Carsey School of Public Policy White Paper



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Clean Energy Project Development for Low-Income Communities

Strengthening the Ecosystem for Delivering Solar Energy and Deep Efficiency Retrofits

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Executive Summary

From fall 2020 through 2021, the Carsey School Center for Impact Finance at University of New Hampshire has conducted interviews with 80 individuals, held two roundtable events with over 150 participants, facilitated five focus groups with 70 participants, trained 179 participants from 97 organizations in solar lending, and engaged in countless meetings and informal conversations with organizations working to bring clean energy projects to low-income and underserved communities. We've focused particularly on projects like community solar, and solar and efficiency projects for multifamily housing, homeowners, and small businesses. Through these experiences, the biggest takeaway we've learned is that **scaling clean energy projects in these communities is not just a financing challenge**.

To be sure, clean energy projects serving low-income communities do have significant needs for concessionary capital, especially in order to create the co-benefits that matter for these communities—like energy affordability, job creation, and climate resilience. There are also real needs to facilitate the flow of capital to low-income clean energy projects and open up access to financial markets for both debt and equity investment. Thankfully, we are also hearing about a surge of interest on the part of banks, corporations, and other impact investors to make these investments. We discuss those needs and opportunities in this white paper.

However, financing is not the only need. As one solar financer put it to us: "**I'm less worried about finding the money than finding the deals**." Time and again, the issue we repeatedly heard from fund managers looking for low-income clean energy projects to finance—such as Green Banks, CDFIs, and other investors—was that there is a **lack of shovel-ready pipeline**. To scale this pipeline, funders and policymakers need to think holistically about **building the ecosystem** required to identify, develop, and then finance impactful and investable projects. This work requires more than providing low-cost capital or credit enhancements to financing pools of projects. That is certainly part of the work, but as one interviewee put it, "that's the easy part." The hard part is supporting the work of community-level organizations that can understand community needs and interests, create investable deals responding to those needs, and shepherd them through the financing process.

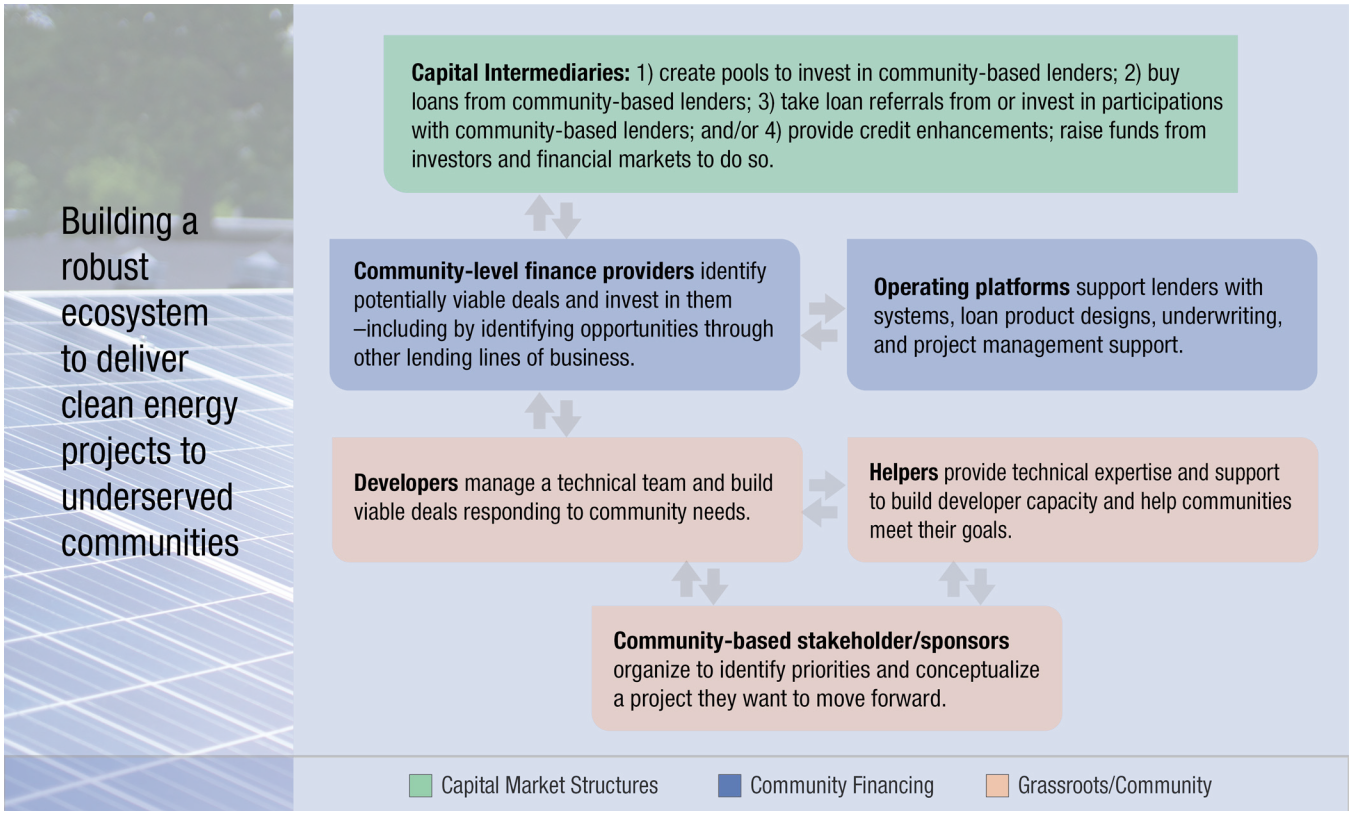
For the community development world, at least, this isn't a new insight—for a decade or more, leading researchers in the field have talked about the need to build the "capital absorption capacity of places." More recently, this conversation has started to talk about the need to support ecosystems that create "rich and more coordinated opportunities" for generating social impact. The graphic or "map" in Figure 1 depicts the different levels of the ecosystem that we believe are necessary to deliver clean energy projects to low-income and underserved communities—a "grassroots" or community level in orange, a community financing level in blue, and capital market structures in green. Note that the map is of niches or roles in the ecosystem, not organizations—an individual organization could inhabit more than one niche.

