Final Technical Report (FTR)
Cover Page

a. Federal Agency	Department of Energy	
b. Award Number	DE-EE0009009	
c. Project Title	Accessible Training and Shared Capitalization Platforms for Low-Income Solar Finance	
d. Recipient Organization	University System of New Hampshire	
e. Project Period[1]	Start: 4/01/2020	End: 11/30/2023
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h. Certifying Official (if different from the PI or BC)	[PI Michael Swack]	

Signature of Certifying Official

July 9, 2024

Date

By signing this report, I certify to the best of my knowledge and belief that the report is true, complete, and accurate. I am aware that any false, fictitious, or fraudulent information, misrepresentations, half-truths, or the omission of any material fact, may subject me to criminal, civil or administrative penalties for fraud, false statements, false claims or otherwise. (U.S. Code Title 18, Section 1001, Section 287 and Title 31, Sections 3729-3730). I further understand and agree that the information contained in this report are material to Federal agency's funding decisions and I have any ongoing responsibility to promptly update the report within the time frames stated in the terms and conditions of the above referenced Award, to ensure that my responses remain accurate and complete.

[1] *If you have received No Cost Time Extensions (NCTE), please add a note below the table indicating the length of each one and which budget periods were affected.*

1. **Acknowledgement:** This material is based upon work supported by the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE) Solar Energy Technologies Office (SETO) under the Fiscal Year 2019 funding Program DE-FOA-0002064 Award Number DE-EE0009009.

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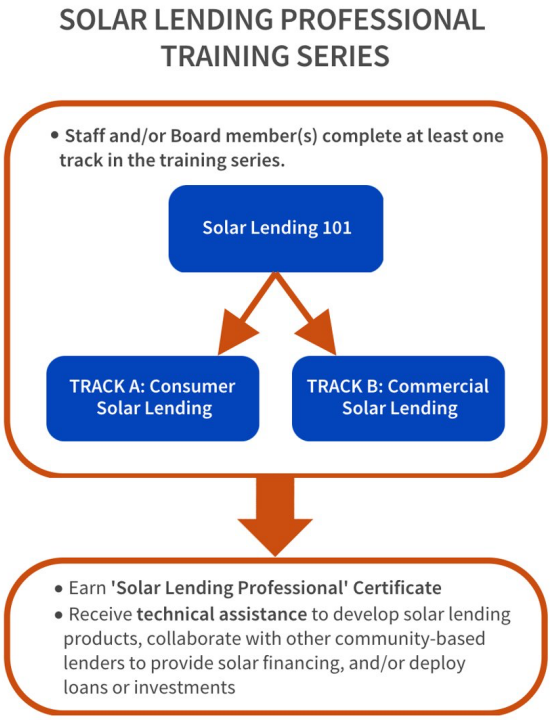
3. Executive Summary:

From March 2020 through November 2023, the University of New Hampshire Carsey Center for Impact Finance and its partners worked to create accessible training programs and shared capitalization platforms to enable community finance institutions – such as credit unions, community banks, and Community Development Financial Institutions ("CDFI"s) – to expand their engagement in solar finance in low-income communities.

To **bridge knowledge gaps for community financial institutions (CFIs) around solar finance**, we developed three virtual trainings and complemented these with e-workshops and guides/tools to help alumni implement their new products and strategies. Following a short self-paced Introduction to Solar Finance, Commercial Solar Lending (8 weeks) and Consumer Solar Lending (6 weeks) are instructor-led trainings for cohorts of 20-25 students. All training occurs via remote learning using the Canvas platform and virtual classroom instructional design methodology.



Over the project period, 263 participants from 143 organizations completed our consumer or commercial solar lending courses. An additional 125 participants from 410 organizations took our self-paced Intro to Solar Finance course. In total, we had 388 participants representing 183 organizations across our three training offerings.

The trainings earned consistently high satisfaction ratings and had a significant impact in moving community-based lenders towards engagement in the solar lending space. Alumni e-workshops were engaging and well-attended and helped advance the financing of new solar projects. Our online Consumer Solar Lending Financial Counseling Tool and Commercial Solar Lending Guide have been well-utilized.

We continue to see deployment and impact from organizations that participated in training courses. As of the end of the project period, 66 CFIs that participated in training courses had developed solar lending products and/or collaborated with other CFIs to provide solar financing. Likewise, 66 CFIs that participated in training courses had deployed new loans or investments – collectively serving 17,775 households, of which over 43% are LMI, live in LMI census tracts or represent other eligible CDFI target markets. We anticipate that recent graduates' activities will add to these figures in the coming months.

Going forward, the launch of the Greenhouse Gas Reduction Fund (GGRF) promises significant growth of community-based lenders in the climate mitigation space, including for solar lending. The project team will continue to work together with funding from other sources to expand the trainings and supports we provide for lenders. We are offering additional iterations of the Consumer and Commercial Solar Lending courses and expect continued high demand for these courses as the GGRF rolls out. We continue to maintain and develop online "resource banks" for solar lending and to provide alumni workshops.

Building upon the successes and lessons learned from the solar lending courses, we are developing additional courses to support community lenders in climate mitigation and resilience finance. Training growth will include additional offerings of, and updates to, the solar lending trainings developed through this grant, as well as the development of numerous additional "green lending" trainings in topics such as single-family "green home" lending, multifamily decarbonization lending, developing and financing solar and storage for resilient community facilities, community engagement, and a "climate finance 101" course. All these courses are under development at the present time.

To **mobilize capital and provide collaborative vehicles to facilitate investment by CFIs in solar projects in low-income communities**, we supported business planning for expansion of Inclusive Prosperity Capital's (IPC) Smart-E platform and presented actionable investment opportunities for community-based lenders in commercial and community solar projects. Smart-E mobilizes the financial capacity of local lenders, a vetted contractor network, and local community relationships to drive scaled-up implementation of residential energy retrofits. Smart-E supports partners with a standardized and credit-enhanced lending and project management platform. Over the course of the project:

- We developed a set of financial models and a business plan for program expansion.
- We secured funding from the Community Guarantee Program (CIGP) for a credit enhancement that supports program expansion.
- We secured grant support from Wells Fargo foundation that has supported expansion of the Smart-E platform to three new states: Arizona, New Mexico, and Texas.

Going forward, we will continue to partner with IPC on Smart-E rollout to additional states, including an interim program evaluation of the Southwest states rollout to recommend adjustments to future rollout processes.

To **build the green finance movement** and leverage what we've learned across the field, we held two clean-energy-themed Financial Innovations Roundtable events, as well as working meetings to develop Equity Strategy Maps in advance of GGRF funding.

- 'Expanding the Field of Climate Finance' (2020) co-hosted by the Federal Reserve Bank of San Francisco and The Climate Safe Lending Network – this virtual event offered an opportunity to discuss the challenges and opportunities banks and CDFIs face as they address risks in low- and moderate-income communities. as well as in the financial sector broadly, due to the shocks and stresses of climate change. The 2020 FIR and how these institutions can help increase individual, institutional, and community-wide resilience. The program explored new and modified products that address climate risk in communities and how those products can be scaled.
- 'Advancing Clean Energy Equity' (2022) in partnership with the Federal Reserve Bank of New York - 90 invited organizations including green banks, CDFIs, and large bank and corporate investors. This event explored how impact investors can work with green banks and CDFIs to promote climate justice, including working sessions on specific topics such as PPA financing platforms and solar for affordable multifamily housing.
- Equitable Strategy Maps and webinars (2022). UNH engaged a range of equity-focused community financial institutions and other community development groups in a series of working meetings to develop Equitable Strategy Maps to support the rapid and impactful deployment of Greenhouse Gas Reduction Funds, including for Community Solar.

We also published three white papers: *Bringing Solar Energy to Low- and Moderate-Income Communities* (Hangen, Regan, & Boege, 2021); *Scaling Equitable Solar Finance* (Hangen, Regan, & Boege, 2021); and *Clean Energy Project Development for Low-Income Communities: Strengthening the Ecosystem for Delivering Solar Energy and Deep Efficiency Retrofits* (Hangen, 2022).

Going forward, we will continue to engage and convene CFIs and other key players in the green finance ecosystem. To build on the aforementioned convenings, with support from other funders, we will host a two-part event on how GGRF awardees can collaborate on the shared infrastructure needed to successfully deploy GGRF dollars to Low-Income and Disadvantaged Communities. Lender capacity-building and trainings – such as those developed through this project – are a key component of the shared infrastructure needed for a just and equitable clean energy transition.

4. Table of Contents

5. Background

We are at a watershed moment in low-income solar in the US, thanks to the Inflation Reduction Act (IRA). The US EPA Greenhouse Gas Reduction Fund is providing $7 billion in low-income solar financing through the “Solar For All” program, additional $6 billion through the “Clean Communities Investment Accelerator” that may also be used for low-income distributed solar, and finally $14 billion through the “National Clean Investment Fund” that will help to create scaled financing vehicles for climate mitigation. Perhaps even more importantly, both the Section 25 residential and Section 48 commercial renewable energy tax credit programs were extended and deepened through the IRA. The IRA provided further support for low-income community solar and low-income residential solar lease and PPA programs by establishing “adders” that boost the tax credit value for low-income-serving projects. Moreover, the IRA establishes elective pay and transferability mechanisms that will greatly ease the ability of project developers to monetize the tax credits. Together with a panoply of other IRA programs supporting clean energy and buildings decarbonization, these programs present community-based lenders with unprecedented opportunities to finance solar projects for households and clean energy project developers in low-income and disadvantaged communities (LIDACs). This project, launched before the IRA became law, has helped to provide a jump start for community-based lenders to get ready for its implementation.

