

ADVANCING SMALL BUSINESS SOLAR EQUITY

FINAL TECHNICAL INSIGHTS REPORT

LAKE STREET–WEST BROADWAY–UNIVERSITY AVENUE
MINNEAPOLIS AND SAINT PAUL, MINNESOTA



Photo by Brandon Stengel for BWBR Architects, Inc (www.bwbr.com)

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About this Report

The *Advancing Small Business Solar Equity: Final Technical Insights Report* represents the culmination of two years of work in participation with Round 3 of the National Renewable Energy Laboratory's Solar Energy Innovation Network (SEIN). SEIN Round 3, titled "Equitable Solar in Underserved Communities," supported eight underserved communities across the United States in "exploring new approaches to the equitable adoption of solar energy in residential and commercial-scale settings" and in "confronting the solar barriers they face and unlocking the solar benefits most relevant to their own contexts" (National Renewable Energy Laboratory 2023). This project was one of four selected to support solar access for commercial entities in underserved communities.

The research conducted for this report was done within the Minnesota Twin Cities geographic context, but certain findings and the proposed Solar Hub Network model may be found applicable nationally. Community-based organizations that serve small businesses, chambers of commerce, community development finance institutions and other community lenders, municipal governments, solar incentive providers, solar industry professionals, and others may find elements of this report useful.

About the Solar Energy Innovation Network

The Solar Energy Innovation Network (SEIN) seeks to overcome barriers to solar adoption by connecting teams of stakeholders who are pioneering new ideas with the resources they need to succeed. Teams that participate in SEIN receive direct funding and analytical support from the US Department of Energy national laboratories and participate in peer-to-peer learning with other teams tackling similar challenges.

These teams are developing and documenting their solutions for solar adoption with scale in mind so that others can adapt those solutions to their own contexts. Ultimately, the true impact of these teams' efforts will be to enable a wide array of communities to adopt solar solutions that meet their needs in their contexts.

SEIN is funded by the US Department of Energy Solar Energy Technologies Office and is led by the National Renewable Energy Laboratory.

Disclaimer

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Navigating this report

The report is organized into the following sections:

- Section 1 introduces the project, including its goals, team members, and the process we used to gather information and reach outcomes.
- Section 2 discusses our research process and findings.
- Section 3 shares our core proposed program design concept, the Solar Hub Network.
- Section 4 lays out an agenda for our team to continue advancing small business solar equity.

The appendices elaborate on elements of this report in extensive detail. Find summaries of each appendix in the appendix list at the bottom of this report.

See the following sections and appendices for more information on the following topics:

- The project team and the small business corridors this project focuses on: “Section 1.2: Team Members” and “Appendix B: Community and Partner Profiles Report”
- Human-centered design principles and the interview process: “Section 2.1: Human-Centered Design Process” and “Appendix A: Interview Guide”
- Community resources developed: “Section 1.3: Principles,” “Appendix B: Community and Partner Profiles Report,” “Appendix C: Solar Procurement Options Brief,” “Appendix D: Incentive Options Brief,” and “Appendix E: Financing Options Brief”
- The Solar Hub Network model: “Section 3: Program Design,” “Appendix G: Solar Technical Assistance Process,” and “Appendix H: Template for Training CBOs on Solar”

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Executive Summary

Solar energy has emerged not just as a strategy for meeting renewable energy goals and greenhouse gas emissions reduction goals but also as a tool for wealth building, allowing individuals and businesses to generate their own electricity at a lower cost than electricity from the grid. To access and benefit from solar energy, individuals must understand the opportunity, have confidence that they can pursue and benefit from it, and find contractual and financial partners they can trust.

Small businesses, particularly Black, Indigenous, and people of color (BIPOC)- and immigrant-owned businesses, face significant challenges to benefiting from solar energy:

- A lack of familiarity with solar and an absence of trusted advisors or peers familiar with solar
- Uncertainty about the pros and cons of the multiple procurement options for accessing solar power and a lack of a framework for comparing and contrasting each option
- Limited access to capital or financing to overcome the significant upfront costs of solar
- Language barriers, which can limit understanding of complex technical issues and communication with solar installers

The Advancing Small Business Solar Equity project developed a Solar Hub Network concept to address these needs and challenges based on the project's community engagement efforts.

Project background

The Advancing Small Business Solar Equity project was created to better understand and explore solutions to these systematic challenges. Our project focused on businesses in three commercial corridors located in the Twin Cities: Lake Street in South Minneapolis, West Broadway in North Minneapolis, and University Avenue in Saint Paul. Each of these districts has significant numbers of BIPOC- and immigrant-owned small businesses, many of whom experienced significant challenges resulting from the civil unrest that followed the murder of George Floyd.

The team included three community-based organizations (CBOs) that directly serve the businesses in these districts, drawing on business technical expertise and longstanding relationships with business owners. In addition to staff from CBOs, the team also included organizations and members with expertise in solar, community-based program design, and facilitation.

The project was funded by the US Department of Energy's Solar Energy Technologies Office and the National Renewable Energy Laboratory (NREL) through the Solar Energy Innovation Network Round 3, which supported eight underserved communities across the United States in "exploring new approaches to the equitable adoption of solar energy in residential and commercial-scale settings" (National Renewable Energy Laboratory 2023).

Human-centered design approach to exploring barriers and solutions

We used a human-centered design approach to explore and discover the barriers that prevent small businesses from accessing solar. Human-centered design focuses on the people and the human experience at the center of an issue or problem by engaging those most impacted by the outcome, finding the right problem to solve, considering the system and context, and iterating on solutions. For our project, we conducted interviews with small business owners, focused on understanding how small business owners learn about new opportunities, weigh trade-offs, and navigate decision-making processes. Additionally, we interviewed local solar installers and industry experts to better understand other perspectives on the opportunities and challenges around small business solar adoption.

Community resources developed through the project

Our interviews informed the creation of several appendices to this report: a series of “Community and Partner Profiles,” a “Solar Procurement Options Brief,” a “Financing Options Brief,” and an “Incentive Options Brief.” In addition to the briefs, the team developed guiding principles—fostering partnership, cultivating trust, exercising transparency, building wealth, understanding risk, and practicing respectful language. Once these were identified, we used them to inform and evaluate the program design.

Core program design concept: A Solar Hub Network

Our research identified a clear need for small business owners to have access to trusted, impartial advisors who could help them navigate the opportunity to install rooftop solar. Many businesses named a community-based organization (CBO) as their go-to source for business advising. These CBOs could serve as critical hubs for trusted support for business owners who want to explore solar. We developed the concept of a Solar Hub Network, a network of economic development CBOs that could serve as anchors for small businesses seeking guidance on solar. To advance the concept, we created a step-by-step description of how CBOs can provide technical assistance to a small business interested in exploring solar. We also drafted a list of Twin Cities area solar installers, paired with guidance about how to use the list and a suggested training template for bringing on CBOs as partners in solar technical assistance.

Future capacity building and research efforts

From the start, we saw this project as a first step for building capacity to address the issue of small business solar access in the coming years. To prepare us for the work to come, we created a list of additional resources and products that we plan to develop, including the following:

- Solar readiness checklists to help assess if a business and building is suited for solar
- Templates to help businesses and CBOs seek out bids from solar installers
- Simple handouts to help businesses understand the available incentives and finance options
- A pro forma template for comparing options

We also identified several research topics that we plan to continue exploring, including the following:

- Opportunities to integrate energy efficiency and electrification with solar
- Supporting community development financial institutions (CDFIs) to create green lending tools
- Solar potential studies for mixed-use and/or renter-occupied properties

Section 1: Project Overview

1.1 Project Description

The following are the scope, vision, goal, and objectives of the Advancing Small Business Solar Equity project, as defined during a scoping workshop hosted by NREL at the start of the project.

Scope

The scope of the project is to engage minority-owned businesses in underserved neighborhoods to increase solar deployment and to collaborate in applying human-centered design to understand stakeholders' lived experiences, gain insights, and challenge assumptions. The project entails co-creating solutions to reduce inequities in solar adoption, increase business resilience, and build capacity and leadership to sustain ongoing community action.