In the body of our white paper, we will "tour" through this ecosystem—reviewing examples of the work different organizations are doing in each of its niches, as well as which niches seem to be richly populated and which niches need more support and investment. Our main conclusions from this tour are that:

» **More capacity-building funding and support is needed at the grassroots level of the ecosystem**. To succeed at serving low-income communities, clean energy projects must not only understand the energy commodity and the complex financing structures that have been used to incentivize energy markets—they must also have a deep understanding of the customer and the communities in which customers live. As with developing affordable housing or other kinds of real estate in low-income communities, developing clean energy projects is a job best done with deep engagement from the community. Achieving this engagement requires more support for grassroots-level actors who can then bring projects to fruition.

  In particular, we recommend that funders and policymakers think more about how to support the growth of mission-driven developers as organizations, for example through working capital grants and soft debt, as well as training and technical assistance. We also believe that much more work is needed to build out "helper" roles that make project development easier for mission-driven developers and community sponsors. These "helper" roles can support community leaders to meet community goals around clean energy—as, for example, the

FIGURE 1. ROAD MAP TO DELIVERING CLEAN ENERGY PROJECTS TO LOW-INCOME COMMUNITIES



Note: This figure reviews roles and not organizations. The number of different entities needed to complete this ecosystem can vary; e.g., lenders can provide technical assistance; developers can be community-based entities; etc.

Vermont Law School Energy Clinic has helped resident-owned manufactured housing parks to make and implement plans for community solar projects. They can also support developers to do their work more efficiently—as, for example, Amicus Solar has helped small development companies to reduce procurement costs and access technical expertise.

» **There are many community lenders who are well-positioned to finance clean energy projects, whose capacities could be unlocked by providing lending operating platforms**. A rich array of Green Banks, Community Development Financial Institutions (CDFIs), Community Development Credit Unions (CDCUs), other credit unions, and mission-driven community banks crisscrosses the nation—including among them many institutions with the ability to make risk-tolerant, high-touch loans that many deep-impact clean energy projects will require. Most of these institutions lack deep clean energy project lending expertise, but nearly all of them—especially CDFIs—have deep borrower relationships in low-income communities. Lending operating platforms can provide a shared source of technical expertise, product designs, and information technology systems that would make it possible for financial institutions to engage in clean energy project finance while focusing on what they do best: developing relationships with and underwriting borrowers. We believe that supporting these platforms is a vastly more efficient and impactful solution than standing up new clean-energy-specialist lenders across the country.

» **There are many opportunities to engage new investors to provide capital for clean energy project finance in low-income communities,** but they cannot be easily realized without scaling up the pipeline of investable projects. We have been heartened to learn about increasing interest among bank, corporate, and even individual investors in supporting climate equity impacts. Several barriers stand in the way of realizing this interest, including investor concerns over search and underwriting costs, liquidity, risk, and reputational risk (wanting to be sure that environmental impacts are real). The most salient

barrier, however, seems to be around scale—the ability to present investment opportunities in large enough bite sizes, which in turn could help to mitigate other investment concerns. Achieving scale, however, points back to the initial problem: the need to develop a more robust shovel-ready pipeline of projects that could then be aggregated for investment.

Our recommendations for funders and policymakers are therefore to:

» Focus investments to **build capacity of mission-driven developers and community-led organizations**, as well as "helper" organizations serving these groups, so that they, in turn, can expand the pipeline of shovel-ready projects.

» Support the **development and growth of shared platforms**—for both mission-driven developers and for community-based lenders—that make it easier for these actors to bring investable projects to market and finance them.

» Look for opportunities to **serve as "ecosystem builders"** to connect, empower, and collaborate with others to build the whole system, as well as to support organizations that are playing ecosystem-building roles.

We further recommend that funders and policymakers seek to think, work, and **convene stakeholders around particular project types** when seeking to strengthen ecosystems. For example, a convening could bring together developers, community organizations, "helper" organizations, and community finance institutions to discuss how they can work together to create more community-owned community solar projects (or multifamily efficiency retrofit projects, or small-scale solar and efficiency projects for small businesses, etc.).

We also urge funders and policymakers to **support a diversity of organizations and strategies** even as they seek scaled solutions. If a robust ecosystem is necessary to deliver clean energy projects to low-income and underserved communities, the corollary is that ecosystems need diversity to thrive. This is especially true in the clean energy space, where new technologies and changing market and regulatory conditions mean that not every business model currently in place is adaptive, and new adaptations may emerge that will work better. We think that this principle applies across all levels and niches of the ecosystem, even regarding the creation of different structures for financial intermediation. At the same time, it is important to make the learnings from these diverse strategies accessible to others in the field—to promote an "open source" sharing of frameworks that others can use as the basis for further innovation.

Finally, as we stand on the cusp of potentially momentous corporate and government investment into climate equity, we hope that funders and policymakers will consider how to **promote funding and governance mechanisms that listen to, and are accountable to, the underserved communities** that we are all charged to better serve.

Introduction

From fall 2020 through 2021, the Carsey School Center for Impact Finance at University of New Hampshire has conducted a series of engagements to understand the opportunities and challenges to bring clean energy projects to low-income and underserved communities. These activities have included:

» Interviews with 80 individuals from a range of sectors including mission-driven solar developers, community-based organizations, Community Development Finance Institutions (CDFIs) including both loan funds and credit unions, climate equity policy advocates, banks, philanthropies, and financing intermediaries.