Not surprisingly, recent publications and conferences in the field have revolved around IRA implementation, accompanied by a raft of federal regulations detailing guidelines for various IRA programs. Key themes in these publications and conferences that relate

directly to community-based solar lenders have included the following (with representative literature cited below each theme):

Ensuring equitable access, outcomes and meaningful benefits for LIDACs; identifying and recommending strategies to support the development of solar deployment and strong project pipelines in LIDACs

- Clean Energy States Alliance (CESA) published two reports on GGRF Solar for All program design, linked to a broader initiative it is running to help States scale up solar for under-resourced communities:
    - A report on Solar for All GGRF Program Design Options for States (Bourg-Meyer and Paulos, 2023), presenting three program models for low-income community solar (subscription model, ownership and cooperative models, and "energy assistance" models).
    - Program Design Guidance for Single-Family Home LMI Solar Programs (Bourg-Meyer and Garrett, 2023), which proposes a third-party-ownership model to help LMI homeowners afford rooftop solar. Such models help LMI homeowners access the renewable energy tax credit by maintaining ownership at a nonprofit or corporate entity that monetizes the Section 48 credit and passes the savings along to the homeowner via a lease or power-purchase agreement. In the absence of such a strategy, LMI homeowners might not be able to utilize tax credits, as the Section 25 credit is not refundable and therefore not usable by households with no or low tax liability.

- Hangen and Swack (2022) recommend Five principles to promote success for the GGRF to serve LMI populations. These include: building not just capital markets but robust ecosystems to deliver clean energy projects to underserved communities; ensuring that funding reaches project developers and end users on terms that work for them; reducing regulatory barriers and creating policy enablers; integrating climate mitigation into the everyday work of the community development movement; and incorporating community governance into institutions deploying GGRF funds.

- The Just Solutions Collective issued a set of Best Practices for Equity and Governance for GGRF implementation (Chi 2023) including prioritizing direct benefits to LIDACs, requiring community engagement, accountability to local and impacted communities, operating with transparency, and applying robust safeguards against worsening pollution, economic burdens, or disparities.

- The Communities First Fund held a convening on February 28, 2024, "Investing in a Clean & Just Energy Future," inviting GGRF applicants, community-based organizations, and other stakeholders. The event sought to strengthen project pipeline, support the development of financial products offering more equitable outcomes for socially disadvantaged communities, and help LIDACs to leverage

IRA tax incentives including direct pay.

- A group of partner organizations – Elevate Energy, NRDC, Building Electrification Institute, Rising Sun, Emerald Cities, and Greenlink – published Guidelines for Maximizing the Benefits of Federal Investments in Buildings (2024), which focuses on opening access for LMI communities for buildings retrofits including distributed solar. The report discusses affordability, workforce-related, and equity-related barriers to retrofits. Key recommendations are to understand and respond to the needs of specific stakeholder groups, design programs at the community level to respond flexibly to needs, employ "one stop shop" approaches for easier navigation, and to center community input through co-creation of program designs.

Leveraging capital

- The Climate Policy Initiative published Harnessing the transformative potential of the Greenhouse Gas Reduction Fund (Lee et al 2024), which recommends five areas of action to help the GGRF achieve its potential: catalyze private capital at scale; standardize definitions, products and underwriting; coordinate and target technical assistance; enhance the alignment of government efforts; and create a 'sandbox culture' of collaboration and learning around the GGRF.

- The Lincoln Land Institute published Strategy Considerations for Greenhouse Gas Reduction Funding (McGrail 2023). The report recommends seeking to blend private capital with GGRF, leverage state and local development finance sources; and embrace "land-based finance solutions" through land value capture mechanisms for local governments.

Easing access to elective pay and transfer of renewable energy tax credits

- Lawyers for Good Government has issued a number of publications and convened webinars to assist organizations in accessing direct pay.

Embedding climate resilience as a core mission concern for community-based lenders

- The New York City Energy Efficiency Corporation (NYCEEC) and UNH co-published a Practitioners' Guide to Community Lending for a Just and Equitable Energy Transition (Probst, Poole Johnson, and Vargason, 2023). The paper has a target audience of community-based lenders such as CDFIs, Community Development Credit Unions, and Minority Depository Institutions as well as Green Banks. Its central thrust is that "business as usual is no longer enough... resilience and environmental justice should be goals that community lenders center in their work." The guide goes on to provide key resources and references to provide "an entry point to clean energy finance for community lending practitioners and to community development finance for green lenders." It

includes a comprehensive overview of existing community-based lenders and green lending activity.

- The UNH Financing Equitable Resilience initiative similarly seeks to "normalize resilience" by integrating the assessment of resilience and climate mitigation goals into the technical assistance that lenders provide to borrowers before the loan, as well as into loan underwriting.

Establishing lending implementation guidelines and standards for buildings decarbonization; establishing methodologies for impact measurement

- The White House Office of Domestic Climate Policy proposed, and is refining with public comment, a National Definition of a Zero-Emissions Building. This definition is highly relevant to low-income solar, as the draft definition stipulates that such buildings should be "powered solely from clean energy," which requires that they either have on-site generation of renewable energy or are pulling 100% clean energy from the grid, e.g., via a community solar subscription. EPA has signaled that its "priority project" categories for the GGRF CCIA program will align with this definition, impacting how community lenders should think about their loan program design and project selection criteria.

- Natural Resources Defense Council (NRDC) organized a January 2024 convening of GGRF applicants, community lenders, and other stakeholders at which building decarbonization standards were discussed. University of New Hampshire is organizing a follow-up discussion of this topic at a convening to be held in April 2024, with the goal of mapping a process by which GGRF awardees would agree to a common set of implementation guidelines and standards.

UNH and Inclusiv have been incorporating these themes and trends into training content, alumni workshops, and convenings of lenders in order to ensure that community-based lenders remain at the forefront of the climate justice movement and can align their lending products and services with the emerging realities on the ground.

6. Project Objectives:

Key project goals are:

- Train at least 200 staff or board members from at least 50 different community finance institutions, with at least 85 percent of trainees rating their experience as “good” or “excellent” and “agreeing” or “strongly agreeing” that “after completing this training, I feel better prepared to offer solar finance products to my community.”
- Support at least 30 community finance institutions to develop solar lending products and/or collaborate with other community finance institutions to provide solar financing. At least 20% of these institutions are located outside the Northeast and CA and represent all of the other 5 U.S. regions (West, Central, Midwest, Southeast, Mid-Atlantic).
- Work with at least 30 community finance institutions to deploy loans or investments serving at least 1,000 households, including at least 750 households outside the Northeast and CA. At least 300 of these households will be low- or moderate-income, live in low- or moderate-income census tracts or represent other eligible CDFI target markets. Households served will count community solar or similar projects where power is supplied to an entire building reducing power prices to common areas and/or residential units. Also, at least 300 of these households will be served via a retail-level product such as via a consumer loan or mortgage, as opposed to a community solar subscription. Loans and investments include consumer loans as well as larger project financing, such as community solar or commercial-scale projects. Community finance institution involvement must include a financial investment either directly in the project, or an investment in a fund or entity that invests in the project. Additionally, 5 projects (in 3 out of the 5 regions outside of the Northeast and CA) will be financed by community finance institutions and deployed in low-income communities for non-profits, municipalities, schools, etc., providing power indirectly to low- or moderate-income households.

7. Project Results and Discussion

The project uses a three-pillar approach to engage and support community financial institutions (CFIs) to help make solar energy accessible to low-income and underserved communities. Within the Statement of Project Objectives (SOPO), tasks, milestones, and go/no-go decision points were organized by a combination of 'pillar' and budget period, as organized below and in **Figure 2**.

Training & Support

- Task 1.0: Bridge knowledge gaps for CDFIs and CDCUs around solar finance. (BP1)
- Task 3.0: Provide additional support and tools to further bridge knowledge gaps for CDFIs and CDCUs around solar finance. (BP2)
- Task 6.0: Provide additional support and tools to further bridge knowledge gaps for CDFIs and CDCUs around solar finance. (BP3)

Collaborative Infrastructure

- Task 5.0: Mobilize capital and provide collaborative vehicles to facilitate investment by Community Finance Institutions in solar projects in low-income communities. (BP2)
- Task 8.0: Continue to mobilize capital and grow collaborative vehicles to invest in solar projects in low-income communities. (BP3)

Movement Building

- Task 2.0: Engage and convene community finance institutions to recruit them to solar lending. (BP1)
- Task 4.0: Track and support the development of solar lending in community finance institutions. (BP2)
- Task 7.0: Track and support the development of solar lending in community finance institutions. (BP3)

Figure 2. SOPO tasks by category, across the project period.