Vision

We envision a future in which Black, Indigenous, and people of color (BIPOC)- and immigrant-owned small businesses in the Twin Cities are leaders in solar adoption. One in which economic development agencies can accurately demonstrate the potential of clean energy to contribute to equitable wealth generation in communities deeply impacted by systemic racism.

Goal

Increase solar adoption and resilience of BIPOC- and immigrant-owned small businesses and build capacity and leadership in the community to sustain ongoing action.

Objectives

- Collaboratively develop a scalable model(s) for underserved small businesses with a priority on BIPOC- and immigrant-owned small businesses in the Lake Street, West Broadway, and University-Midway corridors to adopt solar based on a deep assessment of business needs, barriers, and preferences.
- Ensure that the proposed business model(s) supports the continued success of small businesses in underserved communities and builds community wealth.
- Provide education and ongoing support to small businesses on the economic opportunities and risks of installing solar, including available incentives and potential economic benefits.
- Share lessons learned with regulators, solar installers, program managers, and others to ensure that appropriate changes are made to existing regulations, programs, and business offerings.

1.2 Team Members

The Advancing Small Business Solar Equity project was a collaborative effort of a multi-sector team that included nonprofit organizations with expertise in place-based economic development, partners with a depth of knowledge on clean energy and community-level program design, and government and utility agencies with aligned goals.

Lake Street Council

Lake Street Council engages, serves, and advocates for the Lake Street business community in Minneapolis to ensure the vitality and prosperity of the commercial corridor. Founded in 1967, the organization provides economic vitality planning, business technical assistance services, and programming for the six-mile-long commercial corridor. Lake Street Council brings together small businesses, major employers, local government, and the nonprofit sector to support and shape economic activity.

Team member: Matt Kazinka, senior strategic initiatives manager

Roles: principal investigator, project manager, and lead for outreach on Lake Street

Areas of expertise: program development and outreach and engagement to small businesses, understanding of small business energy barriers, grant management, cross-sector partnership coordination, and reporting

Neighborhood Development Center

Neighborhood Development Center (NDC) is a nonprofit organization community development financial institution (CDFI) that offers training, lending, technical assistance, and real estate spaces to inner-city entrepreneurs. NDC's mission is to improve neighborhood economies by developing the talents of micro-entrepreneurs within their own communities. NDC has trained more than 8,000 entrepreneurs to date (80 percent of whom are people of color) and currently has nearly 650 alumni in business. NDC works in several communities across the Twin Cities metropolitan area. Their priority neighborhoods include the University-Midway Corridor (Saint Paul), East Side of Saint Paul, North End of Saint Paul, West Seventh of Saint Paul, West Side of Saint Paul, North Minneapolis, South Minneapolis, Northeast Minneapolis, Brooklyn Park, and Brooklyn Center.

Team member: Earlsworth "Baba" Letang, director of community engagement

Roles: participation in stakeholder team and outreach on University Avenue in Saint Paul

Areas of expertise: small business project financing and technical assistance, small business engagement, and neighborhood organization engagement

Northside Economic Opportunities Network

The Northside Economic Opportunity Network (NEON) is a North Minneapolis community-based organization established in 2006 whose mission is to expand economic opportunities and build wealth for North Minneapolis residents through the creation, growth, and development of small businesses. NEON supports entrepreneurs from the start-up and planning stage through success and growth.

Through classes, one-on-one technical assistance, and lending, NEON helps businesses secure space, begin operations, and stabilize.

Team member: Terry Austin, community engagement manager

Roles: participation in stakeholder team and outreach to businesses in North Minneapolis

Areas of expertise: business technical assistance, outreach to businesses in North Minneapolis, and community engagement

Great Plains Institute

A nonpartisan, nonprofit organization, the Great Plains Institute (GPI) accelerates the transition to net-zero carbon emissions for the benefit of people, the economy, and the environment. The Great Plains Institute also acts as one of the four partner organizations that compose the Clean Energy Resource Teams (CERTs). For 20 years, CERTs has worked across Minnesota, facilitating and catalyzing community-based and community-determined clean energy solutions.

Team members: Diana McKeown, Metro CERT director; Aaron Backs, MN AmeriCorps member and sustainability project coordinator

Roles: facilitation, strategic communications and outreach, development, and refinement of the outreach model

Areas of expertise: facilitation and understanding of solar photovoltaics (PV), including resources and incentives, strategic outreach, behavioral psychology, and community-based social marketing

William Weber Consulting LLC

William Weber Consulting (WWC) is a community-based research and facilitation company focused on creating change by advancing sustainable, restorative solutions for people and the planet through collaboration. WWC brings over two decades of facilitation, research, and project management experience to bear on a diversity of projects with broad impact. A practical approach rooted in design thinking and a generative iterative process, WWC guides teams to co-created solutions with interactive and consensus-driven methods.

Team member: William Weber, principal

Roles: program design, research, and engagement

Areas of expertise: facilitation, engagement, program design and implementation, education, and research practice in resilient and regenerative design

City of Minneapolis

The City of Minneapolis is the municipal entity that serves the people of Minneapolis, the largest city in the state of Minnesota. More than 4,000 people work at the City of Minneapolis. Members of the Sustainability Unit located within the Department of Health participated in this project.

Team members: Stacy Miller, climate and energy regulatory specialist; Isaac Evans, sustainability program coordinator; Kelly Muellman, sustainability program coordinator

Roles: connections to businesses in targeted areas that have successfully done solar, explaining/modifying city programming, utility and business organization connections, and leveraging existing programming

Areas of expertise: energy program design and management, energy regulatory, policy, and technical knowledge, program analysis, connections to solar developers, community planning and economic development, community outreach and engagement, and financing and incentives

City of Saint Paul

The City of Saint Paul is the municipal entity that serves the people of Saint Paul, the second largest city in the state of Minnesota and home to the Minnesota State Capitol. Members of the Department of Planning and Economic Development participated in this project.

Team member: Kurt Schultz, program coordinator in planning & economic development

Role: connect the stakeholder team to the City of Saint Paul resources and staff

Areas of expertise: city energy project design and management, solar technical knowledge, Saint Paul policy and resource knowledge, and connections to Saint Paul businesses

Xcel Energy

Xcel Energy is an energy utility company that provides electricity and natural gas to customers in multiple states. Xcel Energy's headquarters are in Minneapolis, where it provides electricity across the city. In neighboring Saint Paul, Xcel Energy is the sole provider of both electricity and natural gas. Xcel Energy's energy generation mix includes approximately 50 percent clean energy, with targets to reach 80 percent clean energy by 2030.

Team member: Callie Walsh, program manager, Solar*Rewards® & DER Interconnections

Role: advise on Xcel Energy rates and programs, including the Solar*Rewards® incentive program

Areas of expertise: electric utility management and programming, solar incentives, grid interconnections, and regulatory frameworks

1.3 Principles

The Advancing Small Business Solar Equity team developed six principles to serve as a guide to this project. They summarize key learnings from the project in proactive terms and communicate the team's aspiration to create a culture of partnership, understanding, and mutual respect. Additionally, they acknowledge challenges that must be addressed and opportunities that must be seized to overcome systemic issues that have led to the current disparity in renewable energy adoption by BIPOC- and immigrant-owned small businesses and the surrounding community.

Fostering partnership

The foundation of the Advancing Small Business Solar Equity project is collaboration and partnership. We strive to establish and grow relationships and create enduring commitments to ensure solar energy is accessible to BIPOC- and immigrant-owned small businesses. Working with community-based organizations and using a human-centered design process, we identify collective priorities and co-create solutions that address the needs and concerns of small businesses. We act to shift power to community organizations and business owners in communities impacted by historical racial injustice with effective place-based solar programs. We invest in capacity building for community-based organizations to serve their communities with solar programs.