» Two Financial Innovations Roundtable events that engaged over 150 participants and included five facilitated focus groups with 70 participants—"Expanding the Field of Climate Finance," held in the fall of 2020, and "Scaling Equitable Solar Finance," held in the spring of 2021.

» A training series in solar lending that has engaged 179 participants from 97 organizations, all of them community-based lenders such as CDFIs, Community Development Credit Unions, and mission-aligned community banks and loan funds.

In addition to these formal activities, the Center has engaged in countless meetings and informal conversations with organizations working to bring clean energy projects to low-income and underserved communities. Mostly, our work has focused on solar energy, although we have also spoken with many about deep energy efficiency retrofits—and so we intend this paper to speak mostly to that substantial, but certainly not all-encompassing, part of the clean energy space. We believe that there are also very substantial opportunities for other types of clean energy work, such as

helping low-income consumers to purchase electric vehicles, efficient lighting, or smart appliances, but these spaces involve very different delivery systems which are best explored separately.

We've learned a lot, but there is one overriding theme that has emerged from all of this work: **Scaling clean energy in low-income communities through solar and deep efficiency retrofits presents financing challenges, but that is only part of the problem. Funders and policymakers need to think more holistically about building the ecosystem required to identify, develop, and finance impactful and investable projects.**

For the community development world, at least, this isn't a new insight—for a decade or more, leading researchers in the field have talked about the need to build the "capital absorption capacity of places." More recently, this conversation has started to talk about the need to support ecosystems that create "rich and more coordinated opportunities" for generating social impact. We think that the term "ecosystem," however wonky it may sound, is well-chosen. It connotes a highly complex web of relationships that encompasses both cooperation and competition, and an environment that encourages innovation and adaptation. It also connotes something that is not centrally planned—a place where a thousand flowers can bloom. There is no one single entity that can successfully lead an entire ecosystem to health, and attempts to mastermind the allocation of resources within an ecosystem from the outside usually prove to be foolhardy.

Let's take a tour through the roles that need to be played in a healthy ecosystem to deliver clean energy in low-income communities, including a review of who is currently playing those roles and whether more capacity is needed in that part of the ecosystem. In Figure 1 (see page 3) we've provided a graphic to serve as a kind of road map. One very important note about the map, though: it is a review of *roles* or "niches" within the ecosystem, not *organizations*. Even though we will provide examples of organizations that play each role we will review, there does not need to be a unique organization or type of organization for each role in the ecosystem. In fact, many organizations play more than one role. Many project developers, for example, are also finance companies, and some are community-based, community-led entities. Many lenders are also technical assistance providers. And so on. One more caveat before we begin the tour: many of the organizations we will discuss as examples will be unfamiliar to people working in the mainstream finance or energy sector. We touch on important roles that mainstream banks, power utilities, and state and local government agencies can play, but we do not think that these players represent the backbone of what is needed to bring the benefits of clean energy projects to low-income and underserved communities. We focus instead on the development of a community-driven ecosystem that looks something like the nonprofit community development system in the United States that delivers affordable housing to low-income families. This system presents many opportunities for investment to the financial sector, but relies upon the work of hundreds of mission-driven, community-connected developers and providers, with the support of hundreds more mission-driven, community-connected financing institutions. Indeed, the community development industry itself could play a role in delivering clean energy to low-income communities. The main way in which we depart from how that sector has been organized is to point out opportunities to create marketplace platforms that make it easier for both project developers and lenders to participate in the clean energy space. These platforms can provide shared services, partner matchmaking, and technology solutions to help both developers and lenders operate more efficiently and effectively, an opportunity that is too frequently overlooked in the affordable housing space.

The Grassroots Level

When we interviewed mission-driven financing entities who are deeply engaged in clean energy lending, we expected the availability of low-cost capital to be their number one concern. It wasn't. The top concern we heard about instead was deployment—having enough good projects to invest in. The entire grassroots level of the ecosystem, in the orange boxes, is an area where more support is needed to build that pipeline. We are especially concerned that the "helper" role within this ecosystem is neglected by funders and policymakers. In the community development and affordable housing field, a significant infrastructure—with a combined budget of many hundreds of millions of dollars—exists to support hundreds of community groups and community development nonprofits, through intermediaries such as—but not limited to—NeighborWorks America, Enterprise Community Partners, LISC,

RCAC, and Housing Partnership Network. The clean energy space lacks such an infrastructure, although a number of the community development intermediaries just listed are building their capabilities and mobilizing their networks around climate issues and clean energy solutions for the communities they serve.

At the end of the day, energy is consumed by customers—individual homes and businesses. Any successful clean energy project has to be built on a deep understanding of the customer, because it has to convince a customer that it's something they want to and can do. The customer has to conceive of some benefit they will get by implementing or participating in the project (the "why should I care?" criterion). For that matter, they have to conceive even of the *possibility* of the project: what are the best ways for my home, apartment building, or business to save energy or generate renewable energy? What is a "community solar" project or a "microgrid" and why would I want to be a part of one? Then, the customer needs to decide that they trust whoever is going to develop that project—the insulation contractor, rooftop solar installer, community solar developer, etc. Lastly, we get to the question about how to pay for the project.

The challenges we describe above are true of customers at any income level. But they are magnified for customers in low-income and underserved communities. Policymakers have long recognized that projects serving low-income customers will face challenges with affordability and financing. But even before then, there are barriers:

- Often, environmentalists have marketed efficiency and solar as something that people should do in order to save the planet, even if they cost a lot. This branding misses the mark with low-income customers for whom cost is a critical factor, even though these customers often care deeply about climate change.
- Figuring out one's best options for a clean energy project require obtaining outside expertise, and cost time and money—both in short supply in low-income markets.
- Many low-income and underserved communities have had experiences that, quite rightfully, have caused them to lose trust in whether outside actors such as developers, lenders, or utility companies have their best interests at heart. These experiences greatly compound the everyday issues of consumer trust ("do I trust that contractor to do a good job?") that exist at all income levels of the market.