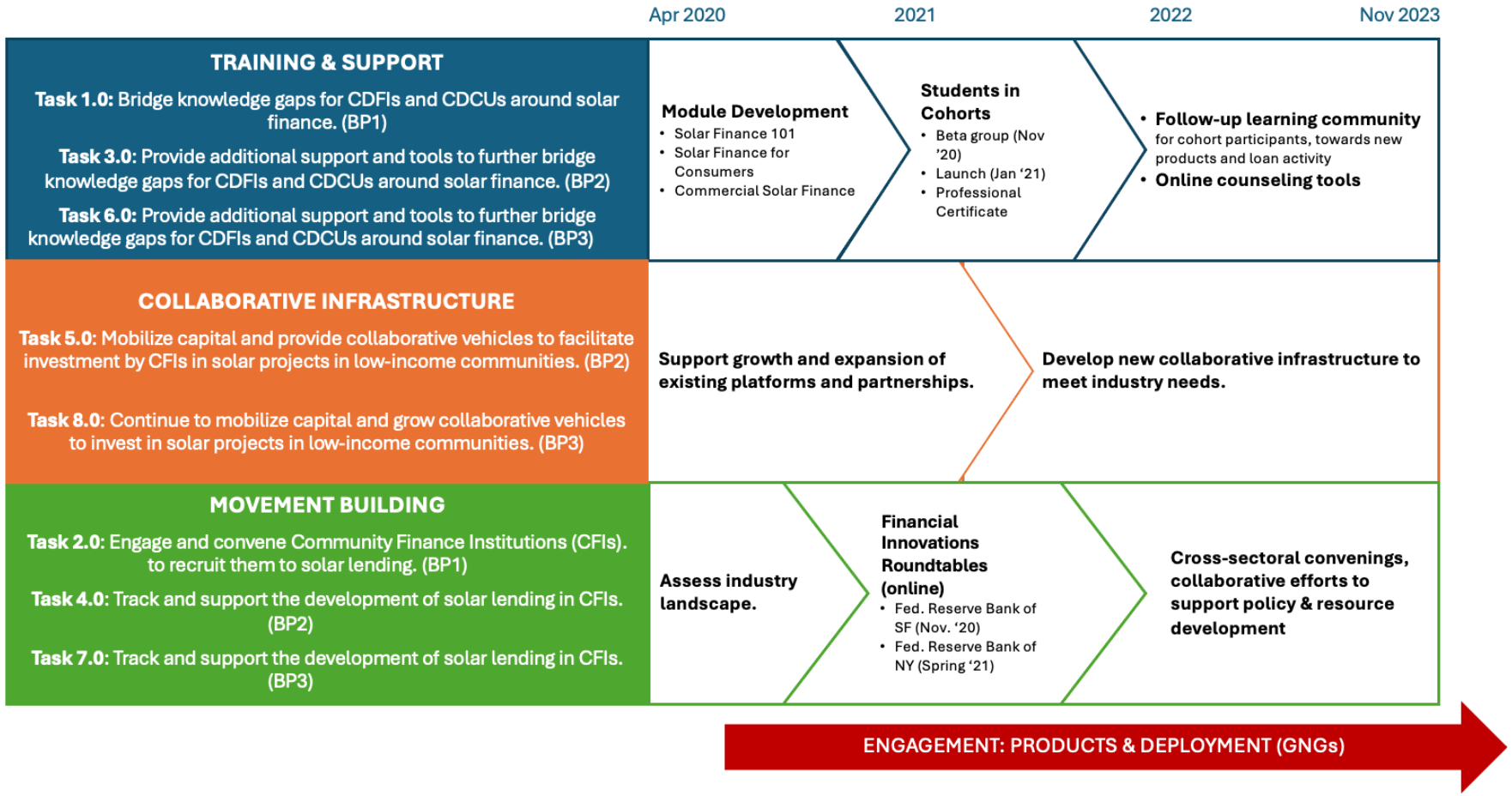


Table 1. Project goals and achievements.

PROJECT GOALS		BP1		BP2*		EOP*	
		Goal	Reported	Goal	Reported 3/15/22	Goal	Reported 10/31/23
TRAININGS							
GNG/EOP-A Trainings	# CFI staff/board members enrolled	**40**	53	**150**	169	**200**	388
	# CFIs represented	**12**	37	**35**	99	**50**	183
	% of trainees rating their experience as "good" or "excellent"	**80%**	83%	**85%**	98%	**85%**	97%
	% of trainees "agree" or "strongly agree" that "after completing this training, I feel better prepared to offer solar finance products to my community."	**80%**	83%	**85%**	87%	**85%**	94%
COMMUNITY FINANCIAL INSTITUTION (CFI) ENGAGEMENT							
GNG/EOP-B New products & collaborations	# CFIs developed solar lending products and/or collaborated with other CFIs to provide solar financing	**4**	10	**24**	38	**30**	66
	# of these institutions located outside the Northeast and CA	**2**	7	**5**	24	**6**	44
	# of regions represented by these institutions (outside of NE and CA)	**2**	5	**4**	5	**5**	5
	total # of regions represented by these institutions (including NE and CA)	**2**	5	**4**	5	**6**	6
GNG/EOP-C Deployment	# CFIs deployed new loans or investments	**10**	22	**24**	36	**30**	66
	# households served	**200**	2191	**600**	5464	**1000**	17775
	# of these households located outside the Northeast and CA	**150**	174	**450**	3710	**750**	16171
	# of these households that are LMI, live in LMI census tracts or represent other eligible CDFI target markets.	**50**	545	**180**	2882	**300**	7687
	# of these households served via a retail-level product (such as via a consumer loan or mortgage, as opposed to a community solar subscription)	**50**	2191	**180**	3191	**300**	17775
	# of projects outside the Northeast and CA deployed in low-income communities for non-profits, municipalities, schools, etc., providing power indirectly to LMI households.	**1**	2	**3**	32	**5**	50
	# of regions represented by these projects	**1**	1	**3**	3	**4**	4

* Goals and reported data are cumulative across budget periods.

All go/no-go and project goals were met and exceeded, as shown in Table 1. Note that GNGs also included in-person collaboration and training workshops, which were not possible due to COVID-19. These were removed and reconfigured as part of our April 2021 SOPO modification, described in the following pages.

The remainder of this section describes our progress and outcomes, structured by task, milestone, and go/no-go point.

Task 1.0: Bridge knowledge gaps for CDFIs and CDCUs around solar finance

Subtask	Description	Timeline
1.1	Establish and Engage Advisory Group	Months 1-3
1.2	Advisory Group focus group on Training Content	Months 1-3
1.3	Develop beta version of Module 1 and Module 2 content	Months 1-3
1.4	Operationalize the online training platform	Months 4-6
1.5	Hold first "boot camp" to help CFIs engage in solar finance	Months 4-6
1.6	Finalize Module 1 and Module 2 content and place on platform	Months 6-8
1.7	Take Module 1 and Module 2 live	Month 9

MILESTONE 1.1.1 ACHIEVED.

#	Month of Completion	Performance Metric	Success Value
M 1.1.1	Jun-20	Advisory Committee Formed	≥ 7 CFIs with diverse geographies / perspectives represented

Our Advisory Committee has 13 members representing diverse geographies and perspectives. List has been shared with DOE.

At the recommendation of our advisory group, the SOPO term, "Modules 1-3," was replaced by three trainings: Solar Lending 101, Consumer Solar Lending, and Commercial Solar Lending.

A boot camp had been scheduled for May 2020 but was cancelled due to COVID. In lieu of boot camps, we moved to a highly interactive online course experience, replacing the self-paced format originally envisioned. All training occurs via remote learning using the Canvas platform and virtual classroom instructional design methodology. Using Canvas and Zoom, students interact with each other and with course instructors and guest experts through regular class meetings, online discussion boards, and group assignments.

MILESTONE 1.1.2 ACHIEVED.

#	Month of Completion	Performance Metric	Success Value
M 1.1.2	Nov-20	Training Content - Modules 1 & 2	Module 1 & 2 content is finalized and placed on platform

All content for Introduction to Solar Finance, Consumer Solar Lending, and Consumer Solar Lending was finalized, placed on platform, and launched with students. Launch Dates:

- Consumer Solar Lending: November 2020.
- Solar Lending 101: December 2020.
- Commercial Solar Lending: February 2021.

MILESTONE 1.1.3 ACHIEVED.

#	Month of Completion	Performance Metric	Success Value
M 1.1.3	Dec-20	Customer satisfaction – Consumer and Commercial	80% positive review rate on first training cohort of each course

Ahead of schedule, we completed a full pilot cohort of our Consumer Solar Lending course. This included 12 participants who completed all the coursework to earn a certificate and 9 non-certificate participants who were experienced practitioners in community-based lending and/or solar lending who took the course to provide feedback to help us improve the beta version of the course. **Of the 12 certificate participants, 83% percent rating their experience as "good" or "excellent" and 83% selecting "agree" or "strongly agree" that "after completing this training, I feel better prepared to offer solar finance products to my community."**

We received detailed and valuable feedback from the beta cohort on how to improve the training. In addition, the students showed a lot of enthusiasm for the course. Here are a few quotes from course participants:

- "It was great! I learned a lot about our market in NC and will continue to use what I learned in this course on future research projects and our business case. We were able to meet some great institutions and hear about the wonderful opportunities in solar lending. The Market Analysis assignment will be essential to use because it contains a lot of information that we will need for our business case."

- "Thank you for providing this course! It was very helpful for me to think through the different aspects of solar lending."

- "Packed full of pertinent Consumer Solar Finance material"

"The Market Analysis, the Contractor Checklist, and Product Design were very useful, and I think these will be used after the course… We found it beneficial to work on it as we learned more about our market and useful resources on the benefits of solar."

MILESTONE 1.1.4 ACHIEVED.