Cultivating trust

Trust is the foundation of working in partnership. We acknowledge a trust gap exists between the communities the Advancing Small Business Solar Equity project seeks to serve and the broader structures of institutional power that shape solar access, including government agencies, energy utilities, and large corporations. In building and restoring trust, we recognize past dishonest, exploitative practices and act to put an end to them. We practice deep listening and patience, allowing for the time it takes to build trust with one another.

Exercising transparency

We practice transparency in all interactions and program development to build trust. Daylighting the pros and cons of program details leads to understanding the risks and benefits of solar, empowering small business owners to make decisions with complete information. Ease of understanding is an essential component of transparency and starts by using shared, inclusive, respectful language. This includes using preferred language (e.g., using “under resourced” instead of “low-income”) and avoiding jargon, technical language, and acronyms as much as possible to ensure our conversations are accessible to everyone.

Building wealth

We act to build wealth in communities impacted by historical racial injustice. We recognize past extractive and transactional practices and act to keep the benefits of solar in the community. Solar energy can achieve multiple outcomes, one of which is generating wealth through energy production. We prioritize equitable wealth access that builds assets for small and underserved businesses that have

been precluded from other wealth-building opportunities. We recognize and support the development of green jobs in communities as a wealth-building opportunity.

Understanding risk

Understanding and mitigating risk is central to the programs developed by the Advancing Small Business Solar Equity project. Education and ongoing support to small businesses through community-based organizations is an opportunity for a transparent, candid discussion of the risks and benefits of rooftop solar, including available incentives and potential economic benefits. A strong entrepreneurial spirit underpins many successful BIPOC- and immigrant-owned small businesses. We believe that small businesses know what is best for them and strive to provide the information needed to make informed decisions.

Practicing respectful language

Communication is built on a respectful shared language and a shared understanding while addressing historical inequity. Many common words and phrases have histories rooted in racial disparities, colonialism, and racism. They can carry explicit and implicit biases or dehumanize people by assigning identity based on circumstance. Our language should be equitable and inclusive and help shape the change we are collaboratively working toward.

1.4 Process of Development

Our project team, consisting of both established and new partnerships, convened around the initial Solar Energy Innovation Network (SEIN) application process, which began in September 2021. We were notified of our selection to join Round 3 of SEIN in December 2021 and had developed a contract by February 2022.

The National Renewable Energy Laboratory (NREL) and their partners at RMI hosted a virtual scoping workshop for our team in April 2022, where we collaboratively developed a shared understanding of our project scope, goals, vision for success, and objectives. The outcomes of the scoping workshop led to a work plan. We first met the members of the other SEIN Round 3 teams at the virtual SEIN Working Session #1, held in July 2022.

In August 2022, we began implementing our human-centered design research process. We created an interview guide with a framework for interviewing small business owners, solar experts, and solar installers who could provide us with the user input needed for human-centered design. Between October and December 2022, our team conducted 18 interviews, with two to four team members present at each interview. We met five times to collectively synthesize what we heard and learned in the interviews. During the process, we rejoined our fellow SEIN Round 3 teams at the NREL campus in Golden, Colorado, in November for an in-person SEIN Working Session #2.

From December 2022 to February 2023, the team held a series of local model development workshops to sort through everything learned in our human-centered design research process and identify potential program models that would best address the project goals. By March, we had created the framework for the Solar Hub Network as the core model to develop. In April 2023, we traveled to Denver, Colorado, to share our findings and outcomes with our fellow Round 3 SEIN teams and other nationwide practitioners.

In addition to hosting these workshops, NREL provided technical assistance and analyzed cost-effective opportunities to deploy small business rooftop solar in the Twin Cities project areas. The analysis includes a range of commercial building types, financial incentives, procurement methods, and installed solar costs. NREL will publish its findings in the forthcoming report, *Economic Analysis of Rooftop Solar PV for Twin Cities Small Businesses*.

This report captures the development process, research findings, and program design of the Advancing Small Business Solar Equity team. It was written in the summer and fall of 2023, edited in the following winter, and published in early 2024.

Section 2: Research

The Advancing Small Business Solar Equity project research was conducted using a human-centered design process. The appeal of the approach is the focus on developing empathy with the users, in this case, small business owners, in contrast to treating them as an anonymous component in the system. The human-centered design process is iterative and includes three phases: inspiration, ideation, and implementation. “Section 2: Research” focuses on the first two phases.

2.1 Human-Centered Design Process

Human-centered design (HCD) is an approach to problem-solving that focuses on people and the human experience. The fundamentals include engagement with those being served, finding the right problem to solve, considering the system and context, and iterating on solutions. For the Advancing Small Business Solar Equity team, the appeal in incorporating this approach was the focus on developing empathy with small business owners in contrast to treating them as an anonymous component in the system, which tends to dehumanize them. This aspect of the approach is particularly poignant when engaging historically marginalized communities. Such communities are often categorized by a demographic attribute rather than seen as individuals.

The incorporation of the HCD approach into the team’s process was adapted from the work of IDEO, a global design studio, roughly following their three phases of inspiration, ideation, and implementation (IDEO Design Thinking 2024). Two resources guided the team’s process in developing program model that places small business owners at the center of the work:

- Tim Brown, *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation* (New York: Harper Business, 2009).
- Design Kit: The Course of Human-Centered Design (Acumen Academy and IDEO.ORG), <https://www.designkit.org/resources/5.html>.

Building the project team

The Advancing Small Business Solar Equity team intentionally brought together community-based organizations (CBOs), solar and energy industry experts, and the electric utility and municipal governments that serve the team’s three focus small business corridors. The premise was that each held an important perspective on the challenge of bringing rooftop solar and solar plus storage to underserved BIPOC and immigrant small business owners. Furthermore, the role of Lake Street Council’s leadership placed the team firmly within the community rather than city hall or the utility.

After the uprising following the murder of George Floyd, the communities in the project areas were subject to a barrage of assistance. Good intentions often missed the mark by failing to meaningfully engage with the community. There was survey fatigue and little capacity or interest in a business-as-usual approach to addressing challenges in the community. As members of the community ourselves, the team experienced this firsthand and recognized the need for a fresh approach.

The design challenge

As with any HCD process, the design challenge served as a touchstone of the work. In response to the NREL request for proposals, the team identified the challenge and posed it as a question: How might we address barriers to solar program adoption faced by BIPOC- and immigrant-owned small businesses in corridors impacted by systemic racism and civil unrest to increase installation of solar and solar plus storage?

Drawing inspiration

The inspiration phase heavily focused on research. The team has deep experience in delivering energy efficiency programs, and this was a jumping-off point. Taking up the challenge question, the project kicked off with a brainstorming session to consider: “What do we already know? What are our assumptions? What do we need to learn more about?”

An outcome of these discussions was identifying people to interview and organizations to connect with to better understand the barriers and determine potential solutions. The team identified the following groups to interview:

- Group 1: Small business owners in the corridors without solar installed
- Group 2: Small business owners in the corridors with solar installed
- Group 3: Solar installers
- Group 4: Solar experts

Next, the team wrote an interview guide (detailed in Appendix A). Questionnaires for each group were guided by the human-centered design interview approach. Two primary types of questions were asked: general questions intended as conversation starters and go-deep questions intended to explore motivations, frustrations, and interactions to build understanding.

Interviews were conducted in the fall and early winter of 2022 and 2023. They were done in pairs, primarily in a virtual setting due to the ongoing COVID-19 pandemic. All members of the team were encouraged to participate so they could hear from business owners firsthand. The team captured key learnings from the interviews with debriefing sessions. The sessions were conducted remotely using a virtual whiteboard.

Ideation and concept development

The ideation phase was conducted in a series of workshops. The first focused on synthesizing the learnings, and the second on developing a customer journey.

The objectives of the first workshop were to develop and articulate our understanding of the small business owner experience, understand key barriers and opportunities to break through them, and identify options to include in program models.