Collective action can help communities to overcome some of these barriers, even when the customer unit is as small as an individual household. For example, Solarize campaigns bring homeowners together to purchase rooftop solar systems in bulk. In addition to driving down costs, working together helps neighbors to learn about solar from other neighbors that they trust, and evaluate options for equipment and installers more efficiently than they could on their own. Other community-based organizations have developed community-owned community solar programs in which everyone can participate.

In short: successful clean energy projects in low-income markets will often start with a deep understanding of, and engagement with, the community—not just a marketing plan to target individual customers. Thus, we arrive at our first stop on the tour: ***Community-based stakeholder/sponsors*** can play a key role to convene neighbors, understand and articulate community priorities, and envision and promote clean energy projects that respond to those priorities. Sometimes, this function might be played by community-based groups who can also develop projects, such as People Power Solar Cooperative or Cooperative Energy Futures. But groups that do not have any technical clean energy development expertise themselves can also initiate action leading to viable projects, whether they be a nonprofit affordable housing group, a neighborhood business association, a grassroots environmental justice group, or a church that wants to create a local resiliency hub. The support of even small groups of resident leaders should not be overlooked within this role. For example, the HEAT Squad, a nonprofit home energy efficiency program in Vermont, found many of its customers in its first years through the volunteer efforts of community residents; an evaluation of the program found that this people-centered approach boosted the likelihood of low-income homeowners signing up for a home retrofit by nearly 50 percent. Just as importantly, attempts by outside actors to promote a project without the support of community stakeholders are unlikely to succeed. As the leader of one mission-driven financing group put it, "just knowing where low-income people live is not enough." A Green Bank executive expounded upon this point: "Climate equity is hard business. There are issues of trust on the ground—people in communities thinking about whether those investors will really have their best interests at heart."

A critical point for policymakers to recognize is this: most low-income communities have priorities they want to achieve through clean-energy work that go well beyond just reducing carbon emissions. These desires are reflected in the kinds of clean energy projects that are taking shape in these communities. In the rural South, a black-owned solar development company is working to help families in persistently poor communities save money on electric bills, while also helping small and minority landowners preserve their land. In places like California, Texas, and Puerto Rico, communities are trying to build and control their own resilient sources of power in the face of badly mismanaged electric grids. In Vermont, a nonprofit home energy retrofit program is working to address home health and safety concerns for low-income homeowners, not just save them energy. Still other groups are focused on creating workforce benefits, like a mission-driven solar company that is sourcing solar panels from a company employing people who have previously been incarcerated. One manager of a CDFI clean energy lending program aptly summarized the mindset that the best mission-driven actors take into this space: "We have to start by asking, what problems do our constituents face and how can we help solve them?"

Creating these kinds of co-benefits alongside climate benefits is not free, and often requires the use of judiciously-applied but substantial subsidies. For example, low-income families cannot afford the price of resilient energy storage without significant financial help. Using solar panels constructed by a new social venture company that hires hard-to-employ individuals raises concerns over risk for investors, who may then demand some sort of credit enhancement. Getting a solar deal on an affordable rental housing development to pencil out often requires 15- or 20-year terms on the debt, which raises liquidity concerns for investors. Investing in these co-benefits is therefore a place where funders and investors should think about placing capital on concessionary terms.

Two key challenges face many community-based stakeholder/sponsors. First, many of them lack financial capacity. Even when a community is partnered with a developer, the community-based entity itself is still often going to be asked to put up the earliest and most at-risk layer of financing for their project. Sponsor equity is therefore a key need, particularly when the clean energy project is a larger than a single-family-home retrofit. It is sometimes possible to provide sponsor equity for a clean energy project via "back leverage" loans—for example, one could make a loan to a church that would then place those funds as the most at-risk layer of financing for their resiliency hub project. As the example immediately suggests, however, those kinds of loans are not often going to work as hard debt, and are probably better structured as recoverable grants (or just grants outright). The good news is that this funding can be a relatively small percentage of the overall capital stack, so anyone willing to invest here will see tremendous leveraged impact.

A second, crippling capacity limitation within this niche of the ecosystem is that most community-based stakeholder/sponsors do not have the technical, regulatory, or financial knowledge to assess the viability of their ideas or identify the best path forward to turn their clean energy idea into reality. Technical assistance is therefore a huge need, and a major reason why we have included a "helper" niche in our ecosystem map. We will return to this critically important "helper" role after first visiting the role of developers.

The ***developer*** niche of the industry can take many forms. We are using this term very broadly in an attempt to encompass not only the development of "projects" like a community solar project, but also the delivery of "programs" like a home energy efficiency retrofit or residential solar program. Multiple organizations and people inhabit this niche providing a wide array of skills: not just the people who are building project pro formas or overseeing the operation of a program, but all the players on that team like engineers, permitting specialists, installers, energy auditors, marketers, lawyers, etc. We hope that this brief description serves to underscore the complexity we are skimming over in our description of this niche.

The stakeholders we've engaged with are in near-consensus that funders and policymakers are underinvesting in this niche of the ecosystem. In particular, there is a widespread feeling that not just projects, but developers themselves, need support. One of our interviewees has worked extensively at CDFIs, banks, early-stage investment funds, and as a developer in the solar space. Her advice was unequivocal: "the biggest challenge around expansion of clean energy finance in low-income communities is developer capacity—people on the ground who are going to get projects done. That is the number one issue." From the perspective of a community-based developer looking at the same issue, "community-controlled projects are at a disadvantage.

In our early going we didn't know what to expect—we under-estimated the interconnection costs, had projects that backed out, had to understand which documents to notarize, what was filed where—community groups face the startup costs, and don't have the scale."