#	Month of Completion	Performance Metric	Success Value
M 1.1.4	Mar-21	E-Workshop	First interactive e-workshop

- **First interactive e-workshop.** On Solar Loan Participation as a way to quickly invest in solar projects and launch solar loan programs. Each of the following guest speakers shared information about their experience with solar/green loan participation
- Lee Pierce, Senior Vice President of Lending, Seattle Credit Union
- Rick Tazelaar, VP, Strategy & Development, Clean Energy Credit Union
- Eric Darmanin, Chief Lending Officer, United Nations Federal Credit Union

At the conclusion of BP1, as Figure 3 shows, we met or exceeded goals in the following GNG categories: GNG-1A (Trainings); GNG-1B (New products & collaborations); and GNG-1C (Deployment).

Regarding GNG-1D and GNG-1E, we worked with our Technical and Program Managers to propose a SOPO modification (budget unchanged) that resulted in the cancellation/modification of these two GNG categories:

GNG-1D CANCELLED/MODIFIED.

#	Performance Metric	Success Value
GNG-1D	Bootcamp	≥ **10** CFIs participate. In coordination with Inclusiv's 2020 Annual Conference, host an in-person training and technical assistance workshops of approximately 2 days each.

Due to COVID-19, Inclusiv's 2020 Annual Conference did not take place in person. Instead, we offered an online conference session on "Climate Change and Equality: The Role of Credit Unions to Make Clean Energy Accessible and Affordable" to inform and build interest in the training.

We have shifted the online training strategy from a self-paced structure to a cohort-based, instructor-led model with both real-time interaction through weekly ZOOM sessions and online interaction through group discussions and assignments. Thus, the "online training" and "bootcamp" components have been effectively merged into one "online training / bootcamp" style experience.

In future Inclusiv Annual Conferences, Inclusiv will offer sessions on solar finance – but not offer the intensive, two-day "bootcamp." (Our SOPO/budget modification proposal will reflect this.)

GNG-1E CANCELLED/MODIFIED.

#	Performance Metric	Success Value
GNG-1E	Bootcamp	≥ **10** CFIs participate. In coordination with the "collaboration workshop," host an in-person training and technical assistance workshops of approximately 2 days each.

Due to COVID-19, UNH's 2020 Financial Innovations Roundtable was held virtually instead of in-person and did not include workshops. As noted for GNG-1D, the "online

training" and "bootcamp" components of the project have been merged into one "online training / bootcamp" style experience.

Task 2.0: Engage and convene community finance institutions to recruit them to solar lending

Subtask	Description	Timeline
2.1	Obtain advisory committee input on stakeholder engagement activities	Months 1-3
2.2	Literature Review	Months 1-6
2.3	Conduct a survey of community financial institutions	Months 3-6
2.4	Conduct in-depth interviews with key community finance industry stakeholders	Months 3-6
2.5	Prepare and publish market research report	Months 7-9
2.6	Design and prepare agenda for “collaboration” workshop	Months 4-12

MILESTONE 1.2.1 MODIFIED & ACHIEVED.

#	Month of Completion	Performance Metric	Success Value
M 1.2.1	Mar-21	Market research report	50 survey responses and 10 in-depth interviews

This report was published as part of the lead-up to our second Financial Innovations Roundtable.

For survey research, the team worked on two survey efforts with a total of 228 responses to date:

- First, we partnered with the Richmond Federal Reserve Bank to add two questions about solar and clean energy lending volume to a COVID response survey they fielded during the summer of 2020. This was a broad survey of the entire CDFI industry and yielded 205 respondents. Of these respondents, only 22 had closed any clean energy loans during 2019 and 2020.
- Second, Inclusiv fielded a survey to member credit unions in October 2020 that focused exclusively on clean energy lending, including numerous, detailed questions about solar loan products offered by the respondents. This survey yielded 23 responses. We re-fielded the survey in January 2021 in hopes of obtaining additional responses.

Note that the original milestone date of December 2020 was extended to March 2021. Interview and survey goals were met, and literature review completed, in support of this report by December 2020, but we decided to obtain additional interview results before publishing the final market research report. In specific, we added interviews to probe more deeply into issues around the availability of capital for commercial low-income solar projects, such as community solar, as our interviews to date raised a number of concerns that we wanted to verify and explore further. We focused more on capital users (e.g. mission-driven solar developers) during the remaining interviews.

MILESTONE 1.2.2 ACHIEVED.

#	Month of Completion	Performance Metric	Success Value
M 1.2.2	Mar-21	Stakeholder "collaboration" workshop	45 participants

Ahead of schedule, UNH completed its first "collaboration workshop" on November 16 and 17, 2020, in collaboration with the San Francisco Federal Reserve. This event focused broadly on expanding the field of climate finance and included a specific session about expanding platforms for consumer solar finance as a part of that broader focus. Detailed event proceedings have been published online on the UNH website. UNH prepared a Climate Finance Policy Brief in collaboration with the Climate Safe Lending Network as a follow-on publication.

We also completed a second collaboration workshop in April 2021, in collaboration with the New York Federal Reserve. This event focused more specifically on financing solar energy for low- and moderate-income communities. The event, which spread over multiple days, began with detailed working sessions looking at capital needs to scale low-income solar in a variety of spaces including community solar, solar for affordable multifamily properties, solar for manufactured housing parks, and distributed solar and storage for low-income homeowners. The working sessions included a range of capital users, community-based lenders, and impact investors. Building on the working sessions, a plenary event reached a broader audience, not only including working session participants but also engaging other energy sector, financial and philanthropic actors.

Inclusiv emphasized climate resiliency and solar finance at its 2020 Annual Conference on October 28. At this event, Inclusiv announced the launch of the Solar Lending Professional Training program at each session. Project team members Keith Bisson (CEI) and Cathie Mahon (Inclusiv) also led a conference session on November 12 at the 2020 Opportunity Finance Network Conference, entitled "Investing in Climate Solutions for the Environment and the Economy."

Task 3.0: Provide additional support and tools to further bridge knowledge gaps for CDFIs and CDCUs around solar finance

Subtask	Description	Timeline
3.1	Hold second interactive e-workshop to provide follow-up support for training participants	Month 15
3.2	Develop beta version of online solar finance counseling tool	Months 13-20
3.4	Hold third interactive e-workshop to provide follow-up support for training participants	Month 18
3.5	Continue to offer intensive, online, cohort-based trainings	Months 13-24
3.7	Hold fourth interactive e-workshop to provide follow-up support for training participant	Month 21

**There is no Subtask 3.3 or 3.6.*

#	Month of Completion	Performance Metric	Success Value
M 2.3.1	Jun-21	Second interactive e-workshop	Second Zoom interactive webinar is held.
M 2.3.3	Nov-21	Financial counseling tool	Initial version of online counseling tool is developed, first customers are using
M 2.3.4	Mar-22	Customer satisfaction – Consumer & Commercial	85% positive review rate

**There is no Milestone 2.3.2.*

In BP2, our three training offerings – Introduction to Solar Finance, Commercial Solar Lending, and Consumer Solar Lending – continued to have high demand, with cumulative engagement of over 400 applicants and participation from 247 enrolled students.

We continued to achieve high satisfaction ratings for the courses. In online evaluations, 98% of certificate participants to date rated their experience as "good" or "excellent" and 87% selected "agree" or "strongly agree" that "after completing this training, I feel better prepared to offer solar finance products to my community." **(MILESTONE 2.3.4 ACHIEVED)**

Alumni e-workshops continued to be engaging and well-attended and to help advance the financing of new solar projects. E-workshop topics in BP2 included a networking session for lenders to identify ways to collaborate on solar lending; credit enhancement for solar lending and Commercial PACE lending; navigating solar loans for small businesses; and a Shark Tank-Style Commercial Solar Lending Business Planning workshop. **(MILESTONE 2.3.1 ACHIEVED)**

> **Second interactive e-workshop.** On June 3, 2021, we held our second interactive e-workshop to provide follow-up support for training participants. This workshop focused on supporting the recent graduates of our Commercial Solar Lending Professional Training and Certificate course. The topic covered was launching a solar loan product for small businesses. Graduates of the course convened to share best practices and identify open questions and areas where additional support is needed. There were 10 financial institutions present and the workshop started with 4 financial institutions that have experience with small business and/or commercial solar loans sharing their experience in the space. The participants explored different approaches for financial institutions to navigate the operational and tactical aspects of launching a small business solar loans program. Discussion included: how to fund the new loan program (grants, loans, etc.), business plan and implementation plans, customer acquisition for solar loans and solar installer partnerships, underwriting process, credit memo examples, internal change management at a financial institution to build

enthusiasm for solar loan products, staff training, and common challenges that LMI small businesses face in relationship to installing solar projects.

Third interactive e-workshop. On October 18, 2021, alumni of our Commercial Solar Lending training course pitched their community-based solar lending business plans at our three-hour Shark Tank-Style Commercial Solar Lending Business Planning workshop. Our solar lending experts provided the presenters with real-time feedback and recommendations on their business plans.

Fourth interactive e-workshop. On October 26, 2021, we held an Alumni Workshop on credit enhancement for solar lending and Commercial PACE lending. We had representatives from the Community Investment Guarantee Pool (CIGP) present their climate investment guarantee pool. In addition, we had NYCEEC speak on opportunities to become a certified Commercial PACE lender in New York City. Over 40 of our training alumni attended this session, and several have followed up directly with CIGP and NYCEEC to learn more about their programs and how they might participate.

Fifth interactive e-workshop. On January 25, 2022, we held our first interactive e-workshop of 2022 and were thrilled to have over 45 alumni in attendance! The goal of this workshop was to help the members of our network get acquainted and connected with each other across the six cohorts that have completed our training program to date. In addition, we guided alumni through the resources we offer them and provided them with an orientation on how to access and use Tribe, our online community networking platform, including the Solar Lending Resource Library that is part of Tribe.

