power critical loads through a utility grid outage?
 - What is the financial impact of rate switching, net metering, and/or meter aggregation?
 - What percentage of the site's load can be offset with renewable energy?
What are the emissions benefits of this renewable generation?

REopt Web Tool

The **REopt Lite web tool** is a free, publicly available tool to evaluate and optimize the economic viability of DERs

- **Financial mode** optimizes DERs and dispatch strategy to minimize life cycle cost of energy
- **Resilience mode** optimizes DERs to sustain critical load during grid outages
- **DERs included:** Solar PV, battery storage, wind, combined heat and power (CHP), generator, and chilled water storage
- **Access REopt:** reopt.nrel.gov/tool
- **Access the user manual:** reopt.nrel.gov/tool/reopt-user-manual.pdf

The screenshot displays the REopt Lite web tool interface, organized into three main steps:

- Step 1: Choose Your Focus**
Optimize for financial savings or energy resilience?
Two buttons are shown: **Financial** (selected with a blue underline) and **Resilience** (with a shield icon).
- Step 2: Select Your Technologies**
Five technology selection buttons are shown:
 - PV** (checked with a blue checkmark and solar panel icon)
 - Battery** (checked with a blue checkmark and battery icon)
 - Wind** (unchecked with a blue square and wind turbine icon)
 - CHP** (unchecked with a blue square and CHP icon)
 - Chilled Water Storage** (unchecked with a blue square and snowflake icon)
- Step 3: Enter Your Site Data**
This section is highlighted with an orange header bar and contains the following fields:
 - Site and Utility (required)**: A header bar with a location pin icon and a minus sign.
 - * Site location**: A required field with a question mark icon, a text input box containing "Enter a location", and a link to "Use sample site".
 - * Electricity rate**: A required field with a question mark icon, a dropdown menu, and a checkbox for "Use custom electricity rate".
 - Optional inputs**: A plus icon and a link to "Reset to default values".

At the bottom of the interface, there is a header bar for **Load Profiles (required)** with a plus icon.

Links to Resources

- [Portfolio Screening Approach Fact Sheet and Case Study](#): Presents a framework for MFAH housing providers to evaluate their multi-state building portfolios for community solar project viability.
- [Portfolio Screening Workbook](#): Excel-based tool to help housing providers think through state-level policy landscapes as they relate to MFAH community solar development. This workbook also walks through the steps necessary for MFAH building owners to assess their portfolios for enabling policy landscapes.
- [Techno-economic Analysis using REopt](#): Presentation on how MFAH housing providers can use REopt to assess the techno-economic potential of their portfolio as part of the portfolio screening process.



MFAH Portfolio Modeling Tool Spreadsheet and User Guide

Ian Fischer,
Urban Ingenuity (UI)

Urban Ingenuity: *Our Expertise*

Solar Development & Investment Platform:

- Open-source solar development, finance, and operation with affordable housing portfolios & non-profit organizations
- 10+MW developed (DC, NY, NJ, CT, MA, MD, PA, CA)



Microgrid Advisory Services:

- Technical assistance, owner's agent, and development services to institutions (*Gallaudet University, Hunts Point, Walter Reed*)
- Advisory services for local governments (*DC DOEE, NYC: ORR, MOS, EDC*)

PACE Financing:

- Program administrator for DC PACE, under contract to the DC Green Bank

The Evolution of our Pooled Approach

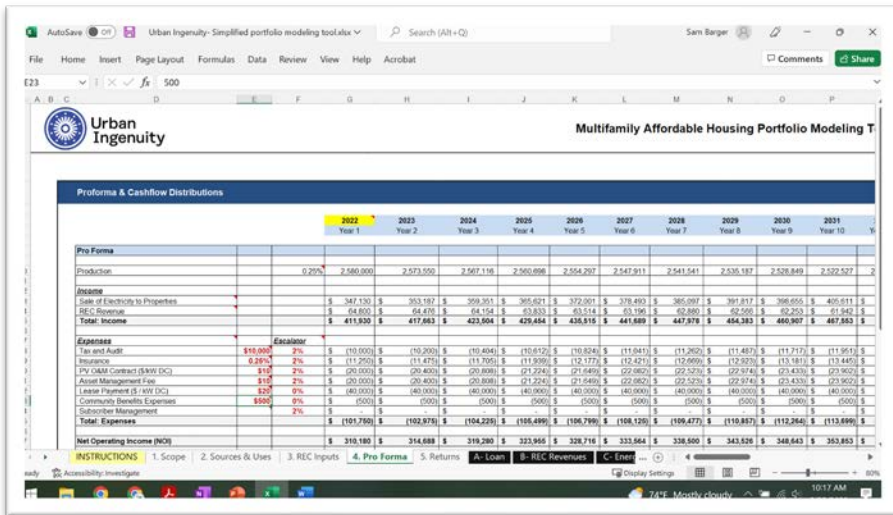


- ✓ *Roofs are assets that can be monetized!*
- ✓ *Housers are developers that are used to complexity- solar is development*
- ✓ *Capture a greater share of the benefits for housers and community residents*
- ✓ *Leverage economies of scale, streamline documents & access to capital*