An executive at a mission-driven bank added, "there should be a role for philanthropy to invest in really small startups, new entrants, and emerging solar developers." A nonprofit that provides financing for nonprofit solar projects agreed, "we need an incubator, startup capital, and technical assistance programs for mission-driven solar developers." Another interviewee framed a similar recommendation that "foundations should make grants to partners to help with the organizing of their pipeline, the workforce training costs—the unique costs of community-based projects."

These needs can be frustrating for some funders, for example one who reported that "we struggle to be able to invest in low-ticket, high-touch things and that is what exists in the landscape right now." But most interviewees feel that "focusing on the really early-stage stuff," as one CDFI put it, is still the job at hand for foundations.

While capacity-building investment is a primary concern, access to project capital on viable terms *is* also a challenge that developers feel, however. One nonprofit that has been working to help health centers, multifamily housing, and other community facilities to develop solar and storage projects reports that "some lending institutions are requiring rates of return that just aren't feasible for these kinds of projects." A mission-driven solar developer reports, "A lot of [investors] want to be out in 6 or 7 years. That's a challenge. To do the impact projects that we do, something approaching 20 to 25 years on the term is what it takes to create value." Another thought leader in this space reports "the deals that are here today don't quite hit the investment threshold. People need to understand why these local projects experience barriers and then be willing to make money more in line with what is needed." As we discussed above when we touched on needs for sponsor equity, *early stage* project money is especially needed. One interviewee, a lender who was providing technical assistance to a black-owned, mission-driven solar developer, reported that the developer had five promising projects they were looking at, but lacked financing to pay for utility interconnection studies. The developer was instead planning to sell many of those early-stage projects to larger, less mission-oriented developers for "pennies on the dollar," missing out on a chance to build their business.

A final observation before we continue our tour: at the end of the day, we heard that building developer capacity is as much about building the capacity of people as it is about organizations. Our interviewees identified unmet workforce development needs across a wide spectrum of jobs. One suggested that foundations should support HBCUs to have workshops about careers in renewable energy, and noted in particular a dearth of electrical engineers. Several felt that Universities should offer courses and training in clean energy development project finance, and on business planning for clean energy businesses and programs. A number of mission-driven developers we spoke with are working to help people from low-income communities get jobs as installers, and are seeking support for the training components of their work. Recruiting a greater diversity of people to work in solar development could help to overcome cultural and linguistic barriers to clean energy project deployment.

It should be clear from our first two stops on the tour that there is a critically important ***"helper" role*** to be played if we are to have a healthy ecosystem for low-income clean energy finance**.** Helpers can provide both community stakeholder/sponsors and project developers with reliable and knowledgeable technical assistance to be able to evaluate the technical and economic potential for a project, as well as to help them chart a course that will get them to a completed project. Unfortunately, there has not been enough support for this kind of work.

Let's start by looking at helper roles working with community stakeholders and sponsors. While project developers themselves can play an important role in working with communities and helping them understand their options, there are also organizations that can function uniquely in a helper role. A great example is the Vermont Law School Energy Clinic, which has helped resident leaders in mobile home parks in New Hampshire to articulate their goals for solar energy projects and put them out to bid to project developers. Another great example is how Elevate Energy helps multifamily building owners evaluate the potential for clean energy projects. A CDFI active in clean energy lending enthused, "Elevate sends out qualified human beings who will jockey building owners through the process, fill out rebate applications, vet contractors, etc. Funders need to put more money into building

assessments [like what Elevate provides]." In New York City, Solar One provides a variety of helping programs for communities touching issues like green workforce development, energy efficiency technical assistance, and solar project technical assistance. Clean Energy Group, through its Resilient Power Technical Assistance Program, supports community-based organizations, housing providers, and municipalities with technical assistance for solar and storage projects. Technical assistance to communities includes supporting individual households. Inclusiv, for example, is developing a clean energy financial counseling component to add to its Pathways to Financial Empowerment program that is currently used by the financial coaches at community development credit unions.

The Department of Energy—in particular the office of Shalanda Baker, Deputy Director for Energy Justice—has been proactive about addressing technical assistance needs for community-based stakeholders. It has launched the Communities LEAP (Local Energy Action Program) pilot to help low-income, energy-burdened communities identify and advance opportunities for clean energy deployment. The pilot will provide in-kind supportive services valued at up to $16 million for energy transitions. To date, unfortunately, no funders have stepped forward to also provide working capital to the groups participating in the pilot program, which would seem like an excellent opportunity to lever the impact of a grant.

The Justice40 Accelerator program, which seeks to share "information, resources, and capacity with frontline community organizations," should help both mission-driven developers and other community-based stakeholders. Developers themselves can be helpers for other developers, for example by pooling projects from developers to be better able to access investor financing, as SunWealth does with its Solar Impact Fund. Trade associations such as the Solar Energy Industries Association (SEIA), while they are not focused particularly on low-income communities, offer training webinars to members, providing networking opportunities, and coordinate members to engage in policy advocacy.

Beyond that, community-based lenders—our next stop on the tour—can provide technical assistance (TA) to developers, and a number of them also provide working capital to help developers grow. Usually, TA work is around helping the developer structure project financing or address other concerns to make a project investable, but some lenders do provide broader capacity-building support to developers. For example, one Green Bank related a story of how they agreed to serve as the fiscal agent for a mission-driven solar developer who had gotten a small grant from a family foundation, and helped another program build its business plan for its mission to deliver energy efficiency and solar energy to low-income homeowners. However, the Green Bank reports, "no one pays us to do this work." In addition to a lack of operating funding for TA provision, lenders themselves do not always have expertise in clean energy, so are limited in the kinds of support they can provide.

Platforms for Developers—The Ultimate "Helper" Role?

Several interviewees noted that there are opportunities for standardization and efficiency that could help developers bring projects to market cheaper and faster, particularly with solar energy but potentially in other areas as well, such as efficiency retrofit installers. "There are opportunities for standardization," one mission-driven developer commented—"whether it is project Power Purchase Agreements, operating agreements, leases—across the board. That can create huge efficiencies and reduce legal and transaction costs." LIFT Solar Everywhere is one example of an initiative that is building on this opportunity to create a free toolkit for community solar program designs that solar developers (and others such as utilities and municipalities) will be able to use.