The team synthesized learnings across interviews with descriptive insight statements capturing themes, ideas, and patterns. For example: “There is intense competition for small business owners’ time and attention... make it worth it,” and “Businesses have (and use) trusted networks—may be place-based, or social groups, like faith communities.” An overarching takeaway from the workshop was that there is both an information gap and a capacity gap on solar for small businesses. Small business owners are entrepreneurial by nature, and programs need to be grounded in business decisions.

The second workshop explored the customer experience from first awareness of the program through the end of life of a photovoltaic system. The team considered the small business perspective at each phase. For example, the span of the timeline was directly informed by insights gained through the interview process. The team realized that questions and concerns regarding rooftop solar do not end with installation and interconnection to the electric grid. Concerns of performance and maintenance are as common as which solar installer to hire.

Interactions between small businesses and other players emerged as a major theme during the exercise. It became apparent that the focus on the people and their experience encompassed more than small business owners. All perspectives along the delivery path of rooftop solar projects needed to be considered, including solar installers, lenders, and CBOs. (See “Appendix B: Community and Partner Profiles Report” and “Appendix F: Solar Installers Brief” for further information.)

Finally, the team had a wide-ranging brainstorming session motivated by the question: “How might we...?” For example: “How might we provide financing for ‘unbankable’ businesses?” and “How might we better understand business readiness (for solar) and risk?” This helped the team understand in concrete terms the barriers to solar adoption encountered by small businesses in underserved communities.

The team came to focus on the following: “How might we raise awareness, increase education, and generate demand for solar among small businesses in our communities?” While broad, it proved fruitful. The trend in the brainstorming session tracked toward community connection and the need for CBOs to lead. The solution took shape by mapping the customer experience using interview insights on trust, relationships, and the need for extended engagement.

Program concept and process outcomes

This led to creating the project’s core program design concept of a Solar Hub Network in existing CBOs to embed resources, education, and technical assistance on rooftop solar for small businesses in the communities. The Solar Hub Network would link individual CBO hubs across the city, creating a culture of solar and energy efficiency in BIPOC- and immigrant-owned small business corridors. In addition, connecting individual CBO hubs in a network would allow for effective and meaningful sharing of information and resources across Twin Cities. (See “Section 3.1 Program Design Concept” for details.)

Another major outcome of the HCD process was the project principles. They captured a number of recurring themes that emerged from group discussions, served as a litmus test for program ideas,

assessed outcomes, and shaped a higher set of goals as the team worked with communities impacted by systematic racism. (See “Section 1.3: Principles” for details.)

The team is currently preparing for the Solar Hub Network implementation phase. The customer experience map continues to inform the tools needed to support CBOs and small businesses at every stage of a solar project. (See “Section 3.1: Program Design Concept,” “Appendix G: Solar Technical Assistance Process,” and “Section 4: Future Agenda” for details.)

2.2 User and Community Profiles

The “Community and Partner Profiles Report” (Appendix B) outlines the history, perspective, and identity of the Lake Street, West Broadway, and University-Midway corridors, as well as the project partner CBOs. It was developed through interviews with the primary constituent communities, research, and the team’s prior experience with the communities.

An overarching takeaway from the human-centered design approach was the reinforcement of treating CBOs as key partners to be served by the program as it develops. The insights gained from the interviews informed the emerging program approach to develop community-based solar hubs that prioritize relationships and solutions that address the unique challenges in each corridor.

The three corridors participating in the Advancing Small Business Solar Equity project transect the urban fabric of Minneapolis and Saint Paul and serve as anchors for the cities’ BIPOC- and immigrant-owned small business communities, reflecting the racial and economic diversity of the surrounding residential area. Lake Street and West Broadway Avenue in Minneapolis and University Avenue in Saint Paul intersect through multiple qualifying Opportunity Zone census tracts, as designated by the US Department of Housing and Urban Development.

Although historically underserved, these are beloved communities filled with creative, hardworking people and thriving business districts. Established CBOs have long-standing relationships with community members and small business owners, which provides a foundation of trust. While they have much in common, they are distinct in character and population.

The fabric of these corridors consists of small and medium-sized owner-occupied stand-alone structures, mixed-use buildings, and businesses that rent their building space. While not readily quantifiable at this time, an important finding was that building type and ownership status pose significant barriers to the equitable adoption of rooftop solar in these underserved urban areas.

Please read “Appendix B: Community and Partner Profiles Report” for more detailed research findings.

2.3 Solar Procurement Options Brief

The “Solar Procurement Options Brief” (Appendix C) explores options available to small businesses to adopt rooftop solar. They include direct procurement and investor options, including power purchase agreements (PPAs), community solar gardens (CSGs), and a variation on the PPA model featuring cooperative ownership.

The solar options were assessed using the project principles as a guide. Particular attention was paid to the issues of transparency, understanding risk, and wealth building. Each of these procurement options has advantages and disadvantages to weigh against each other, as illustrated in Table 1.

Table 1: Solar procurement options in the Twin Cities metro area: Comparison of key considerations for small business participation in solar energy as identified by the team.

	Direct purchase and ownership	Power purchase agreement	Community solar garden	Solar cooperative
Ownership				
Owner	Direct ownership by small business	Developer ownership (typically) with an opportunity for direct ownership after 7-10 years	Developer	Cooperative ownership
Financing				
Capital costs	Business	Investor	Third-party developer	Co-op
Captures tax credits & depreciation	Business	Investor	Third-party developer	Co-op
Captures other state/local incentives	Business	Investor	Third-party developer	Co-op
Positive cash flow	Financing may be structured to be cash flow-positive	X	X	X
Profit-sharing				X
Eligibility				
Location of array	Rooftop	Rooftop	Off-site	Rooftop or off-site
Participation by building owner-occupier	X	X	X	X
Participation by renter	With permission of property owner	With permission of property owner	X	X
Risk & transparency				
Level of fiscal risk for business	High	Low	Low	Low
Operations & maintenance	Business	Developer	Developer	Co-op
Renewable energy certificate ownership (see note)	X	Investor	Awaiting state regulatory guidance	Co-op
Contract		X	X	X
Note: Ownership of renewable energy certificates (RECs) depends on participation in Xcel Energy’s Solar*Rewards® incentive program. See “Appendix D: Incentive Options Brief” for more details.				

Please read “Appendix C: Solar Procurement Options Brief” for more detailed research findings.

2.4 Incentive Options Brief

The “Incentive Options Brief” (Appendix D) summarizes the incentives available for businesses in the Twin Cities Xcel Energy service territory. The brief casts a wide net to identify programs to maximize the potential benefit to small businesses from federal, state, city, and utility programs. The dashboard format is intended to provide key information about the available opportunities and highlight their relevance to small business owners. The brief also includes links to websites with information on incentive programs and additional resources.

The brief informed the data analysis and modeling conducted by NREL for the Advancing Small Business Solar Equity team, which will be published in the forthcoming report *Economic Analysis of Rooftop Solar PV for Twin Cities Small Businesses*. Additionally, it will be used to inform program development and future education for CBOs and the small businesses they serve.

It is important to bear in mind that incentives are not universally available and may be subject to annual allocation limits, geographical boundaries, and specific program requirements. Furthermore, access to specific incentives by small businesses may be limited due to other factors, such as a lack of tax appetite, which limits effective participation in investment tax credits. Tracking incentive availability is a significant challenge for program development, communications, and administration.

Incentive options explored:

- Federal: Inflation Reduction Act (investment tax credit) and accelerated depreciation
- State of Minnesota: state solar sales tax exemption and property tax exemption
- Utility (Xcel Energy): net energy metering, PV Demand Credit, and Solar*Rewards® for income-qualified for-profits
- Municipal: City of Minneapolis Green Cost Share program

Note that the most significant incentive for solar is the direct savings from reduced utility bills. While not captured as part of the brief, it is nonetheless an ongoing direct benefit of rooftop solar.

Table 2 highlights each of the incentive options included in our research.