MFAH Portfolio Financial Modeling Tool

Excel-based Portfolio Financial Modeling Tool

- Based on a real estate development model
- Populated with sample projects for guidance
- Includes: Project Scope, Sources & Uses, Pro-forma, and Returns
- Single-site OR Portfolio-scale analysis
- Easy to manipulate based on individual needs

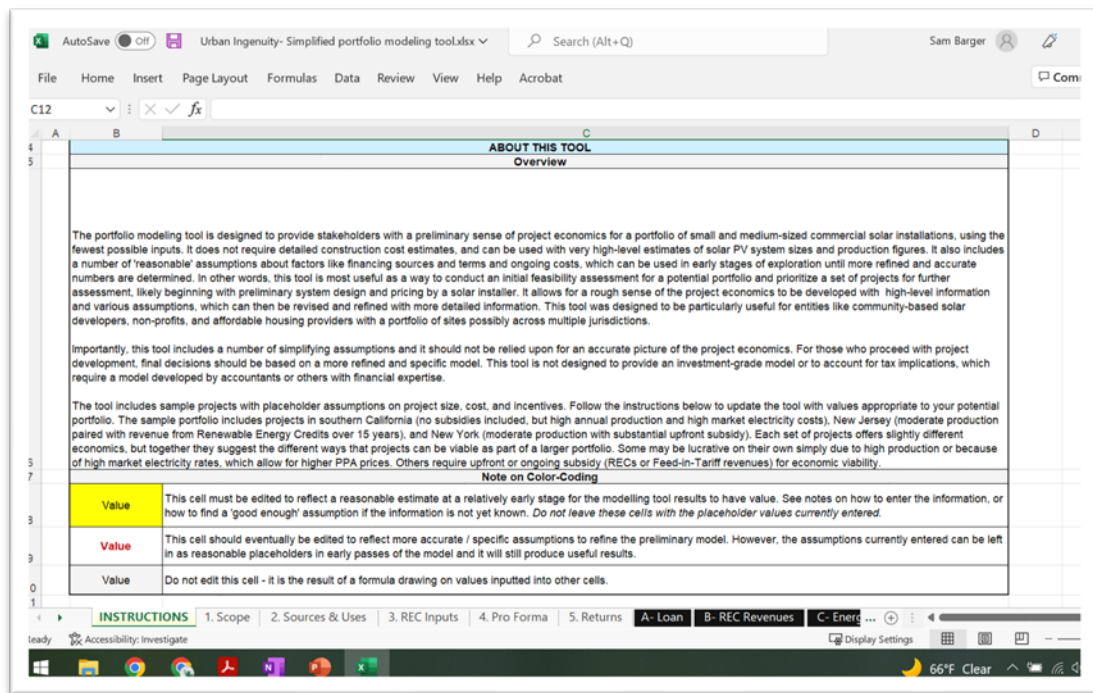


| | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|------------------------------------|----------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 |
| Pro Forma | | | | | | | | | | |
| Production | 0.20% | 2,580,000 | 2,573,550 | 2,567,116 | 2,560,686 | 2,554,267 | 2,547,811 | 2,541,341 | 2,535,187 | 2,528,849 |
| Income | | | | | | | | | | |
| Sale of Electricity to Proportions | | \$ 347,130 | \$ 353,187 | \$ 359,353 | \$ 365,621 | \$ 372,001 | \$ 378,493 | \$ 385,097 | \$ 391,817 | \$ 398,655 |
| REC Revenue | | \$ 64,809 | \$ 64,476 | \$ 64,154 | \$ 63,833 | \$ 63,514 | \$ 63,196 | \$ 62,880 | \$ 62,565 | \$ 62,253 |
| Total Income | | \$ 411,939 | \$ 417,663 | \$ 423,506 | \$ 429,454 | \$ 435,515 | \$ 441,689 | \$ 447,977 | \$ 454,382 | \$ 460,908 |
| Expenses | | | | | | | | | | |
| Tax and Audit | \$10,000 | 2% | \$ (10,000) | \$ (10,000) | \$ (10,000) | \$ (10,000) | \$ (10,000) | \$ (10,000) | \$ (10,000) | \$ (10,000) |
| Insurance | \$10,000 | 2% | \$ (11,250) | \$ (11,475) | \$ (11,700) | \$ (11,925) | \$ (12,150) | \$ (12,375) | \$ (12,600) | \$ (12,825) |
| Property Owner Contract (S&M) [DC] | \$10,000 | 2% | \$ (20,000) | \$ (20,000) | \$ (20,000) | \$ (20,000) | \$ (20,000) | \$ (20,000) | \$ (20,000) | \$ (20,000) |
| Asset Management Fee | \$10,000 | 2% | \$ (20,000) | \$ (20,000) | \$ (20,000) | \$ (20,000) | \$ (20,000) | \$ (20,000) | \$ (20,000) | \$ (20,000) |
| Lease Payment (S - W) [DC] | \$10,000 | 2% | \$ (40,000) | \$ (40,000) | \$ (40,000) | \$ (40,000) | \$ (40,000) | \$ (40,000) | \$ (40,000) | \$ (40,000) |
| Common Area Benefits Equipment | \$10,000 | 0% | \$ (0,000) | \$ (0,000) | \$ (0,000) | \$ (0,000) | \$ (0,000) | \$ (0,000) | \$ (0,000) | \$ (0,000) |
| Subscriber Management | \$10,000 | 2% | \$ (10,000) | \$ (10,000) | \$ (10,000) | \$ (10,000) | \$ (10,000) | \$ (10,000) | \$ (10,000) | \$ (10,000) |
| Total Expenses | | \$ (95,750) | \$ (102,875) | \$ (104,225) | \$ (105,499) | \$ (106,759) | \$ (108,000) | \$ (109,230) | \$ (110,450) | \$ (111,669) |
| Net Operating Income (NOI) | | \$ 316,189 | \$ 314,788 | \$ 319,281 | \$ 323,955 | \$ 328,716 | \$ 333,689 | \$ 338,747 | \$ 343,932 | \$ 349,239 |