Taking that idea one step further, a major opportunity in the "helper" space would be to build platforms that make it easier for developers to put together projects, by performing certain functions for a number of developers or helping them to operate more efficiently than they could on their own. An example in this space is Amicus Solar, a cooperative that helps independent solar developers share knowledge and work together across a diverse range of areas, including pooled purchasing from suppliers, IT tools for business optimization, project management, marketing, and more. Growing and expanding these kinds of supports—both in the solar industry and for energy efficiency and other clean energy project types, and with a special focus on groups serving low-income communities—could make it much easier for mission-driven developers and installers to grow their businesses.

Community-Based Finance Providers and Lending Operating Platforms

Community stakeholder/sponsors and community-based developers need **community-based lenders** and tax credit equity financing entities who understand the community and are willing to do the kind of hands-on, small-scale lending that is difficult for mainstream banks to take on. This niche of the ecosystem is richly populated:

» Green Banks are dedicated exclusively to climate finance. They have a broader mission than serving low-income communities, but a number of them have engaged in financing projects in those communities. As of 2021 there are 21 Green Banks active in the US. According to the 2021 US Green Bank Annual Industry Report, Green Banks invested $442 million of their own capital into projects in 2020.

» Community Development Financial Institutions (CDFIs) are dedicated to delivering capital in low-income and underserved communities, but make loans for a broader variety of purposes than clean energy. There are over 1,200 certified CDFIs in the country, with over $222 billion in assets under management; these organizations include nonprofit loan funds, credit unions, community development banks, and community development venture capital funds. Many CDFIs do not currently have a clean energy lending program. However, CDFIs excel at the high-touch, risk-tolerant lending approaches that will be required to finance clean energy projects in these communities, and the field is rapidly evolving to take on clean energy lending opportunities. A survey by the Opportunity Finance Network (OFN) of 232 of its CDFI members found that in 2019, these members made $444 million in clean energy loans. OFN reports that this statistic is likely an undercount. It does not include energy efficiency measures as a part of construction lending unless the efficiency component was tracked separately, which is often not done, or other loans with positive carbon impacts—like loans to revitalize urban neighborhoods or to build transit-oriented developments. OFN's membership is concentrated among loan funds (as opposed to CDFI Banks and Credit Unions), so these data are likely most reflective of that sector of the field.

» Community Development Credit Unions (CDCUs) are also dedicated to delivering capital in low-income and underserved communities and have a broad array of loan products. While there is overlap with the CDFI field, there are 424 credit unions participating in Inclusiv, the national federation for CDCUs, that serve over 15 million members and manage $217 billion in assets. As with other CDFIs, many CDCUs do not have specific clean energy lending programs. Unfortunately, credit union regulators do not include clean energy lending in required reporting, but Inclusiv was able to identify 72 member organizations with green loans. Of these, 31 reported their dollar volume of loans, and are originating an average annual loan volume of $79 million.

» Minority-owned banks also overlap with the CDFI field but include non-CDFI banks as well that are owned by women and people of color and seek to serve low and moderate-income communities who are underserved by traditional banks. A number of other mission-oriented banks play important roles in the space, such as Amalgamated Bank, which has a particularly well-developed clean energy lending program and has partnered with both Green Banks and CDFIs. Inclusiv has captured data from 19 mission-driven banks; these institutions have reported $449 million in annual loan volume (some of which is loans to other lending entities like Green Banks and CDFIs).

» Beyond the explicitly mission-oriented space, huge numbers of credit unions (5,400 across the United States as of 2020) and community banks (4,750 across the United States with 29,000 branches as of 2019) also represent an important resource that should not be overlooked to serve LMI communities. For example, Inclusiv has identified 207 mainstream credit unions making green loans and obtained data on loan volume for 24 of them, identifying $824 million in annual loan volume. (Of this volume, $748 million was from one credit union, Technology Credit Union.)

» Some Green Banks and CDFIs are also able to channel tax credit equity to projects. As we have written about earlier, investor appetite for tax credit equity skews heavily to larger and less mission-oriented projects, creating a significant barrier to scaling equitable clean energy finance. Federal climate legislation under consideration proposes changes to the tax credit programs, including both deepening the credits for

low-income-focused projects and allowing a "direct pay" option for developers to receive this support without selling the credits to an investor, that would dramatically reshape the landscape and lower barriers.

The amounts of these investments that have gone to low-income projects varies by institution, but is highest among CDFIs, who are obliged to serve these markets as a condition of certification. In broad strokes, the principal challenge in this niche is to make it easier to operate, and sometimes to capitalize, low-income-focused clean energy financing programs. There are many organizations who know how to lend in underserved communities but who need help with certain technical aspects of clean energy, and there are also organizations who are adept at clean energy lending but who are still learning how to lend in underserved communities.

Amongst our interviewees, comments about needing help with the technical aspects of clean energy lending were mostly focused on CDFIs and CDCUs, while comments about needing help to better serve low-income communities were mostly focused on Green Banks. However, the reality is quite nuanced, and it is hard to generalize about an entire category of organizations. For example, there are Green Banks such as (but not limited to) IPC and NYCEEC who are doing impactful deals serving low-income communities, and two Green Banks—SELF in Florida and Growth Opps in Cleveland—actually *are* CDFIs. It is also important to observe that not all Green Banks have the capacity to do all types of clean energy lending; some Green Banks in fact do not have the capacity to serve as the lead lender on the project, but instead provide credit enhancements to support other lenders. Similarly, there are CDFIs and Credit Unions with deep clean energy lending expertise—VSECU Credit Union has a $100 million portfolio of consumer and commercial clean energy loans; Clean Energy Credit Union does nothing but clean energy loans, as does Bright Community Capital, an affiliate of Coastal Enterprises CDFI; Self Help Ventures Fund was a pioneer in lending to the first utility-scale solar projects in the southeast.