Our Online Consumer Solar Lending Financial Counseling Tool was beta tested and launched via a full pilot offered to the members (customers) of Guadalupe Credit Union in New Mexico, where 118 members completed the counseling tool as of March 15, 2022. **(MILESTONE 2.3.3 ACHIEVED)**

Task 4.0: Track and support the development of solar lending in community finance institutions.

Subtask	Description	Timeline
4.1	Continue to engage with Community Financial Institution stakeholders as the project continues	Months 13-24

There were no milestones related to Task 4.0. In BP2, we continued to engage with CDFIs and leverage what we had learned across the field. UNH and Inclusiv incorporated IRA updates and new resources into training content, alumni workshops, and convenings of lenders, in order to ensure that community-based lenders remain at the forefront of the climate justice movement and can align their lending products and services with the emerging realities on the ground.

Task 5.0: Mobilize capital and provide collaborative vehicles to facilitate investment by Community Finance Institutions in solar projects in low-income communities

Subtask	Description	Timeline
5.1	Conduct outreach around a shared consumer lending platform	Months 13-18
5.2	Develop business plan for a shared consumer lending platform	Months 13-24
5.3	Develop financial model for expansion of shared consumer lending platform	Months 13-24
5.4	Outreach to Community Finance Institutions and impact investors to invest in or participate in Investment Funds	Months 13-24
5.5	Feasibility study of secondary market investment vehicles	Months 16-24

In BP2, we made significant progress in business planning for expansion of the Smart-E platform. Smart-E mobilizes the financial capacity of local lenders, a vetted contractor network, and local community relationships to drive scaled-up implementation of residential energy retrofits. Smart-E supports partners with a standardized and credit-enhanced lending and project management platform, helping to:

- Reach low-income and credit-challenged homeowners through generous underwriting criteria and affordable terms;
- Save contractors money and time to serve their customers, helping them to grow their business; and,
- Reduce risk and cost for local community lenders, enabling them to use their capital and relationships to engage in green lending.

Specific business planning subtasks included:

- **Subtask 5.3**. Development of a set of financial models for program expansion. One model, for the Smart-E platform itself, projects platform revenues, expenses, and lending credit enhancement needs based on inputs concerning the pace of roll-out to new geographies, centralized and market-focused staffing requirements, technology development needs, and lending volumes. A second model helps individual community-based lenders assess the financial benefits to their participation in the platform based on their loan volume expectations, target market creditworthiness, and capital and operating cost structure.
- **Subtask 5.2**. Development of a draft business plan. We conducted team meetings and follow-on research to vet key assumptions and explore key program design alternatives to finalize the business plan.
- We submitted a completed application to the Community Guarantee Program (CIGP) for a credit enhancement that would support program expansion. We also submitted a successful application to the Wells Fargo foundation to support expansion of the Smart-E platform to three new states: Arizona, New Mexico, and Texas.

On **Subtasks 5.1 and 5.4**, the project team passed **Milestone 2.5.1** with investment opportunities presented to 26 community finance institutions, in addition to conducting outreach to impact investors. We used a networking approach to identify and present actionable investment opportunities for community-based lenders in commercial and community solar projects. Specific progress includes the following:

- UNH and project subrecipient Bright Community Capital met with VSECU credit union in Vermont, an Inclusiv member, to discuss investment opportunities in commercial solar projects including community solar and solar installations for nonprofits and municipal facilities. VSECU has been discussing setting up a structure with 8 other New England-based credit unions to co-invest in commercial solar deals.
- Project subrecipient Coastal Enterprises, Inc. was working on co-lending to a solar project with the New Hampshire Community Loan Fund, a CDFI.
- We held a targeted workshop for alumni interested in investing in solar loans originated by other financial institutions. Fifteen lenders attended to hear about new investment opportunities with Clean Energy Credit Union's loan participation pool. After that meeting, several lenders followed up with Clean Energy Credit Union to hold one-on-one meetings to further explore the possibility of purchasing participations in their loans. Two lenders moved forward with purchasing large participation pools form Clean Energy Credit Union, gaining deep insight into how solar loans are structured, and helped them to form their own solar loan origination strategies.
- Through our course alumni, we were regularly asked to recommend community-based lenders operating in specific regions (most recently Colorado, Georgia, Virginia, and Kentucky) that might be interested in investing in new solar projects in their regions. We presented these new investment opportunities to the course alumni operating in each region, connecting those who were interested to the developers of each project.
- We connected four community-based lenders to NYSERDA (New York State Energy & Research Development Authority) to explore purchasing participations in NYSERDA's existing solar loan pool. This enabled NYSERDA to originate new solar loans and enables lenders to learn how a portfolio of solar loans performs.
- Inclusiv worked with CNote to identify ways to link CNote's corporate investors with solar projects originated by community-based lenders. These corporate investors would like to provide impact investment capital to CDFIs and Credit Unions help drive solar projects in the most climate vulnerable communities. To better understand how these corporate investors might support CDFIs and credit unions, Inclusiv completed an online survey of all solar lending students and alumni. We followed this up with two in-depth focus groups to explore the types of investment capital community-based lenders need to scale their solar lending programs. CNote has since been presenting this opportunity to corporate impact investors seeking to place capital in clean energy justice investments. Ultimately, the goal of this process is to develop a custom impact note product that will be offered to impact investors to invest in clean energy through credit unions and CDFIs.

- Inclusiv's Capital team gained expertise in solar lending (through our UNH-Inclusiv solar lending courses!) and started to have preliminary conversations with philanthropic and corporate investors about building a secondary capital investment product for solar loans originated by community development credit unions. Secondary Capital Loans are subordinated, long-term (five years or more) debt available to credit unions with low-income designation from their regulator. Secondary Capital can count as part of net worth for regulatory purposes and, as such, can help growing credit unions to achieve the required minimum capital standards. Inclusiv would like to make secondary capital available for solar loans. The existence of secondary capital will be important for credit unions because, as solar loan programs grow, credit union regulators may start to push back on the perceived risks to credit union financial health of holding portfolios of solar loans on their books for many years (typical solar loans are 7-15 years). Access to secondary capital for 15-20 year terms could help credit unions to manage their risks, ensure they are able to meet their regulatory requirements, and grow their solar loan portfolios over time.

On **Subtask 5.5**, we performed significant outreach and planning work in partnership with the Natural Resources Defense Fund, Forsyth Street Advisors, and a working group of Green Banks and CDFIs including the Coalition for Green Capital, Inclusiv, the Opportunity Finance Network, Inclusive Prosperity Capital, Bright Community Capital, the Connecticut Green Bank, and NYCEEC. The goal of this partnership is to develop a secondary market mechanism that can channel impact investment capital to low-income-servicing solar and clean energy projects. Work completed through this partnership includes one-on-one interviews with CDFIs and green banks as well as prospective investors, facilitation of working group meetings, and generation of "options analysis" and "path forward" documents identifying top priorities for aggregation mechanisms.

Task 6.0: Provide additional support and tools to further bridge knowledge gaps for CDFIs and CDCUs around solar finance.

Subtask	Description	Timeline
6.1	Develop final version of online solar finance counseling tool	Months 24-26
6.2	Continue to offer intensive, online, cohort-based trainings	Months 25-36
6.3	Hold fifth interactive e-workshop to provide follow-up support for training participants	Month 25
6.4	Hold sixth interactive e-workshop to provide follow-up support for training participants	Month 27

We continued to offer trainings in BP3. At the end of the original three-year project period, a total of 263 students representing 143 organizations have completed one of our comprehensive 8–9-week solar lending training courses. An additional 125 individuals representing an additional 40 organizations have participated in our self-paced Intro to Solar Finance course. A total of 388 community financial institution staff from 183 community financial institutions have enrolled in one of these three training courses.

Customer satisfaction ratings remains high, with 94% of trainees rating their experience as “good” or “excellent” and 96% “agreeing” or “strongly agreeing” that “after completing this training, I feel better prepared to offer solar finance products to my community.”

On February 1, 2023, we held our thirteenth interactive alumni e-workshop on “How to Market Your Green Loan Products.” Forty alumni attended this session.

On February 15, 2023, we held our fourteenth interactive alumni e-workshop on “How to Navigate the Rising Interest Rate Environment” and there were 69 alumni in attendance at this session.

Task 7.0: Track and support the development of solar lending in community finance institutions.

Subtask	Description	Timeline
7.1	Continue to engage with Community Financial Institution stakeholders as the project continues	Months 25-36

In BP3, we held 33 meetings with our alumni to facilitate the development and deployment of their solar loan program. We continued to build out our digital tools and resources for our alumni. In response to alumni requests, we provided one-on-one support to our alumni as part of a pilot to provide more specific insight into the exact needs of community lenders with regard to launching their first commercial solar loan product.