User-guide

- Step-by-step instructions for the tool
- Includes: benefits of portfolio-scale development, important project considerations, and instructions on how to refine the model
- Information on pros & cons of portfolio-scale development models: ownership/ co-ownership/ co-development with 3rd party ownership

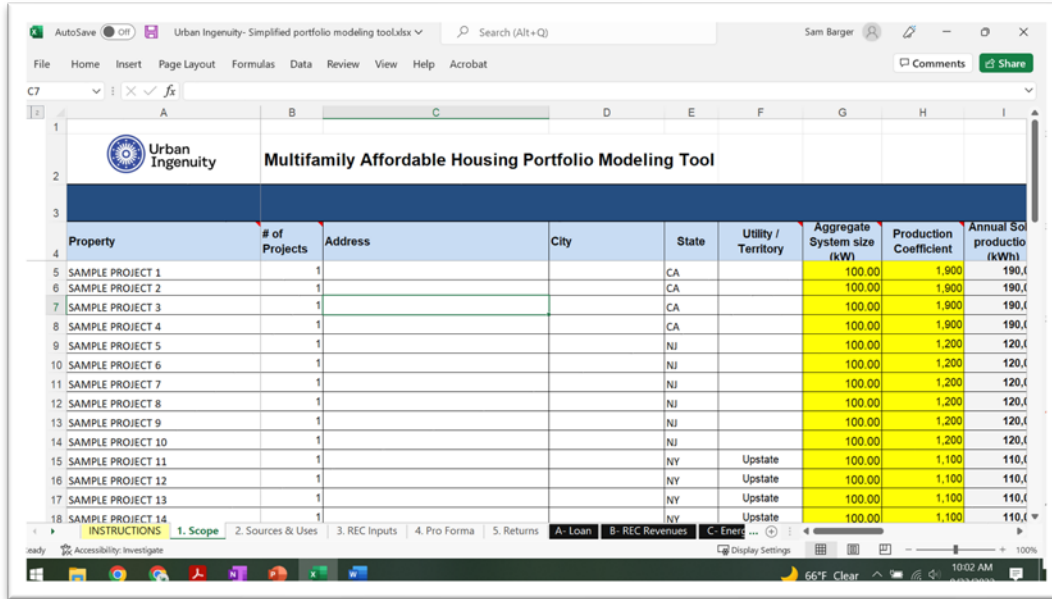
MFAH Portfolio Financial Modeling Tool: *highlights*



Comprehensive Instruction Tab

- Overview of the tool
- Instructions for cell editing
- Description and instructions of each tab
- Links to additional resources