Nor should we view community-based lenders without clean energy technical expertise as coming to the table empty-handed: community lenders have portfolios serving hundreds of thousands of affordable housing units and small businesses, as well as tens of millions of low-income families across the country, and would be well positioned to work with these borrowers to finance clean energy needs if they could access the technical expertise.

Mainstream banks can also play important roles in delivering capital to projects, and frequently do for mainstream clean energy projects like utility-scale solar. However, many interviewees we spoke with are skeptical about the ability of large banks to deliver on capital to mission-driven projects at the deal level. "The way we do business isn't compatible," said one mission driven developer, who specifically cited issues around investment scale and bank underwriting requirements. Another developer challenged us: "show me the bank that will make sure their money will impact low-income households." A third developer was even more dismissive: "I almost always ignore the big flashy [climate] commitments from banks—its bullsh*t—people buying fully-rated bonds they would do anyway." A more natural role for mainstream banks probably is as investors in community-level lenders rather than direct lenders themselves, which is often the case with other types of community development assets as well (such as small business loans). Community-level lenders offer some level of aggregation of assets and reduce the search and underwriting costs for these banks, and community lenders' own equity or net assets in their balance sheet acts as a kind of credit enhancement as well. We spoke with several large banks who have invested (and intend to continue investing) in CDFIs and Green Banks; due to desire for larger deal sizes, we think that large banks also could make natural investors in large pools of assets assembled by capital intermediaries, which we discuss later.

In summary, the best way to describe the reality on the ground is that there is a *very* large number of organizations already on the ground who could play an impactful role, but they vary widely in the capacities they bring to the table, and almost none of them bring the "complete package." Given the complementary strengths and skills of the many players in this space, the best solution would be to find ways to knit them together more strongly. One way to do so is through organization-to-organization partnerships. For example, NYCEEC has partnered with a number of CDFI loan funds, and Inclusive Prosperity Capital (also a Green Bank) partners regularly with loan funds, credit unions, and younger Green Banks who are building their capacity. But to knit more organizations together more quickly and effectively, funders and policymakers should be thinking about how to go beyond one-off partnerships and move into building platforms that can bring capacity to many organizations at a time, which brings us to our next stop on the tour.

Clean energy finance is a technical space, which is why lending **operating platforms** can make it vastly easier for lenders to engage. Even lending for home energy efficiency, one of the simpler clean energy project types out there, requires the ability to interpret the results of an energy audit, assess whether proposed retrofit measures will result in savings, vet the quality of contractors installing retrofits, and assess the potential for the homeowner to access rebates or tax credits to help pay for the product. Loan products themselves need tweaks to work well for clean energy purposes, and for more complicated project types there can also be complex deal structuring needs. Training can help lenders gain some familiarity with the technologies and deal structures that are prevalent in the clean energy finance space, but ultimately, it is probably not a realistic goal to train thousands of lenders across the country to be clean energy experts, nor is it realistic to grow an industry of thousands of specialized lending institutions, for the very same reason. This is where operating platforms come in.

Lending operating platforms allow lenders to focus on what they do best—developing relationships with and underwriting borrowers—while simplifying other aspects of business operations. Many of the best examples come from the credit union space, where Credit Union Service Organizations or CUSOs are providing a range of financial and operational services to member credit unions, such as but not limited to IT support, regulatory compliance services, loan servicing and other lending support services, and investment services. CUSOs help member credit unions manage down the cost of operations, access specialized expertise, expand services that they can offer their members, and spread risks of developing new products and services.

While they do not present a complete lending operating platform for community-based lenders, utility companies can play important roles to facilitate the flow of community finance for clean energy, through on-bill financing as well as utility management of community solar subscriptions. For example, Craft3, a CDFI serving Washington and Oregon, has developed on-bill financing partnerships with local utilities for home energy efficiency programs serving low-income households. Similarly, the Connecticut Green Bank developed a Small Business Energy Advantage funding program, in which the bank buys loans that are financed on-bill with Eversource and National Grid. An interviewee at a CDFI felt that on-bill financing is an important tool for energy efficiency finance, since it "lets you stretch out energy efficiency terms long enough so that the investment is cash flow positive." At the same time, another interviewee noted that utilities can be a barrier as much as they are a helper: "Utilities are not super-psyched about any of this—interconnection, meter swaps, community solar billing and invoicing—all of that is the latest drag on the system. We assume in our workflow planning that the utility will screw things up and we will have to fix them. Utilities are the major obstacle to decarbonization." While we will not delve into utility policy in this paper, which has been well explored in other literature, this comment underscores the importance for policymakers to establish a utility regulatory environment that reduces institutional barriers for mission-driven clean energy work.

Inclusive Prosperity Capital's Smart-E program is the best example of a fully-developed lending operating platform in the clean energy space. Smart-E makes it easy for mission-oriented lenders such as credit unions, CDFIs, and community banks to finance home energy efficiency and renewable energy projects. The platform provides lenders with a standardized loan product design; contractor vetting, project review and quality control services; and an online project management tool to streamline workflows between lenders, contractors, and energy program providers. In this regard, Smart-E is particularly powerful because it effectively is also serving not only as a lending platform, but as a "helper" platform for residential energy efficiency and solar installers. Smart-E is currently in 3 states (CT, CO, and MI), where it serves 16 lenders and has helped over 22,000 homeowners, many of them low-income, to install efficiency upgrades and/or solar.

There are many opportunities to build lending operating platforms in additional clean energy verticals—for example, for small business efficiency and solar, various types of community solar projects including community-owned community solar, and interestingly, a thought leader in the community solar space felt that standardization of loan products and loan underwriting processes could also help community solar developers, by making it clearer to them where the bar is set. Considering their transformative potential, platform-building efforts have received insufficient attention from funders and policymakers.