With the passage of the Inflation Reduction Act (IRA), we played (and continue to play) a leading role in convening and educating community finance institutions about the opportunities to leverage IRA funding to pursue energy equity goals. Our BP3 work included:

- UNH engaged a range of equity-focused community financial institutions and other community development groups in a series of working meetings to develop Equitable Strategy Maps to support the rapid and impactful deployment of Greenhouse Gas Reduction Funds for Community Solar. The strategy maps are now in complete drafts, with a webinar series being scheduled to take place in June and July. The goal of the project is to help community development lenders collaborate – with each other and with other partners, such as developers, TA providers, and others – to develop strategies that will help them promote resilience and decarbonization in low-income and disadvantaged communities. These discussions have been organized by sectors: multifamily housing, single family housing, small business lending, commercial real estate, and community facilities, EVs, and community solar. For example, in the community facilities sector, one CDFI we are working with early on in this project lends to Federal Qualified Health Care Centers (basically, low-income health clinics). The CDFI seeks to lend to these health care centers for solar and battery storage projects.

- UNH supported CDFIs in preparation for coalitions of these groups to apply for the EPA Greenhouse Gas Reduction Fund. We met both in groups and individually with leading CDFIs and networks of CDFIs to support them in working together and conducted research to support rapid deployment of funds in LMI communities by interviewing technical assistance providers, clean energy project developers, and others to understand their funding needs.

During the course of BP3, we identified the opportunity for an additional deliverable: an in-depth Commercial Solar Lending Guide to help graduates of our Commercial Solar Lending Training program more quickly and efficiently develop and launch their solar loan program. **We requested and received a no-cost project extension through November 31, 2023 to complete this guide.**

Inclusiv, GRID Alternatives, and UNH worked in partnership to complete and test this in-depth Commercial Solar Lending Guide. The objective of this TA pilot program was to identify a structure and support a guide for Inclusiv-UNH solar training course graduates who are close to executing on a solar deal but need “last mile” support and access to solar experts to finalize the deal structure. This support includes helping graduates of the solar training program evaluate potential solar sites, vet solar contractor and developer proposals, and finalize underwriting guidance and project pro formas.

The initial pilot was launched with Baltimore Community Lending, Inc. (an African American-led CDFI loan fund) and 2023 Inclusiv-UNH Commerical Solar Lending course graduate to explore the engineering and financial feasibility and develop the financing structure for two different solar projects they were interested in pursuing. The project included a few different phases of work, which will inform future Inclusiv, GRID, and UNH solar TA projects, including:

- **Solar Deal Feasibility:** Evaluating proposed site(s) to determine if solar is feasible (the roof can support it, there is enough sunlight and space to produce the energy needed, etc.). This review includes a remote solar feasibility assessment from GRID Alternatives.
- **Solar Deal Financing:** Determining the financing structure needed to support solar projects (how will the loan / deal need to be structured given solar power production estimates and current energy usage?). This work can include developing and / or reviewing a solar loan term sheet and solar deal project pro forma.
- **Solar Deal Developer / Contractor Evaluations:** Reviewing different solar contractor / developer proposals. This also includes a more in-depth technical site assessment from GRID Alternatives.

The intent of this pilot was to support BCL in executing its first two solar deals. However, GRID Alternative’s solar feasibility assessment and review of developer proposals for the two proposed locations made BCL take a step back and re-evaluate the benefits of these solar projects (there were issues raised around the amount of energy that could

be produced by solar panel installation, which neither developer had flagged in their proposals to BCL).

The day after GRID reviewed the solar proposals and provided their analysis and feedback to BCL, we received this feedback from BCL's loan team "this [GRID's analysis] is exactly the kind of insight we need. Day 1, and we're already on a path to getting smarter about analyzing projects."

The lessons learned from this pilot will be used to develop a structure to support future Inclusiv-UNH solar lending alumni. The lessons learned in this pilot also informed the development of our in-depth Commercial Solar Lending Toolkit (V1), designed to help graduates of our Solar Lending Training program more quickly and efficiently develop and launch their commercial solar loan program.

The Guide currently lives in Canvas (the same platform used to provide Inclusiv-UNH solar lending course materials) and includes five main steps:

- **Step 1:** Refresh Your Knowledge of Commercial Solar Projects
- **Step 2:** Determine Your Financial Institution's Readiness to Execute a Commercial Solar Deal
- **Step 3:** Identify and Partner with a Solar Installer, Developer, or Engineering, Procurement, and Construction (EPC) Contractor
- **Step 4:** Identify a Potential Commercial Solar Deal
- **Step 5:** Determine Commercial Solar Deal Financing Structure

Each Step includes additional materials, commercial solar loan program templates, sample loan policy and procedure documents, and other time-saving tips for community financial institutions looking to execute their first commercial solar deal. This is a first-of-its-kind comprehensive instructional guide to help any community financial institution that has completed our Commercial Solar Lending course and needs additional support to proceed with financing its first commercial solar project.

Task 8.0: Continue to mobilize capital and grow collaborative vehicles to invest in solar projects in low-income communities.

Subtask	Description	Timeline
8.1	Conduct outreach for expansion of a shared consumer lending platform	Months 25-36
8.2	Outreach to Community Finance Institutions and impact investors to invest in or participate in Investment Funds	Months 25-36
8.9	Disseminate lessons learned and best practices from Fund development and deployment experience through networks of Community Finance Institutions, such as Inclusiv and the Opportunity Finance Network	Months 31-36

**There are no subtasks 8.3 through 8.8.*

In partnership with Inclusive Prosperity Capital, we have launched a pilot of the Smart-E Loan consumer lending platform in three new states in the Southwest, Arizona, New Mexico, and Texas. New Mexico was the first state to go-live with four local solar

companies signed on as Smart-E approved-contractors. We held a Smart-E launch event on Saturday, April 22, 2023 (Earth Day!) at one of the participating credit unions, Guadalupe Credit Union, in Santa Fe. There were about 60 Guadalupe Credit Union members in attendance, all were primarily Spanish-speaking from the Latino community in Santa Fe. Jim DesJardins, Executive Director at REIA (Renewable Energy Industry Assn)-New Mexico gave a speech, along with leadership from Guadalupe Credit Union, and the CEO of Inclusive Prosperity Capital.

We had four Smart-E approved program contractors there, at booths, available to speak with/ educate the local homeowners (credit union members) on solar:

- Sol Luna Solar - https://sollunasolar.com/team/ ("Local women owned and operated in New Mexico")
- Photon Rainbow - https://photonrainbow.com/about/ ("mission is to always provide an educational approach for customers looking to get solar for their homes")
- NM Solar Group - https://nmsolargroup.com/ ("100% local and employee-owned. This is our home and we have a vested interest in the health & success of our community.")
- ECC Power Solar Energy - https://ecpower.us/ ("ECC Power was created with the vision of providing cost-effective forms of renewable energy to homeowners and small businesses.")

We also had a booth with representatives from the Solarize Santa Fe program (a city program that is partnering with Guadalupe CU and Smart-E).

Since our Earth Day 2023 launch in Santa Fe, we have expanded the Smart-E Loan pilot to Phoenix, Houston, and San Antonio, and will continue to grow the program in these markets and across the three states (Arizona, New Mexico, and Texas).

Project Developer – Investor Matchmaking
Our solar lending students and alumni network continue to seek and solicit investment opportunities and partnerships. Throughout this project, we have been sharing mission-driven investment opportunities with community finance institutions. Through our alumni network, we support community-serving solar projects in need of financing to connect with dozens of mission-aligned lenders for co-investment. We connect those in need of investment to our network via email notifications, virtual one-on-one and group meetings, our private alumni LinkedIn group, webinars, and informational sessions. This matchmaking helps both developers in need of financing and new solar lenders that don't know how to connect to a project pipeline yet.

Solar Loan Participation Platform Launched
In addition, as part of this project, Inclusiv built and launched a solar loan participation program where interested credit unions can buy and sell solar loans through Inclusiv's marketplace to help facilitate co-financing of solar projects. This structure will enable credit unions with existing solar loan portfolios to access a market where they can sell

participations in their existing loan portfolios to other Inclusiv members credit unions. Selling loan participations allows solar lenders increase their liquidity so they can continue originating new loans, thus growing their solar lending program. For buyers, this platform is a great way for credit unions to learn how these solar loans perform and the details of how solar lending works, before launching a standalone program.

Inclusiv launched this loan participation program in 2023 with a few graduates of its Inclusiv-UNH solar lending alumni network, including purchasing 37 solar loans from Clean Energy Credit Union, 75% of which are in CDFI target markets. This initial purchase helped Inclusiv test its marketplace platform and understand and optimize the user experience on the marketplace.

Clean Energy Credit Union's Solar Loan Participations
Clean Energy Credit Union, an organization that has supported this project by providing expertise in training content development and technical assistance, and by sending several lending staff through the training courses, has been originating solar loans since 2018 and has been selling participation in these solar loans since early 2019. To date, they have sold nearly 3,000 loans with purchased loan amounts of over $100 million. Participation buyers have included more than 70 credit unions and several impact investment firms, located in more than 30 states across the U.S. Purchasing credit unions learn from Clean Energy CU's success by reviewing their loan policies, underwriting guidelines, and due diligence documents, and then tracking performance over the life of the loans. Several purchasing credit unions have gone on to develop their own solar lending programs for their respective communities. Clean Energy Credit Union continues to work with Inclusiv to identify additional loans for expanding beyond the initial loan participation pilot program.

8. Significant Accomplishments and Conclusions

The project continues to generate positive impacts in the clean energy justice space across multiple dimensions:

- Through training, alumni webinars, peer-support-networking and other knowledge-sharing activities, the project is making solar finance familiar to lenders across the community finance industry. Both course evaluations and solar lending data from prior course participants indicate that this knowledge-sharing approach is moving the needle on community lender engagement in the space. Knowledge supports are helping lending staff to make the case for solar within their respective organizations and garner the support of senior management, as we saw in the case example of LISC that we described earlier. We believe that adoption of solar lending practices by organizations participating in our courses may soon have a snowball effect in which competing lenders realize they must also enter the space to keep up.