MFAH Portfolio Financial Modeling Tool: *highlights*

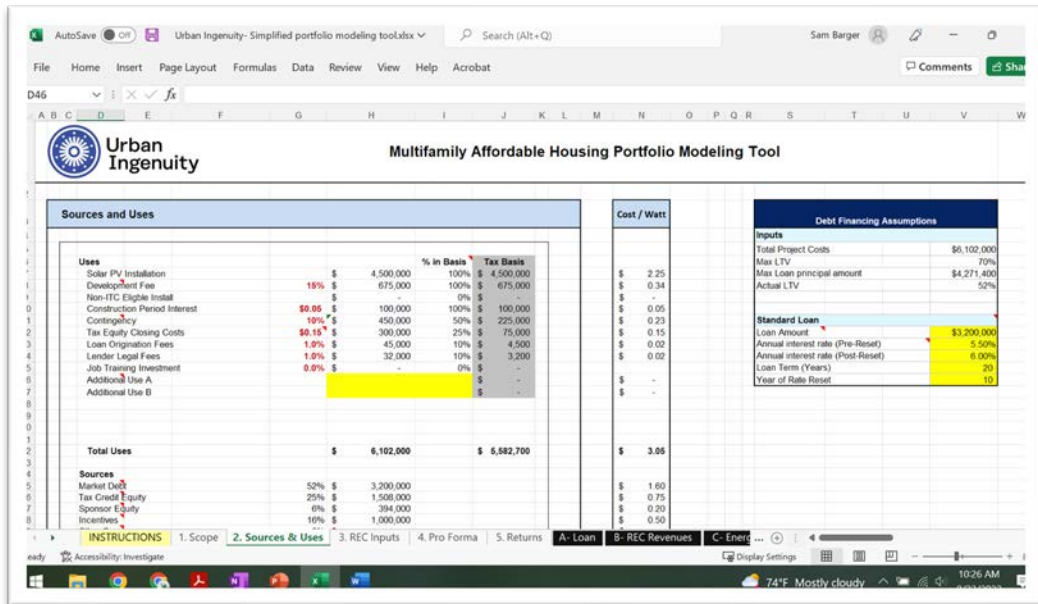


| Property | # of Projects | Address | City | State | Utility / Territory | Aggregate System size (kW) | Production Coefficient | Annual Solar production (kWh) |
|-------------------|---------------|---------|------|-------|---------------------|----------------------------|------------------------|-------------------------------|
| SAMPLE PROJECT 1 | 1 | | | CA | | 100.00 | 1,900 | 190,000 |
| SAMPLE PROJECT 2 | 1 | | | CA | | 100.00 | 1,900 | 190,000 |
| SAMPLE PROJECT 3 | 1 | | | CA | | 100.00 | 1,900 | 190,000 |
| SAMPLE PROJECT 4 | 1 | | | CA | | 100.00 | 1,900 | 190,000 |
| SAMPLE PROJECT 5 | 1 | | | NJ | | 100.00 | 1,200 | 120,000 |
| SAMPLE PROJECT 6 | 1 | | | NJ | | 100.00 | 1,200 | 120,000 |
| SAMPLE PROJECT 7 | 1 | | | NJ | | 100.00 | 1,200 | 120,000 |
| SAMPLE PROJECT 8 | 1 | | | NJ | | 100.00 | 1,200 | 120,000 |
| SAMPLE PROJECT 9 | 1 | | | NJ | | 100.00 | 1,200 | 120,000 |
| SAMPLE PROJECT 10 | 1 | | | NJ | | 100.00 | 1,200 | 120,000 |
| SAMPLE PROJECT 11 | 1 | | | NY | Upstate | 100.00 | 1,100 | 110,000 |
| SAMPLE PROJECT 12 | 1 | | | NY | Upstate | 100.00 | 1,100 | 110,000 |
| SAMPLE PROJECT 13 | 1 | | | NY | Upstate | 100.00 | 1,100 | 110,000 |
| SAMPLE PROJECT 14 | 1 | | | NY | Upstate | 100.00 | 1,100 | 110,000 |

Project Scope Tab

- Populated with sample projects for reference
- Input project or portfolio specifics, such as:
 - ✓ Project size (kW)
 - ✓ Utility
 - ✓ \$/kWh
 - ✓ Estimated production
 - ✓ Incentives
- Aggregate projects for portfolio analysis

MFAH Portfolio Financial Modeling Tool: *highlights*



Sources and Uses

| Uses | | % in Basis | Tax Basis |
|------------------------------|---------------------|------------|---------------------|
| Solar PV Installation | \$ 4,500,000 | 100% | \$ 4,500,000 |
| Development Fee | 15% \$ 675,000 | 100% | \$ 675,000 |
| Non-ITC Eligible Install | \$0.05 \$ 100,000 | 100% | \$ 100,000 |
| Construction Period Interest | 10% \$ 450,000 | 50% | \$ 225,000 |
| Contingency | \$0.15 \$ 300,000 | 25% | \$ 75,000 |
| Tax Equity Closing Costs | 1.0% \$ 45,000 | 10% | \$ 4,500 |
| Loan Origination Fees | 1.0% \$ 32,000 | 10% | \$ 3,200 |
| Lender Legal Fees | 0.0% \$ - | 0% | \$ - |
| Job Training Investment | | | |
| Additional Use A | | | |
| Additional Use B | | | |
| Total Uses | \$ 6,102,000 | | \$ 6,682,700 |
| Sources | | | |
| Market Debt | 52% \$ 3,200,000 | | |
| Tax Credit Equity | 25% \$ 1,500,000 | | |
| Sponsor Equity | 6% \$ 394,000 | | |
| Incentives | 16% \$ 1,000,000 | | |