Table 2: Summary of federal, state, municipal, and utility solar incentives available for small businesses in the Xcel Energy service area of Minneapolis and Saint Paul, Minnesota.

	Inflation Reduction Act, investment tax credit	Minnesota property tax exemption	Minnesota sales tax exemption	Xcel Energy net energy metering	Xcel Energy Solar* Rewards®	Xcel Energy PV Demand Credit	Minneapolis Green Cost Share
Geographic eligibility							
Lake Street	X	X	X	X	X	X	X
West Broadway Ave.	X	X	X	X	X	X	X
University-Midway	X	X	X	X	X	X	
Incentive type							
Tax credit	X						
Tax exemption		X	X				
Ongoing utility bill credit				X	X	X	
Upfront payment or grant					X		X
Incentive level							
	30% tax credit; additional adders available	N/A	N/A	Rate Code A50 if <40 kWac (kilowatt-alternating current); Rate Code A53 if <1 MWac (megawatt-alternating current), non-Time of Use; Rate Code A54 if <1 MWac, Time of Use	\$0.50/Wdc (watt-direct current) upfront; \$0.015/kWh (kilowatt-hour) production	\$0.07/kWh production during peak load hours	Base incentive rate \$0.20/estimated Year 1 kWh production; additional incentives available
Incentive timing							
Before completion of solar array		N/A	N/A				
Within 30 days upon completion of solar array		N/A	N/A		X		X
Ongoing		N/A	N/A	X	X	X	
During tax filing	X	N/A	N/A				
Limitation							
Size of solar array	<1 MWac; >1 MWac if prevailing wage & apprenticeship met			<1 MWac or <120% annual usage	<40 kWac or <120% annual usage	>40 kWac	
Competitive application*	Low-income adder				X		X
Renewable Energy Certificate (REC) ownership	System owner	N/A	N/A	System owner	Xcel Energy	System owner	System owner

*Program subject to annual limits by funding and/or installed kW caps.

Please read “Appendix D: Incentive Options Brief,” for more detailed research findings.

2.5 Financing Options Brief

The “Financing Options Brief” (Appendix E) summarizes loans available to small businesses in the focus corridors. The identified financing options are most suitable for small business owners seeking direct purchase and ownership options for rooftop solar installations. The loan options provide a variety of funding limits and terms that may be applicable based on the size and cost of the solar array, business circumstances, project timeline, and expectations for return on investment.

Barriers to access to capital were explored:

- First, the “bankability” of small businesses. Conventional loans require high credit scores and business history to underwrite small business loans. Community development financial institution (CDFI) lenders have greater flexibility with lending and, in many cases, already have established relationships with business owners.
- Second, conflict with Islamic religious beliefs prohibiting the payment of interest. A number of the finance institutions interviewed have experience with Murabaha transactions, which are cost-plus-profit purchases in lieu of interest payments in accordance with Islamic law.

Financial options covered in the brief include the following:

- Metropolitan Consortium of Community Developers (MCCD), CDFI
- Neighborhood Development Center (NDC), CDFI
- Saint Paul Port Authority (SPPA), Commercial-Property Assessed Clean Energy (C-PACE) program
- Center for Energy and the Environment (CEE), solar finance program
- City of Minneapolis—Two Percent Loan program
- City of Saint Paul—Neighborhood Sales Tax Revitalization Program (STAR)

The commercial loan program from CEE, although currently inactive, is included for informational purposes. It is one of the few options noted that specifically served businesses that leased their space. Several CDFIs serving the corridors have expressed interest in developing a loan product specifically geared toward energy efficiency and renewable energy-related projects.

Table 3 contains highlights of each of the financing options included in our research.

Table 3: Summary of geographic eligibility, financing types, and finance parameters for programs serving small businesses in Minneapolis and Saint Paul, Minnesota.

	Metropolitan Consortium of Community Developers (MCCD); standard loan offering	Neighborhood Development Center (NDC); standard loan offering	Saint Paul Port Authority (SPPA); Commercial-property assessed clean energy (C-PACE)	Center for Energy and the Environment (CEE); Commercial solar financing program	City of Minneapolis; 2% loan	City of Saint Paul; Neighborhood Sales Tax Revitalization (STAR) program
Geographic eligibility						
Lake Street	X	X	X	X	X	
West Broadway Ave.	X	X	X	X	X	
University-Midway	X	X	X	X		X
Financing types						
Loan	X	X		X	X	X
Property assessment			X			
Financing parameters						
Interest rate	5-7%	5-7.25%	5%	2-4%	2%	3%
Term length	10 years	5-20 years	10 years	5-10 years	5-10 years	8 years
Secured (requires collateral)	X	X		If >\$50,000	X	X
Match requirement					X	If >\$50,000
Per-project funding limit		<\$250,000	\$20,000-\$1,000,000	<\$100,000	<\$50,000 or <\$75,000	
Credit check required	X	X	X	X	X	X
Designed specifically for solar			X	X		
Able to structure with fees instead of interest				X		X
Special focus on low-income entrepreneurs	X	X			X	X

Please read “Appendix E: Financing Options Brief” for more detailed research findings.

2.6 Solar Installers Brief

The “Solar Installers Brief” (Appendix F) captures key themes and learnings from interviews with local installers with experience working in the program corridors. While the primary focus of the interviews conducted for this project was on expanding the team’s understanding of BIPOC- and immigrant-owned small businesses, the scope extended into the solar installation industry in order to gain insights from the delivery side of the solar procurement and installation process and to understand the current relationship between solar installers and small businesses in the program corridors.

Please read “Appendix F: Solar Installers Brief” for more detailed research findings.

Section 3: Solar Hub Network Model Design

3.1 Program Design Concept

A primary outcome of the Advancing Small Business Solar Equity project was developing the Solar Hub Network program model, a model for delivering solar technical assistance and resources to small businesses via trusted messengers and advisors from community-based organizations (CBOs). Solar hubs will have two primary functions. First, they will embed resources, education, and technical assistance in small community businesses on rooftop solar. Second, they will link CBOs across the city, creating a culture of solar and energy efficiency in BIPOC- and immigrant-owned small business corridors. Both components are critical to accelerate rooftop solar adoption in the near term and sustain the momentum into the future. In addition, connecting individual CBO hubs in a network will allow for effective and meaningful sharing of information and resources across Twin Cities.

The Solar Hub Network model embodies and reflects the project principles. It will be founded in partnership to establish and grow relationships and create enduring commitments to ensure solar energy is accessible to BIPOC- and immigrant-owned small businesses. Housing hubs within existing CBOs puts information in the hands of people already working to support small businesses in participating communities. Furthermore, the network structure and education across organizations is intended to embed solar into the culture of the collective and not rely on it being a passion project of a single staff member.

CBOs are known and trusted agents with pre-established relationships within their communities. This helps to minimize the trust gap, which can be an impediment. CBO staff know individual business owners and their businesses. They can be responsive with relevant information based on circumstance. This way, individual business goals, needs, and risk tolerance can be considered on a case-by-case basis. Furthermore, they can approach the procurement of solar as a business decision, applying the same thoughtful and thorough consideration. This helps to normalize solar in a practical manner by weighing the pros and cons with a transparent, informative process.

Development

The decision to develop the Solar Hub Network came about as the result of a number of findings that, taken together, suggest that instead of developing new programs, there is a need for connecting existing programs and information with trusted partners in the community. The core of the solution to breaking down barriers to solar adoption for BIPOC- and immigrant-owned small businesses is centered on relationships. The team recognized conversation as an effective and critical agent of change.

First, the assumption going into the project was that the focus of the human-centered design process would be BIPOC and immigrant small business owners since the perspectives of the business owners need to remain central to the process to create effective solar programs. While this remains true, as the exploration of the design challenge developed, it became apparent that putting people first

encompassed more than small business owners. Everyone's perspectives along the delivery path of rooftop solar projects needed to be considered, including solar installers, lenders, and the CBOs.