- Our platform development activities are now taking root with the expansion of the Smart-E consumer lending platform to three new states – Arizona, New Mexico, and Texas – and development of a business plan to continue and sustain that growth in many more states over the next 5 years.

- Our broader movement building activities are lifting up solar lending and clean energy justice to make these issues highly visible within the community development field and change how community development thought leaders are thinking about them. For too long, many community development groups have put climate issues outside their mission focus. Now, the field understands that climate change and renewable energy are core community development issues. With support from our training programs, community lenders are now actively preparing to deploy IRA funding for solar energy in their communities.

- Learnings from our solar lending trainings are now informing our design of multiple new courses in other areas of climate mitigation and resilience finance.

SOLAR LENDING ALUMNI SUCCESS STORIES

Below are a few examples of how Inclusiv-UNH Solar Lending course graduates (alumni) are building and scaling clean energy markets that are accessible, for the first time, to low-income and disadvantaged communities (LIDAC) and communities of color around the country:

NATIONAL

Clean Energy Credit Union *is a low-income designated credit union with a national footprint that finances solar photovoltaic systems, electric vehicles, insulation, weatherproofing, air-source heat pumps, geothermal heat pumps, electric bicycles, and more. In its first six years, Clean Energy CU has provided over $200 million in clean energy loans for 8,500 households, helping to offset nearly 700,000 tons of carbon dioxide equivalent. Clean Energy Credit Union has been an Inclusiv member since 2019 and a graduate of both Inclusiv-UNH's consumer solar lending and commercial solar lending training courses.*

In 2023, Clean Energy Credit Union launched a program that provides discounted loan rates to low- and moderate-income (LMI) and Black, Indigenous, People of Color (BIPOC) individuals across the country and partners with philanthropic organizations to provide grants that lower the cost of a solar system to households that do not qualify for the solar investment tax credit. They also provide education to households on how best to make financially sound investments in their homes that will also lower their utility bills and their greenhouse gas emissions.

VERMONT

Vermont State Employees Credit Union (VSECU)*, a Division of New England Federal Credit Union, has been serving Vermonters since 1947. VSECU has 170,000 members and $3B in community owned assets and has been an Inclusiv member since 2020. VSECU has also had two of its lenders graduate from Inclusiv-UNH's consumer solar lending training program.*

VSECU supports the environmental prosperity of its members by offering low-interest loans that reduce the overall cost of investing in solar and energy efficiency investments. Their green loan offerings include financing for energy efficient appliances, electric vehicles, solar systems, home energy efficiency and electrification improvements, bicycles and e-bikes, geothermal, and advanced wood heating systems. VSECU also offers a VGreen Money Market account, which allows members to earn a competitive interest rate on savings that help fund VGreen loans. As of October 2023, VSECU's green loan portfolio was $133 million.

VSECU has extensive experience deploying grant program funds through credit enhancements such as interest rate buydowns and loan loss reserves. They also participate in a low- to moderate-household income program that deploys zero or low-interest loans to qualifying Vermonters for thermal upgrades and electrification transition improvements, which is subsidized by a major efficiency utility in Vermont. In the past, VSECU has also participated as a grant subrecipient to deploy low interest solar loans to targeted areas in Vermont and works regularly to consider energy savings in their underwriting criteria.

"VSECU is committed to finding opportunities to promote environmentally sound choices for our employees and member-owners. Our members use our VGreen loans to purchase green vehicles, make energy efficiency upgrades to their homes, buy their next bike, or cover the cost of another environmentally friendly purchase. In 2022, we originated $45,461,128 through our VGreen loan program. We recognize the importance of offering green loans to our members who are interested in improving the environment and reducing energy costs and will continue to offer a wide range of products, flexible terms and discounted rates to ensure that our members can achieve their energy goals." - Rob Miller, CEO, VSECU

PUERTO RICO

Inclusiv has almost 100 financial cooperative (cooperativa) members in Puerto Rico. One of these, ***Cooperativa Jesús Obrero****, has spent the past several years leading in solar finance on the island. Cooperativa Jesús Obrero has been a member of Inclusiv since 2018, currently has representation on Inclusiv's Board of Directors, and is a graduate of Inclusiv-UNH's consumer solar lending training course.*

Cooperativa Jesús Obrero is a CDFI and serves 12,500 local residents in Puerto Rico. Since October 2023, this cooperativa has financed 800 photovoltaic solar systems in 31 municipalities across the island, and its renewable energy financing makes up 10% of its total loan portfolio. These solar systems also build climate resiliency. Most recently, they helped residents re-gain access to electricity more quickly after the destruction caused by Hurricane Fiona in September 2022.

WEST VIRGINIA

Element Federal Credit Union (FCU) *is a local financial co-op based in Charleston, West Virginia. Established in 1978, Element FCU is a Community Development Financial Institution (CDFI) and low-income designated credit union and serves 4,700 members with an asset size of $52 million in community owned assets. Element FCU has been an Inclusiv member since 2021 and has had two lenders graduate from its consumer solar lending training course.*

Element FCU provides financial services to low-income geographic areas, employer groups, and associations in West Virginia and currently offers a green loan program that finances energy saving projects, including energy efficient appliances, electric vehicles, solar systems, and home energy efficiency and electrification improvements. In 2023, Element FCU launched a solar lending program to empower West Virginians, stimulate economic growth, and build a more sustainable future in their state.

Element FCU plans to use Greenhouse Gas Reduction Fund (GGRF) grant dollars to reduce the upfront costs associated with installing solar and make clean energy technologies more assessable to their West Virginian community members.

DEEP SOUTH

HOPE (Hope Enterprise Corporation and Hope Credit Union) *is a community lender with three decades of experience closing opportunity gaps in under resourced Deep South communities. One of the nation's largest Black- and women-owned financial institutions, HOPE's mission is to strengthen the financial health and wealth of people in under-resourced Deep South communities. HOPE accomplishes this by providing financial services, aggregates resources, and engages in advocacy to mitigate the extent to which factors such as race, gender, birthplace and wealth limit one's ability to prosper. Since 1994, HOPE has generated or leveraged more than $3.7 billion in financing that has benefitted over 2.5 million people in Alabama, Arkansas, Louisiana, Mississippi, and Tennessee.*

HOPE touches the lives of more than 120,000 individuals living in the households of our member-owners. Of these, more than 80% are people of color, 60% are women, half have household incomes of less than $31,000, and nearly half were previously unbanked or heavily reliant on payday loans, check cashers, subprime mortgages and other predatory financial services before joining HOPE.

A long-time Inclusiv member, HOPE has deep ties with the organization. HOPE's staff participate in Inclusiv's Information Technology, Greenhouse Gas Reduction and Small Business advisory committees. Six members of HOPE's lending team completed Inclusiv-UNH's Green Financing Training. HOPE's Chief Policy Officer serves on Inclusiv's board of directors, and HOPE co-hosted Inclusiv's 2023 annual conference in Memphis, TN.

HOPE's members face the highest energy burdens in the country, and HOPE is actively working to reduce this high energy burden. For example, HOPE supported energy efficiency improvements to housing in a majority Black neighborhood in Moorhead, MS that had fallen into disrepair. Energy audits revealed that the upgrades by HOPE's partner Delta Design Build reduced energy leakage by 72% per home, saving homeowners more than $171 in utility expenses per month.

At the individual level, despite low incomes, a high share of discretionary income is directed towards utility payments. Sixty-nine percent (69%) of HOPE members pay over $200 a month on utilities. Only 40% are able to pay all of their bills on time. In a representative survey of HOPE's membership, 65% indicated an interest in affordable loans to make home improvements that make homes more energy efficient and 70% indicated an interest in affordable loans to purchase energy efficient appliances. HOPE also surveyed nearly 6,000 business borrowers who indicated a high demand for solar applications.

Recognizing the potential benefits, HOPE's members stand ready to take advantage of the Green House Gas Reduction Fund (GGRF). The GGRF is essential to reducing emissions in HOPE's five state footprint and the organization's track record of meeting the needs of the nation's most under resourced communities will ensure people and places most often overlooked by large federal investments are included in and benefit from this historic opportunity.

MINNESOTA

Affinity Plus Federal Credit Union *is a low-income designated, member-owned cooperative, serving communities across Minnesota since 1930. Affinity Plus has 30 branches located throughout Minnesota and is owned by more than 250,000 members, with more than $4 billion in assets. Affinity Plus Credit Union has been an Inclusiv member since 2021 and a graduate of Inclusiv-UNH's consumer solar lending training course.*

Affinity Plus has led the green financing charge in Minnesota, becoming one of the first credit unions in the state to offer its members dedicated solar loan products. As of October 2023, Affinity Plus has funded over $15 million in clean energy loans to 95 households, helping members save on energy costs, reduce their carbon footprint, and increase their home's value.

NEW MEXICO

Guadalupe Credit Union *is a Community Development Financial Institution (CDFI), Minority Depository Institution (MDI), low-income designated credit union and a Juntos Avanzamos credit union that has been serving the Santa Fe Northern New Mexico area since 1948. Guadalupe Credit Union has been an Inclusiv member since 2010, currently has representation on its Board of Directors, and has had three lenders graduate from the Inclusiv-UNH consumer solar lending training course.*

Guadalupe Credit Union provides financial services to low and moderate income and underserved and underbanked families in seven counties in Northern New Mexico and has 27,193 members and $260 million in community owned assets.