Cost / Watt

| |
|---------|
| \$ 2.25 |
| \$ 0.34 |
| \$ 0.05 |
| \$ 0.23 |
| \$ 0.15 |
| \$ 0.02 |
| \$ 0.02 |
| \$ - |
| \$ - |
| \$ - |
| \$ 3.05 |
| \$ 1.60 |
| \$ 0.75 |
| \$ 0.20 |
| \$ 0.50 |

Debt Financing Assumptions

| Inputs | |
|-----------------------------------|-------------|
| Total Project Costs | \$6,102,000 |
| Max LTV | 70% |
| Max Loan principal amount | \$4,271,400 |
| Actual LTV | 52% |
| Standard Loan | |
| Loan Amount | \$3,200,000 |
| Annual interest rate (Pre-Reset) | 5.50% |
| Annual interest rate (Post-Reset) | 6.00% |
| Loan Term (Years) | 20 |
| Year of Rate Reset | 10 |

Sources & Uses Tab

- Uses, such as:
 - ✓ Installation cost
 - ✓ Development fees
 - ✓ Non-ITC eligible costs
 - ✓ Contingency
 - ✓ Loan origination fees
 - ✓ Tax equity closing costs
- Sources, such as:
 - ✓ Market Debt
 - ✓ Tax Credit Equity
 - ✓ Incentives
 - ✓ Sponsor Equity
- Debt Financing Assumptions
- Equity Assumptions: MACRS & Tax Equity

MFAH Portfolio Financial Modeling Tool: *highlights*

AutoSave On Urban Ingenuity- Simplified portfolio modeling tool.xlsx Search (Alt+Q) Sam Barger

File Home Insert Page Layout Formulas Data Review View Help Acrobat

E23 500

Urban Ingenuity

Multifamily Affordable Housing Portfolio Modeling Tool

Proforma & Cashflow Distributions

| | 2022 Year 1 | 2023 Year 2 | 2024 Year 3 | 2025 Year 4 | 2026 Year 5 | 2027 Year 6 | 2028 Year 7 | 2029 Year 8 | 2030 Year 9 | 2031 Year 10 |
|------------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Pro Forma | | | | | | | | | | |
| Production | 0.25% | 2,580,000 | 2,573,550 | 2,567,116 | 2,560,698 | 2,554,297 | 2,547,911 | 2,541,541 | 2,535,187 | 2,528,849 |
| Income | | | | | | | | | | |
| Sales of Electricity to Properties | \$ 347,130 | \$ 353,187 | \$ 359,351 | \$ 365,621 | \$ 372,001 | \$ 378,493 | \$ 385,097 | \$ 391,817 | \$ 398,655 | \$ 405,611 |
| REC Revenue | \$ 64,800 | \$ 64,476 | \$ 64,154 | \$ 63,833 | \$ 63,514 | \$ 63,196 | \$ 62,880 | \$ 62,566 | \$ 62,253 | \$ 61,942 |
| Total Income | \$ 411,930 | \$ 417,663 | \$ 423,504 | \$ 429,454 | \$ 435,515 | \$ 441,689 | \$ 447,978 | \$ 454,383 | \$ 460,907 | \$ 467,553 |
| Expenses | | | | | | | | | | |
| Tax and Audit | \$10,000 | 2% | \$ (10,000) | \$ (10,200) | \$ (10,404) | \$ (10,612) | \$ (10,824) | \$ (11,041) | \$ (11,262) | \$ (11,487) |
| Insurance | 0.25% | 2% | \$ (11,250) | \$ (11,475) | \$ (11,705) | \$ (11,939) | \$ (12,177) | \$ (12,421) | \$ (12,669) | \$ (12,923) |
| PV O&M Contract (\$/kW DC) | \$10 | 2% | \$ (20,000) | \$ (20,400) | \$ (20,808) | \$ (21,224) | \$ (21,649) | \$ (22,082) | \$ (22,523) | \$ (22,974) |
| Asset Management Fee | \$10 | 2% | \$ (20,000) | \$ (20,400) | \$ (20,808) | \$ (21,224) | \$ (21,649) | \$ (22,082) | \$ (22,523) | \$ (22,974) |
| Lease Payment (\$ /kW DC) | \$20 | 0% | \$ (40,000) | \$ (40,000) | \$ (40,000) | \$ (40,000) | \$ (40,000) | \$ (40,000) | \$ (40,000) | \$ (40,000) |
| Community Benefits Expenses | \$400 | 0% | \$ (500) | \$ (500) | \$ (500) | \$ (500) | \$ (500) | \$ (500) | \$ (500) | \$ (500) |
| Subscriber Management | | 2% | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ - |
| Total Expenses | \$ (101,750) | \$ (102,979) | \$ (104,225) | \$ (105,499) | \$ (106,799) | \$ (108,129) | \$ (109,477) | \$ (110,857) | \$ (112,264) | \$ (113,699) |
| Net Operating Income (NOI) | \$ 310,180 | \$ 314,688 | \$ 319,280 | \$ 323,955 | \$ 328,716 | \$ 333,564 | \$ 338,500 | \$ 343,526 | \$ 348,643 | \$ 353,853 |