Second, the existing solar procurement options for rooftop solar in the Twin Cities are relatively well-established and popular, even though BIPOC- and immigrant-owned small businesses face specific barriers to entry. For example, Xcel Energy's solar incentive programs are regularly oversubscribed early in each funding cycle, demonstrating high demand in the market.

As noted in "Appendix C: Solar Procurement Options Brief," the team identified multiple pathways for solar, including direct ownership with self-financing, power purchase agreements (PPAs), community solar gardens (CSGs), and variations on the PPA and CSG models that incorporate cooperative ownership. Local models exist for each of these solar procurement options, and there is strong interest in the solar and renewable energy community in the Twin Cities for further development of these products to make them more effective and equitable.

Early on, the Advancing Small Business Solar Equity team determined that it lacked the expertise and resources to take the lead on program development of this kind. The team will, however, continue to serve as a facilitator and connector between industry partners, CBOs, and the community to ensure programs are developed with the small business experience central to the process.

Addressing historical capital, equity, and trust gaps was identified early on as key to success. Capital and equity gaps can be addressed through program adaptations that carefully consider the capacity and needs of BIPOC- and immigrant-owned small businesses. For example, developing a green financing product by community development financial institutions (CDFIs) familiar with the small businesses in these communities would likely fill an important financing gap.

The final gap, however, could only be bridged through relationships. Given the historical and ongoing extractive and exploitative manner in which outside actors have operated within these corridors, building capacity and knowledge of solar within the community through partnerships with CBOs is logical. The customer mapping of the small business experience in adopting rooftop solar from first awareness through the equipment end of life reinforced the need for a community-based information clearinghouse to provide technical assistance to small businesses.

3.2 Technical Assistance Process

The technical assistance process outlines the key steps in the development and delivery of the Solar Hub Network, including the roles of participants, capacity building for technical assistance, and the tools needed to guide a small business through the procurement process for solar.

Solar adoption technical assistance path and roles

As part of the human-centered design process, the team developed a customer experience map. This led to developing a step-by-step process outlining the roles of participants, technical assistance, and tools needed to guide a small business through the procurement process for solar. From awareness to the array's end of useful life, the team identified the support needed to ensure a positive experience. This includes everything from being realistic about installation timelines to consideration of maintenance and technical support post-installation.

These steps are laid out in a table format in “Appendix G: Solar Technical Assistance Process” with greater detail about the connection between CBOs and businesses and the resources used at each step. It includes a list of tools and resources at each stage and identifies key decision points. Many of the tools and resources referenced in these steps are items that are identified for future creation in “Section 4.2: Desired Implementation Resources.”

Stage 1: Capacity building

Prior to conducting any outreach, a CBO must get oriented and trained on the process of providing technical assistance on solar for small businesses.

Steps in this stage include the following:

1. Develop a partnership, including meeting solar partners and determining funding sources.
2. Build the team, including choosing staff to lead the technical assistance process.
3. Develop materials and conduct training, preferably led by partners with prior experience.

After these steps, the CBO will begin conducting outreach to small businesses about solar.

Stage 2: Outreach and identification

Once a CBO is prepared to provide solar technical assistance, it can begin developing and enacting an outreach strategy.

Steps in this stage include the following:

1. Develop and design marketing and community education materials using channels for reaching the business community they work with, such as social media, newsletters, or workshops.
2. Conduct individualized outreach, including identifying businesses that most likely would be interested in participation and reaching them through preferred communications options.
3. Hold an initial conversation with interested businesses to provide high-level information about solar and the process for installing solar panels.

After these steps, the CBO would schedule an assessment meeting with an individual business that expresses interest in solar.

Stage 3: Assessment

When an interested business is identified, the CBO would meet with the business and conduct an on-site assessment before moving forward with further exploration of solar.

Steps in this stage include the following:

1. Run through the business readiness checklist, asking the business owner questions about their interest in solar, business priorities, capacity for upfront pay and debt financing, and other questions about the business.
2. Run through the building readiness checklist, identifying important information for understanding the solar potential, including the roof's age, the space available on the roof, and any recent electrical panel work.
3. Help the business determine which solar pathways are most relevant based on the results of the two prior steps.

After these steps, the CBO would help the business determine the best-fit solar pathway (if solar is determined to be a fit at all) and continue to the next step.

Stage 4: Project development

Once a solar procurement option is determined, the CBO would begin helping the business receive and vet bids for solar installations. The steps in this section are option-dependent, meaning that they will change depending on which type of solar is being considered.

For example, the steps for the traditional direct ownership pathway include the following:

1. Collect bids using the "Solar Installer List" (Appendix I) to identify and reach out to bidders.
2. Review incentives using the "Incentives Options Brief" (Appendix D) to determine eligibility and fit.
3. Use the "Financing Options Brief" (Appendix E) to select an appropriate financing option.
4. Review and compare bid packages using a pro forma template to line up options side by side and incorporate information about incentives and financing options.

Steps for the other options (PPA, co-op, or community solar) have similarities but may look different because those types of projects often involve working with developers who have integrated packages that include built-in incentives and financing. More detailed steps for these options are explored in "Appendix G: Solar Technical Assistance Process" under "Stage 4: Project development."

After these steps, the business should be able to determine which bid, if any, they choose to move forward with. If none of the bids are attractive, the CBO and business may need to re-evaluate whether this solar option is feasible or if another should be pursued.

Stage 5: Review and decision

Once a winning bidder has been selected by the business, the CBO would assist them in a final review process to ensure they are ready to proceed.

Steps in this stage include the following:

1. Request a draft contract from the winning bidder.
2. Review the drafted contract, checking for any possible concerns about insurance, legal, or tax implications.
3. If concerns are identified, connect the business with a technical assistance provider who specializes in the area of concern.

After these steps, the business should be prepared to make a final decision about signing the contract or declining to pursue the project.

Stage 6: Implementation

A signed contract will lead to implementation, which will be monitored by the business. The CBO should plan to occasionally check in on the project to ensure that there is progress and address any major issues or delays around potential challenges, such as interconnection timelines.

This stage ends with the solar system being installed, interconnected, and turned on.

Stage 7: Follow-up

Once the project is completed, the CBO will follow up with the business to ensure that everything is working well and capture any lessons for future projects.

Steps in this stage include the following:

1. Check in one to three months after the project is completed to see how the solar system is operating as designed and capture any positive or negative feedback.
2. Ask the business owner if they would be willing to share their story/testimonial and photos or video in the form of a case study or media post to spread awareness about small business solar opportunities.
3. If the project involves the small business utilizing a tax benefit, remind the business owner to speak with their tax preparer and ensure they are prepared to file the appropriate tax forms to receive the benefits.

3.3 Draft Implementation Resources

“Appendix G: Solar Technical Assistance Process” identifies several tools and resources that can be used by CBOs, often in conjunction with the businesses they serve, to help a business explore solar. Our team has drafted a subset of the resources and tools identified as needed, which are described below. The remaining resources and tools yet to be developed are described in section 4.2, “Desired Implementation Resources.”

Template for training CBOs on solar

The “Template for Training CBOs on Solar” (Appendix H) is a planning document for structuring a training agenda to help a business-serving CBO learn how to provide solar-related technical assistance.

Solar installer brief

The “Solar Installer List” (Appendix I) has a table of solar installers operating in the Twin Cities. It includes an introduction to the selection criteria, including general considerations, solar vetting programs, and an equity lens, each of which is described in brief below.

General considerations:

- Geographic location of the installer
- Year established

Solar vetting programs:

- State of Minnesota, master solar contract program
- Metropolitan Council, Solar-for-Vouchers program
- City of Minneapolis, Green Cost Share environmental justice projects

Equity lens:

- Minority business enterprise (MBE)
- Women business enterprise (WBE)
- City of Minneapolis Small and Underutilized Business Program (SUBP)

Section 4: Future Agenda

4.1 Road Map to Our Future Vision

At the conclusion of our participation in SEIN, our team is excited to build on what we have learned in this process to continue working toward the future vision we adopted at the start of the project:

We envision a future in which BIPOC- and immigrant-owned small businesses in the Twin Cities are leaders in solar adoption. One in which economic development agencies can accurately demonstrate the potential of clean energy to contribute to equitable wealth generation in communities deeply impacted by systemic racism.