Guadalupe currently offers a green loan program that finances energy saving projects that include solar systems, home energy efficiency and electrification improvements. Guadalupe Credit Union also plans to offer loans for energy efficient appliances, heating and cooling upgrades and home efficiency upgrades like window replacement for low- and moderate-income communities, communities of color, underbanked populations and energy burdened households.

ARIZONA

Tucson Old Pueblo Credit Union (TOPCU)*, is a Community Development Financial Institution (CDFI) and low-income designated credit union based in Arizona and has been serving the Tucson, Arizona community since 1935. TOPCU has 18,801 members and $218,345,000 in community owned assets. TOPCU has been an Inclusiv member and Inclusiv green lending network member since*
2020 and has had multiple staff graduate from Inclusiv-UNH's consumer solar lending training program.

TOPCU currently offers a green loan program that finances energy saving projects, including energy efficient appliances, electric vehicles, solar systems, home energy efficiency and electrification improvements, rainwater collection, grass to turf loans and any water conservation effort for all in their community including low- and moderate-income communities, communities of color, underbanked populations and energy burdened households.

Over the past few years, TOPCU has built a robust solar program, offering opportunities for its members to support climate change efforts and reduce monthly utility bills. TOPCU is the number one solar lender in Tucson. As of August 2023, TOPCU has funded 2,710 solar loans totaling over $84 million, with a current portfolio of $65,704,024.

Member Story: TOPCU recently helped a borrower qualify for a local incentive to reduce his solar installation costs. Before installing solar, he could only afford to run his air conditioner for 2-3 hours a day, which is very difficult in the summer months in Arizona, where temperatures can rise to over 100 degrees Fahrenheit. However, with solar installed, he can now afford to run his air conditioner whenever he needs it, vastly improving his comfort level and quality of life.

PARTNERSHIPS

Cornerstone and CollectiveSun (partnership)

Two Inclusiv-UNH commercial solar lending alumni, CollectiveSun Foundation (non-profit dedicated to advancing climate-friendly projects for low-income people) and Cornerstone Fund (non-profit financial organization supporting faith-based communities), recently partnered together to establish the first-ever credit facility to fund $4 million solar projects exclusively for faith-based organizations.

The Inflation Reduction Act (IRA) has greatly increased opportunities for faith-based organizations and other nonprofits to benefit from solar energy. However, it's still challenging for nonprofits and especially houses of worship to access funding. These faith-based organizations are often excluded from traditional financing options or have limitations on the amount of funding they can obtain. The CollectiveSun and Cornerstone Fund $4 million credit facility is designed to help houses of worship access financing and leverage the IRA federal solar tax credits needed to bring clean and renewable energy to their buildings and community centers.

Funding will be provided via the credit facility's landmark three-party funding structure, which includes capital from two nonprofit foundations (including Cornerstone Fund) and a loan guarantee from the Community Investment Guarantee Pool (CIGP). CollectiveSun will manage construction, own, and operate the solar systems. When a project is placed in service, CollectiveSun will also manage all of the required tax credit filings and integrate tax credit gap financing into the structure. Both CollectiveSun and Cornerstone Fund will work together to provide technical support to participating faith-based institutions on both the finance and engineering side of solar installations.

This project began as a conversation between two Inclusiv-UNH commercial solar lending course graduates, CollectiveSun and Cornerstone Fund, who, after taking the Inclusiv-UNH course were both interested in helping faith-based organizations go solar and determined to find ways to leverage the IRA's solar tax credits.

To read more about this project, please read CollectiveSun's press release, HERE: https://collectivesun.com/press-releases/collectivesun-establishes-first-ever-credit-facility-to-fund-4-million-of-solar-projects/

9. Path Forward

The project team is continuing to work together with funding from other sources to expand the trainings and supports we provide for community-based lenders, including:

- We continue to serve additional iterations of our consumer and commercial solar lending courses. We expect continued high demand for these courses as the Greenhouse Gas Reduction Fund rolls out; GGRF TA funding is also a likely source of continued support for our training initiatives.

- We continue to maintain and develop online "resource banks" for solar lending and to provide alumni workshops.

- With anticipated support from GGRF TA funding and building off our initial successes with BCL lending described earlier, we are looking at providing follow-on advisory services to lenders as they work to roll out solar lending programs. The form of these services could vary from lender to lender, but could include:
    - One-on-one consulting services to refine business plans, loan policies, etc.
    - Pairing lenders with other more experienced lenders, especially on commercial solar loans, via a loan participation agreement.

- Continuing to partner with IPC on Smart-E rollout to additional states, including an interim program evaluation of the Southwest states rollout to recommend adjustments to future rollout processes.

- Development of additional courses to support community lenders in climate mitigation and resilience finance, building upon the successes and lessons learned from the solar lending courses. These courses are currently in development and will include:

    - Developing and financing solar and storage
    - Green home improvement lending (single family focus)
    - Multifamily decarbonization lending
    - Community engagement for climate justice
    - "Climate Resilience 101"

10. Products

Reports

- **OSTI ID 1779793:** Hangen, E., Regan, R., & Boege, S. (2021) *Bringing Solar Energy to Low- and Moderate-Income Communities.* University of New Hampshire. https://carsey.unh.edu/publication/bringing-solar-energy-low-moderate-income-communities

- **OSTI ID 1782719:** Hangen, E., Regan, R., & Boege, S. (2021) *Scaling Equitable Solar Finance.* University of New Hampshire. https://dx.doi.org/10.34051/p/2021.25
- **OSTI ID 186381:** Hangen, E. (2022) *Clean energy project development for low-income communities: Strengthening the ecosystem for delivering solar energy and deep efficiency retrofits.* University of New Hampshire. https://dx.doi.org/10.34051/p/2021.25

Conference Proceedings

- **OSTI ID 1779791: 'Expanding the Field of Climate Finance' at the 2020 Financial Innovations Roundtable**. University of New Hampshire. https://carsey.unh.edu/sites/default/files/media/2021/01/financial-innovations-roundtable-summary-2020.pdf
- **OSTI ID 1892190: 'Advancing Clean Energy Equity' at the 2022 Financial Innovations Roundtable**. University of New Hampshire. https://carsey.unh.edu/sites/default/files/media/2022/08/summary_of_the_2022_financial_innovations_roundtable_-_final.pdf

11. **Project Team and Roles**: List all participants along with their individual roles and/or intellectual contribution (e.g., DOE personnel, students, collaborating organizations).

University of New Hampshire

- Michael Swack, Principal Investigator
- Eric Hangen, Senior Research Fellow, Lead Developer
- Yusi Turell, Project Manager
- Laurie Smith, Student Services

Inclusiv

- Cathie Mahon, President/CEO
- Eben Sheaffer, CFO
- Pablo DeFilippi, EVP, Inclusiv Network
- Susanne James, SVP, Inclusiv Capital
- Alexis Iwanisziw, SVP, Policy and Communications
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- Jack Caplan, Impact Investment Associate
- Monica Copeland, MDI Network Director
- Jules Epstein-Hebert, Director of Membership, Growth and Partnership
- Anna Foote, Senior CU Operations and Compliance Specialist
- Rosa Franco, VP, Loan Participation Marketpalce Program
- Ashley Hunter, Senior Communications Officer
- Cathi Kim, Director, Inclusiv Capital
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- Hannah Kramer, Director, Center for Resiliency and Clean Energy

- Fiona Laird, Program Associate, Center for Resiliency and Clean Energy
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- Keyshla Molina Zayas, Program Officer, Puerto Rico Network
- Bob Mundy, Director, Inclusiv Mortgage
- Peter Rubenstein, VP of Technology, Innovation & Analytics
- Kyia Ruiz, Director of Communications
- Wendy Soria, CU Operations and Compliance Specialist
- Michael Sampson, Data Analyst
- Rene Vargas Martinez, Director, Puerto Rico Network

Coastal Enterprises, Inc. (CEI)

- Keith Bisson, President
- Niels Zellers, Investment Officer, Bright Community Capital
- Jesse McKinnell, Chief Operating Officer, Bright Community Capital
- Linnea Patterson, Environmental Lending Specialist, CEI

Contractors

- Cheryl Fatnassi, Training content development & delivery
- Izuba Consulting, Post grad consulting support
- Rebecca Regan, Market outreach & analysis
- Bianca Nicolosi, Design
- Ironistic Design, Web design
- Retromotion, Graphic design
- Clay Mitchell, Training content development & delivery
- Andrew Berrier, Training content development & delivery
- Inclusive Prosperity Capital (IPC), Training, outreach, and solar finance strategy
- Duanne Andrade, Training content development & delivery
- Clean Energy CU, Training content development & delivery
- Marisol CU, Training content development & delivery
- VSECU, Training content development & delivery
- Sunwealth, Training content development & delivery
- GRID Alternatives, Training content development & delivery
- Baltimore Community Lending, Training content development & delivery
- Dana Archer-Rosenthal, Loan participation and secondary market strategy

12. References

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Will a new EPA fund serve low- and moderate-income people? Five principles to promote success (Hangen and Swack, 2022).
Best Practices for Equity and Governance for GGRF implementation (Chi 2023).
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Strategy Considerations for Greenhouse Gas Reduction Funding (McGrail 2023).
Practitioners' Guide to Community Lending for a Just and Equitable Energy Transition (Probst, Poole Johnson, and Vargason, 2023).