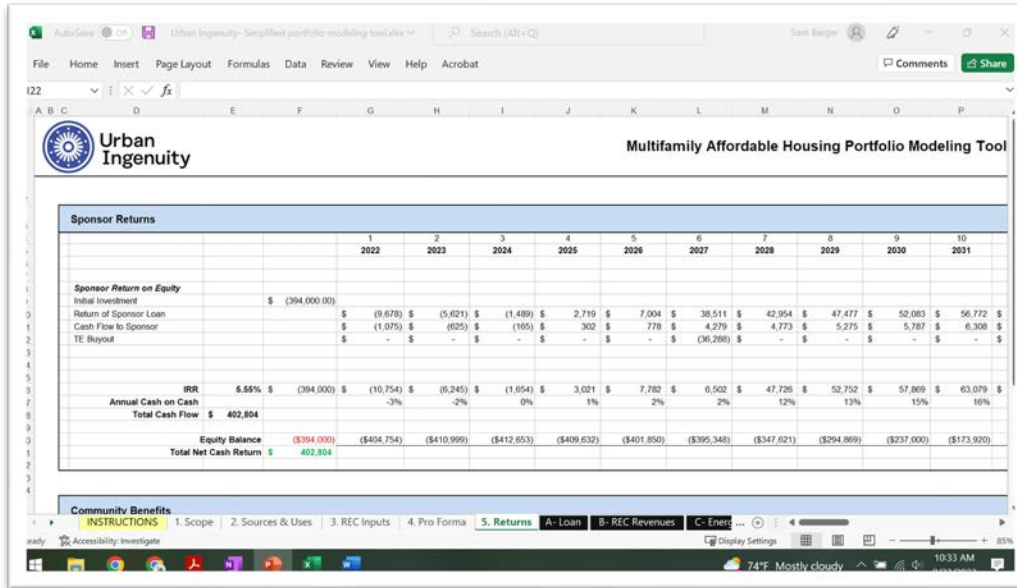
INSTRUCTIONS 1. Scope 2. Sources & Uses 3. REC Inputs 4. Pro Forma 5. Returns A- Loan B- REC Revenues C- Energy

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Pro Forma Tab:

- Income from electricity sales and RECs
- Expenses, such as:
 - ✓ Insurance
 - ✓ O&M
 - ✓ Asset Management
 - ✓ Subscriber Management
 - ✓ Community Benefits
- Debt service
- Fees & Reserves
- Return of Sponsor Equity
- Cash flow for distribution

MFAH Portfolio Financial Modeling Tool: *highlights*



The screenshot displays the 'Returns Tab' of the 'Multifamily Affordable Housing Portfolio Modeling Tool'. The tool is a spreadsheet application with a ribbon menu at the top (File, Home, Insert, Page Layout, Formulas, Data, Review, View, Help, Acrobat) and a search bar. The main area shows a table with columns for years 2022 through 2031. The table is divided into two main sections: 'Sponsor Returns' and 'Community Benefits'. The 'Sponsor Returns' section includes rows for 'Sponsor Return on Equity', 'Initial Investment', 'Return of Sponsor Loan', 'Cash Flow to Sponsor', 'TE Buyout', 'IRR', 'Annual Cash on Cash', 'Total Cash Flow', 'Equity Balance', and 'Total Net Cash Return'. The 'Community Benefits' section is partially visible at the bottom. The 'Total Net Cash Return' row shows a positive value of \$402,804 for 2022, which decreases over time as the equity balance is paid back.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
| Sponsor Returns | | | | | | | | | | |
| Sponsor Return on Equity | | | | | | | | | | |
| Initial Investment | \$ (394,000.00) | | | | | | | | | |
| Return of Sponsor Loan | \$ (9,678) | \$ (5,621) | \$ (1,489) | \$ 2,719 | \$ 7,004 | \$ 38,511 | \$ 42,954 | \$ 47,477 | \$ 52,083 | \$ 56,772 |
| Cash Flow to Sponsor | \$ (1,075) | \$ (625) | \$ (165) | \$ 302 | \$ 778 | \$ 4,279 | \$ 4,773 | \$ 5,275 | \$ 5,787 | \$ 6,308 |
| TE Buyout | \$ - | \$ - | \$ - | \$ - | \$ - | \$ (30,388) | \$ - | \$ - | \$ - | \$ - |
| IRR | 8.65% | | | | | | | | | |
| Annual Cash on Cash | (394,000) | (10,754) | (6,245) | (1,654) | 3,021 | 7,782 | 6,502 | 47,726 | 52,752 | 57,800 |
| Total Cash Flow | \$ 402,804 | | | | | | | | | |
| Equity Balance | (\$394,000) | (\$404,754) | (\$410,999) | (\$412,653) | (\$409,632) | (\$401,850) | (\$395,348) | (\$347,621) | (\$294,069) | (\$237,000) |
| Total Net Cash Return | \$ 402,804 | | | | | | | | | |
| Community Benefits | | | | | | | | | | |