To that end, we have created the following two lists that will serve as starting points for the next phase of our team's work:

- Section 4.2, "Desired Implementation Resources," a list of documents and tools whose purpose has been identified in "Appendix G: Solar Technical Assistance Process."
- Section 4.3, "Future Research Topics," a list of research topics we identified as important for a better understanding of how to advance small business solar equitably and effectively.

Our team intends to seek and secure additional funding to advance this agenda. Our priority is to develop, test, and implement the Solar Hub Network in the Twin Cities, focusing on Lake Street, West Broadway, and University Avenue and possibly expanding to other communities as capacity allows.

The steps for local implementation will include the following:

1. Create the tools identified in the "Desired Implementation Resources."
2. Conduct training with business engagement staff at CBO partners, using "Appendix H: Template for Training CBOs on Solar" as a guide.
3. Support CBOs in implementing solar technical assistance, using "Appendix G: Technical Assistance Process Outline" as a guide.
4. Use elements of human-centered design to iteratively gather feedback from CBOs and businesses to modify and refine our tools, processes, and partnerships.
5. Take advantage of opportunities to study future research topics during and outside of implementation processes.

As we make advancements locally, we also hope to continue our partnership with NREL to refine, share, and replicate our lessons nationally, reaching other communities that have business districts that share traits with Lake Street, University-Midway, and West Broadway. While our research has centered around the context-specific systems and resources available in the Twin Cities, we expect that the overall approach could be replicated elsewhere.

4.2 Desired Implementation Resources

This section includes descriptions of the resources and tools our team has not yet drafted but sees as important elements, as described in “Appendix G: Solar Technical Assistance Process.” For each tool, we offer a short description of its use, what it should include, and any relevant links or references we would look to for guidance in creating the tool.

Guidance for CBOs to identify solar candidates

Intended use: CBOs would use this resource to consider which businesses in their client pool or geography might be good candidates to explore rooftop solar energy.

Existing resources to draw on:

- Clean Energy Resource Teams (CERTs), “[Simple Steps to Solar](#)”
- University of Minnesota, “[Minnesota Solar Suitability App](#)”
 - This tool can provide a general idea of the solar potential for a site by typing in the address of the building. With assistance from CERTs, the tool was developed by graduate students in the master of geographic information science program at the University of Minnesota as a part of the Minnesota Solar Suitability Analysis project.

Elements to include:

- Recommended minimum building size
- Previous expressions of interest in clean energy or other adjacent topics
- Previous experience with energy efficiency implementation

Public relations package: Message guide & solar fact sheets

Intended use: CBOs would use this resource to craft outreach materials about solar to small businesses.

Existing resources to draw on:

- CERTs, “[Solar Energy](#)” tools and guides landing page
- Minnesota Department of Commerce, “[Solar Energy Data & Info](#)”
- Solar Energy Industry Association (SEIA), “[Minnesota Solar](#)” factsheet
- Minnesota SEIA (MnSEIA), “[Resources: Learn about Minnesota solar + storage](#)”
- MnSEIA, “[Diversity, Equity & Inclusion in the Solar and Storage Industries](#)”

Elements to include:

- Recommended language to use along with words or phrases to avoid, based on best practices gleaned from solar and economic development experts
- Common misconceptions and realities about solar
- Accurate information about solar that can be referenced in outreach materials or in conversations with businesses, including some generalized information about costs, benefits, and average project timelines

Solar readiness checklists

Intended use: CBOs would use this resource to help determine if a business is ready for solar and to identify the best-fit solar pathways. The resource would include both a business readiness checklist, assessing the economic traits of the business and its owner, and a building readiness checklist, checking the physical traits of the property.

Existing resources to draw on:

- NREL, "[Solar Ready Buildings Planning Guide](#)"
- US Environmental Protection Agency, "[Solar Photovoltaic Specification, Checklist and Guide](#)"
- BAI Group LLC, "[The Ultimate Solar Checklist for Business](#)"

Elements to include:

- Roof condition (age, structure, flat or pitch)
- Financial aspects (self-financing, need for financial aid, etc.)

Request for proposal template for CBOs to select preferred vendors

Intended use: CBOs would use this template to produce and distribute a request for proposal (RFP) for solar installers and developers to complete to be considered for a preferred vendor list. This would allow a CBO to select its preferred vendors based on the values and principles most important to its community.

Existing resources to draw on:

- CERTs, "[Questions to Ask Companies](#)"
- CERTs blog, "[Take Care in Selecting Electrical and Solar Contractors](#)"
 - Details tips for finding legitimate solar or electrical contractors

Elements to include:

- Topics to ask questions about:
 - Installations completed within the CBO's geography
 - Workforce diversity and languages spoken by team members
 - In-house financing partnerships
- Submission of an example bid
- Demonstrated installer's past experience, including testimonials or references

Bid template for individual businesses

Intended use: A bid template would be intended to provide a common platform for solar installers to bid on potential solar projects hosted by small businesses. A common template shared among solar installers would make it easier for CBOs and businesses to make comparisons between bids when soliciting from multiple solar installers. A small business, or a CBO supporting that small business, would be able to provide the template to selected solar installers.

Existing resources to draw on:

- None identified yet

Elements to include:

- Roof age, size, and available space
- Languages spoken and requested

If possible, make the template work for all solar procurement options; otherwise, make a separate version for direct ownership and power purchase agreements (PPAs), co-op models, and community solar gardens (CSGs).

List of solar options + a decision tree

Intended use: A CBO, working directly with a business, can use a list of solar procurement options and a decision tree to help a business owner determine which solar pathway might be the best fit for them. It would be an abbreviated, user-focused version of the information in “Appendix C: Solar Procurement Options Brief,” limited to 1–2 pages. It would also include a decision tree to help a business answer simple questions to determine which pathways are most favorable and which can be ruled out.

Existing resources to draw on:

- “Appendix C: Solar Procurement Options Brief”
- CERTs, “[Community Solar Gardens](#)”
- CERTs, “[Model RFP for Third-Party Solar](#)”

Elements to include:

- Brief descriptions of each solar pathway
- A table or graphic highlighting simple information about the different solar pathways
- A list of questions for the business owner to consider in the form of a decision tree

List of incentive options

Intended use: a CBO, working directly with a business, can use a list of incentive options to help a business owner determine which incentives they might qualify for. The list would summarize the current incentives for solar available to small businesses in the corridors in an easily understandable format. It would be an abbreviated, user-focused version of the information contained within “Appendix D: Incentive Options Brief,” limited to 1–2 pages.

Existing resources to draw on:

- “Appendix D: Incentive Options Brief”
- NC Clean Energy Technology Center, “[Database of State Incentives for Renewables & Efficiency® \(DSIRE\)](#)”

Elements to include:

- Brief descriptions of each incentive option
- A table or graphic highlighting some simple information about the different incentive options

List of financing options + a decision tree

Intended use: A CBO, working directly with a business, can use a list of financing options and a decision tree to help a business owner understand which financing options would be a fit for their solar project. The resource would summarize the loans and financing mechanisms available to small businesses in the corridors that can be applied to rooftop solar, simplifying the information to help a business make a decision. It would be an abbreviated, user-focused version of “Appendix E: Financing Options Brief,” limited to 1-2 pages. It would also include a decision tree to help a business determine how to find the best-fit financing option for their project.

Existing resources to draw on:

- “Appendix E: Financing Options Brief”

Elements to include:

- Brief descriptions of each financing option
- A table or graphic highlighting simple information about the different financing options
- A list of questions for the business owner to consider in the form of a decision tree

Pro forma template for bid comparisons

Intended use: a CBO, working directly with a business, can use the RFP template to plug in the bids collected during the procurement process and compare costs, benefits, payback periods, incentives, and other important elements.