Returns Tab:

- Sponsor equity including
 - ✓ Return of sponsor loan
 - ✓ cash flow to sponsor
 - ✓ Tax equity buyout
 - ✓ Internal Rate of Return
- Community benefits such as:
 - ✓ Job training
 - ✓ Energy savings
 - ✓ Lease payments
 - ✓ Community benefit payments

Links to Resources

- [Multifamily Affordable Housing Portfolio Modeling Tool Spreadsheet](#): Excel-based tool designed to provide MFAH providers and other users with a preliminary understanding of project economics for a portfolio of small and medium-sized commercial solar installations.
- [Portfolio Modeling Tool User Guide](#): User guide provides overview of the tool and how to use it.



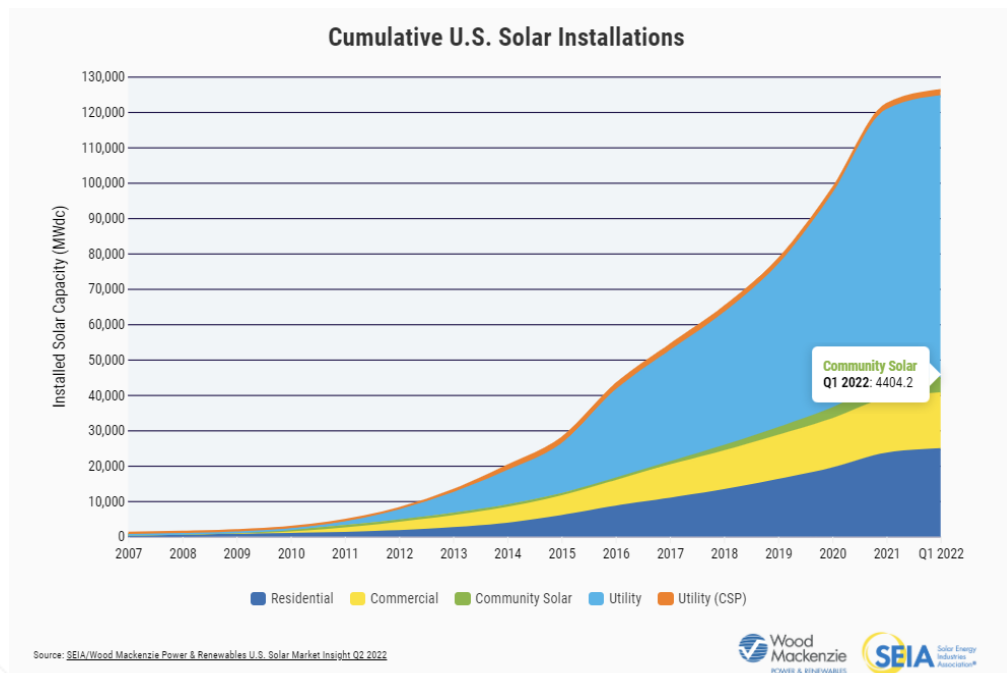


Community Solar and HUD Subsidized Housing Overview and Resident Engagement Tip Sheet

Lauren Westmoreland,
Stewards of Affordable Housing for the
Future (SAHF)

Community Solar and HUD Subsidized Housing

- Traditional solar installations are difficult for renters, especially low-income households to access
- Community solar provides an opportunity for renters to access clean energy
- In MA, a community solar subscription with a low-income adder reduces average annual electricity costs by 35%



Community Solar's Interest in Affordable Housing

- High-level review of 11 community solar programs
- Every program identifies serving low-income households as a priority
- Most programs require that low-income households receive economic benefits from program participation
- Community solar programs want multifamily housing providers to participate

Table 1: Summary of LMI Community Solar Program Characteristics (as of December, 2021)

| Utility Program (Date Launched) | Min. Capacity for LMI Subscribers | Pathways for Affordable Housing | Affordability/Economic Benefits Requirement | Determining Community Solar Benefit Allocation | HUD-Issued Guidance for Utility Allowances |
|--|-----------------------------------|---------------------------------|---|--|--|
| CA SOMAH (2017) ²⁰ | 100%: LMI only | Yes | No | No | Yes |
| CO Xcel Energy Solar* Rewards Program (2011) | 10% of program | No | Yes | Only to define max benefit | No |
| CT Shared Clean Energy Facility Program (2017) | 20% of each project | Yes | Yes | Only to define max benefit | No |
| DC Solar for All (2016) | 100%: LMI only | Yes | No | Only to define max benefit | Yes |