Existing resources to draw on:

- The Advancing Small Business Solar Equity team has received a draft pro forma template from a local installer, but it is not available for publication.

Elements to incorporate:

- Total project cost
- Upfront project cost
- Timing and amount estimated of incentives
- Payback periods
- Financing impacts on costs, if applicable

Proposal review guidance + a decision tree

Intended use: CBOs would use this guidance directly with businesses to help them consider multiple bid proposals and determine which is the best fit for them. A decision tree will make it easy to guide the business owner through questions and arrive at a decision.

Existing resources to draw on:

- None identified yet

Elements to include:

- Comparisons of upfront project costs and the requirement for capital or a bridge loan
- Comparisons of tax benefits and how those can be utilized by a business

List of specialized technical assistance providers for insurance, legal, and tax review

Intended use: CBOs can offer this list of technical assistance providers to businesses that need a more specialized review of their final solar contracts, especially those with a background in insurance, law, or taxes.

Existing resources to draw on:

- City of Minneapolis, "[Business Technical Assistance Program \(B-TAP\) providers](#)" list
- Hennepin County, "[Elevate Hennepin Resources](#)" list of technical assistance providers

Elements to include:

- A list of providers
- Information about whether the services are pro bono or have a cost

4.3 Future Research Topics

Our team has identified the following topics for further research and exploration in future phases of our collaboration. These topics were developed based on the scope of this Solar Energy Innovation Network Round 3 research project, but each is critical for an overall understanding of how to improve small business solar equity.

Role of community solar gardens as a solar pathway

Round 3 of the Solar Energy Innovation Network focused explicitly on rooftop solar, so our project did not study community solar gardens (CSGs) as a solar pathway to any significant extent. However, our research does suggest that CSGs may be a valuable pathway for businesses that do not have adequate roof space, appropriate building conditions, site control, or access to the capital required for direct solar rooftop installations. In the future, our team plans to understand better the Minnesota Community Solar Garden program and to lay out CSGs as a solar pathway in greater detail.

Opportunities to integrate energy efficiency and electrification

Throughout our research, as we came to understand more about the barriers and opportunities to solar implementation among BIPOC- and immigrant-owned small businesses, we identified several similarities to prior work our organizations have done to improve small business access to energy efficiency resources. Anecdotally, we have found that many small business owners lack awareness and knowledge about both solar and energy efficiency, as well as the potential incentives and cost savings associated with each.

At the same time, beneficial electrification is an even newer topic among clean energy advocates, and we have seen little education and awareness building on electrification targeting small commercial buildings and businesses. Our team has limited experience and knowledge about the electrification of commercial buildings, but we know it could be an important opportunity in the near future and one that relates very closely to energy efficiency and solar.

We also believe solar can be more effective when paired with energy efficiency and/or electrification. Buildings that have undergone retrofits to use energy more efficiently and shifted from using natural gas to electricity are better prepared to maximize the cost and environmental benefits of clean energy.

In the future, we are interested in exploring how and if the Solar Hub model could be strategically expanded to partner with CBOs to provide resources on not just solar but also energy efficiency and beneficial electrification.

Targeted lending opportunities and tools

One key opportunity we identified was bridging the gap between lenders who have energy expertise and lenders who have intimate knowledge of the needs of businesses.

There are lenders in the Twin Cities market who provide loans to directly support the development of solar, energy efficiency, and sustainability, whether through the property assessed clean energy (PACE) model or through other targeted green lending programs. These lenders have designed programs thoughtfully to function well with a solar or energy efficiency project, taking into consideration the expected energy savings rates, the timing of payments and incentives, and incentivizing deeper energy savings. However, these lenders are less familiar with lending to hard-to-reach businesses who have poor or no credit scores or who may even be unbanked.

Then, there are community development financial institution (CDFI) lenders who have an extensive history of lending in these communities, helping emerging entrepreneurs who have little to no lending history to access affordable financing at minimal risk. These lenders often have intimate knowledge of the community and close, trusted relationships with small business owners but have little or no familiarity with the specifics of lending around clean energy projects.

A critical opportunity is to connect these two types of lenders, allowing clean energy lenders to learn how to better serve underserved communities and helping CDFIs create green lending projects that work well with clean energy projects.

Funding streams for ongoing CBO technical assistance

One important question raised in our research is whether a CBO-centered model is financially sustainable. By adding an additional player in the delivery of services, we expect to see improved outcomes and greater access to participation. Still, it is also clear that CBOs will require additional financial resources to dedicate staff time toward solar-related technical assistance. We estimate that CBOs will need 3–5 years of funding on the front end to support the capacity building for adding new technical assistance programming to their repertoire.

Ultimately, a successful system may require sustained, ongoing funding for CBOs to focus specifically on clean energy-related programming. However, it is also possible that CBOs that currently rely on a mix of foundation, government, and private funding to provide services to businesses may be able to use those funding streams to maintain their clean energy-focused technical assistance as long as those funding streams are stable and generous enough to support adequate staffing levels. An assessment of these funding streams and their applicability to this form of technical assistance would ensure the long-term viability of this programming.

Solar potential studies for mixed-use buildings and renter-occupied buildings

During the project period, NREL staff identified a need for further study and analysis regarding how building types are categorized in modeling tools like REopt. The commercial building stock in the project corridors includes a high proportion of mixed-use buildings, which are not adequately incorporated into the REopt tool as a building type. Further analysis is needed to understand the energy profiles of a variety of mixed-use building types and incorporate them into modeling tools.

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Appendices

These appendices are available to download as stand-alone documents, separate from the report.

Appendix A: Interview Guide

The Twin Cities Solar Energy Innovation Network’s Advancing Small Business Solar Equity team used a human-centered design approach to understand the Black, Indigenous, and people of color (BIPOC)- and immigrant-owned small business lived experience. The interview guide summarizes this process and includes the questionnaires used with small businesses, solar installers, and local solar experts.

Appendix B: Community and Partner Profiles Report

The “Community and Partner Profiles Report” outlines the history, perspective, and identity of the Lake Street, West Broadway, and University-Midway corridors, as well as the project partner community-based organizations (CBOs). The report also includes key learnings from the interviews conducted with small businesses.

Appendix C: Solar Procurement Options Brief

The “Solar Procurement Options Brief” explores the options available to small businesses to adopt rooftop solar. They include direct ownership and investor options, including power purchase agreements (PPAs) and community solar gardens (CSGs). A solar co-op model is also included as an alternative ownership structure to private investor-driven development.

Appendix D: Incentive Options Brief

The “Incentive Options Brief” summarizes the incentives available to small businesses in the Twin Cities area. The brief provides key information about federal, state, city, and utility-level incentive programs and highlights their relevance to small business owners in the corridors.

Appendix E: Financing Options Brief

The “Financing Options Brief” summarizes loans available to small business owners seeking direct pay options for rooftop solar installations. It covers a variety of funding limits and terms that may be applicable based on the size and cost of the solar array, business circumstances, project timelines, and expectations for return on investment.

Appendix F: Solar Installers Brief

The “Solar Installers Brief” captures key themes and learnings from the team’s interviews with local installers who have experience working in the Twin Cities. The brief provides insight into the delivery side of the solar procurement and installation process.

Appendix G: Solar Technical Assistance Process

The “Solar Technical Assistance Process” is a step-by-step outline of the program participants’ roles, key decision points, technical assistance, and tools needed to guide a small business through the procurement process for solar.

Appendix H: Template for Training CBOs on Solar

The “Template for Training CBOs on Solar” outlines a draft training program to prepare community-based organizations to provide solar-related technical assistance to the businesses that they serve. Topics covered include solar photovoltaic systems, an introduction to key organizations and resources, available solar and financial incentives and programs, and the steps needed to assist a business in learning about, exploring, and installing solar.

Appendix I: Solar Installer List

The “Solar Installer List” is a curated directory of solar installers serving the Twin Cities. The document includes the criteria considered for a solar installer’s inclusion on the list.