HUD Guidance for Community Solar

- In 2018, HUD guidance issued for California Solar on Multifamily Affordable Housing (SOMAH). HUD findings:
 - Virtual Net Energy Metering (VNEM) credits are an incidental benefit.
 - Benefit is assigned to the unit, not the resident.
 - A resident's energy consumption does not determine their benefit credit

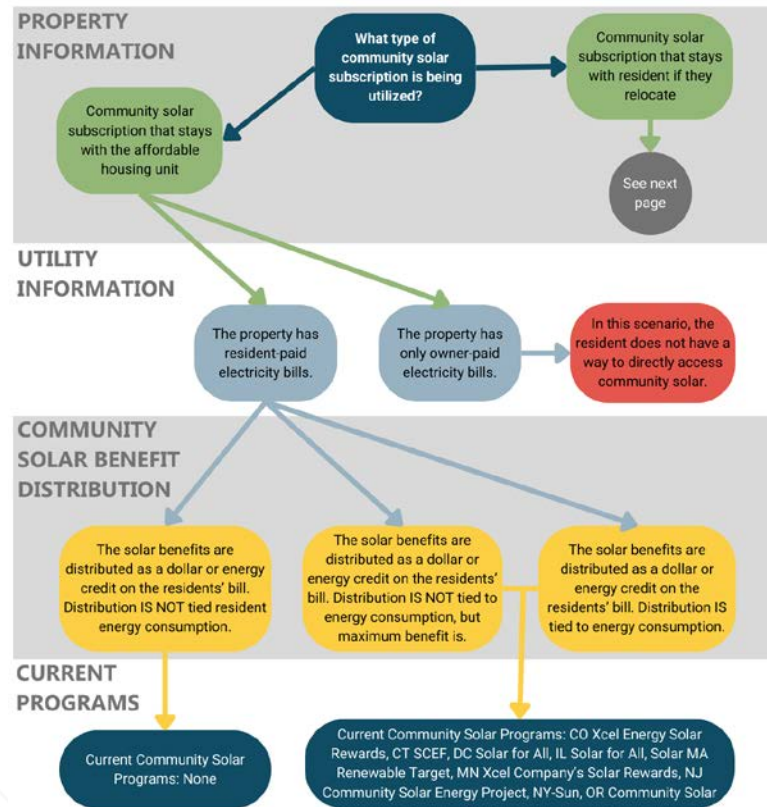
HUD Assisted Housing, Utility Allowances and Community Solar



Utility allowances are updated infrequently and are based on 1) estimates of energy use by an energy-conservative household, 2) actual project-specific energy use, or 3) a property-level estimate based on an engineering analysis. They assume that tenants have reasonable control over their utility usage to ensure that actual costs do not exceed their utility allowance.

Community Solar Programs Compared to SOMAH

- Community solar programs are relatively new
- Most programs align with SOMAH
- HUD guidance could be extended
- Several programs explicitly state subscribers must receive the benefits (no change to rent or UA)



Current HUD Guidance for Community Solar

- California SOMAH
- DC Solar for All
- Illinois Solar for All
- NY SUN
- National Guidance



Channel Square Apartments. Photo courtesy of National Housing Trust

Multifamily Resident Engagement Tip Sheet

1. Assemble your team

- Identify and empower solar champions internally
- Identify potential experienced external partners

2. Build a resident-centered strategy

- Outreach plan should focus on key benefits
- Use multiple existing channels of communication

3. Address barriers upfront

- Make program qualification/verification easy
- Ensure contract has key consumer protections



Links to Resources

- [Community Solar and HUD Subsidized Housing: An Overview of Current Policies, Programs and Practices and the Impact to Tenant Utility Allowances and Income](#): Overview of community solar and HUD utility allowances, including HUD solar potential data and methodology.
- [Expanding Access to Community Solar for Affordable Housing Residents: Three Tips for Resident Engagement](#): Provides tips for increasing the number of multifamily residents subscribing to programs that issue direct bill credits.



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Q & A with Presenters


10 minutes

Wrap-up and Adjourn

- **Access the resources** on the NCSP MFAH webpage:
<https://www.energy.gov/communitysolar/multifamily-affordable-housing-collaborative>
- **Learn more** about Technical Assistance opportunities and apply for no-cost, on-demand support:
<https://www.energy.gov/communitysolar/technical-assistance-opportunities>
- **Register to join NCSP!**
<https://ncsp.solarinyourcommunity.org/registrations/groups/39758>

Thank you!

www.energy.gov/communitysolar



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