Capital Intermediaries

Capital intermediary structures have the potential to help connect community-oriented clean energy lenders with investment that could make it easier for them to lend. Accessing the right kind of capital has been an enduring challenge for community development finance lenders. For non-depository institutions such as CDFIs and Green Banks, both the cost and term of capital are key concerns. For depository institutions, who are mostly financed with short-term deposits, having vehicles that provide them with different asset-liability management options, such as secondary markets, is a key concern. For any lender who is new to a particular type of lending, or who is working to reach hard-to-serve borrowers, credit enhancement also can be a key need, at least until they get comfortable with the performance of the loans.

Mainstream banks are the most common capital providers in the space now—in part, as one CDFI interviewee noted, because they can fulfill Community Reinvestment Act requirements by investing in portfolios of clean energy projects serving low-income communities. Utilities have also played a role. For example, we spoke to one CDFI that was able to launch its clean energy lending programs with a $10 million investment from a utility company, and another that has received operating support for its home energy efficiency program. Utility systems benefits charges in many states have been used to seed efficiency programs operated by utilities themselves (or in New York and Vermont by state "efficiency utilities"), which—if properly partnered with the right mission-driven actors on the ground—can reach low-income populations. State Energy Offices have also partnered with Green Banks and CDFIs to provide credit enhancements, capital, and operating funds to efficiency programs.

At the same time, interviewees we spoke with highlighted what seems to be a growing interest from investors to put their money toward climate equity impacts. In particular, one interviewee who works in corporate engagement at a CDFI funding platform has spoken with over 300 prospective corporate investors in the past year. This interviewee related that many corporate finance groups have been tasked by their senior leadership with investing in social equity and in climate, "and don't know what to do. When we ask what they are interested in, they say that they just know that they need to 'tick a box'—they are sitting on piles of cash and are willing to invest if we can present them with a product." Recently, some of the largest CDFIs have been able to raise investments directly from corporate investors for loan portfolios with positive racial and social equity impacts. Examples include Opportunity Finance Network, which raised a $100 million investment from Twitter for its Finance Justice Fund, and Local Initiatives Support Corporation, which has been successfully accessing the bond market through the issuance of "Impact notes." Other interviewees noted that carbon-neutral pledges by large corporations will drive them to reconsider how their cash is invested, as well the adoption of carbon accounting principles by large banks, who increasingly will have to consider the carbon intensity of their portfolios.

Individual investors also appear to have growing interest. We heard from socially responsible investment advisors that their investors are putting a lot of money into climate, and that interest in CDFIs and social equity impacts is growing as well. We spoke with an interviewee who is now raising investments from Donor-Advised Funds for their LMI solar portfolio, and has been placed on a platform by a major wealth advisor to do so. Lastly, the Connecticut Green Bank reports strong interest from retail investors in its recent issuance of Green Liberty Bonds. There are even opportunities in fintech—for example, Raise Green is a retail-oriented fintech fund, and Atmos Bank is an online bank using a climate-impact strategy to attract deposits.

All of this said, we did hear from interviewees who were skeptical about how much investment will materialize. One interviewee, for example, felt that non-bank and non-utility investors "just don't have that same intersection of interests other than public relations." On the other hand, another interviewee felt that a wide array of corporate investors *do* have a lasting interest, in large part because of the values of their own workforce: "they are all hiring Gen Z'ers and millennials who care about climate—they want to look modern and current."

In short, we may be on the brink of unleashing much greater investment into climate equity finance than in the past, from a broad array of investors. There are several barriers that stand in the way:

» **Scale**. Many investors in the climate space have large investment bite sizes—one green bank reported that the corporates they speak with want investments in the $25–50 million range; a multinational investment management corporation we spoke with discussed much larger minimum

deal sizes even than that, with preferred deals in the hundreds of millions of dollars. A CDFI in the clean energy space talked about working with a large bank who initially was happy to do a $7 million tax equity deal. Subsequent to that experience, however, the bank informed the CDFI that their minimum deal size had risen to $50 million.

Existing climate equity loan portfolios, whether at Green Banks, CDFIs, or other lenders, are often too small to attract much interest, particularly when investors can check the "climate" box by putting money into utility-scale solar or offshore wind. The result is, as one interviewee put it, "left to their own devices, Google and Starbucks will figure out how to deploy billions of dollars and gigawatts of power, and will end up doing a lot of Ikea rooftops just to get the dollars out the door. It's not going to be churches and affordable housing with revenues for low-income partners or minority businesses or a dedicated workforce training component." That said, the Connecticut Green Bank reports success with smaller issuances in the range of $20 million.

» **Liquidity concerns**. Prior research has documented that liquidity is a major barrier to community investing, and we heard from interviewees for this project that liquidity is a frequent concern raised by corporate investors considering climate equity investments. Note that liquidity and scale are interrelated: at a certain level of scale, investments become tradable, which alleviates liquidity concerns.

» **Risk**. "Corporates do want to get comfortable with the risk," cautioned one of our interviewees—"capital preservation is always their number one priority." For that reason, many interviewees felt, as one put it, that "credit enhancements to de-risk pooled investments would be priority number one, to address risks like development risk, nonprofit sponsor risks, technology risk for batteries, and credit risk for low-income offtakers in community solar." On the other hand, several interviewees cautioned against "credit enhancing something that doesn't need it—then you just slow down capital." Indeed, a number of LMI clean energy asset classes, such as energy efficiency loans and solar leases for low-income homeowners, have shown strong credit performance.

» **Reputational risk**. An interviewee reported that corporate investors are weary of "whitewashed" or "greenwashed" products—"the big thing for them is, 'give me an actual product that I can understand with my stakeholders, don't just give me bullsh*t.'" The interviewee continued, "Corporates are learning that the corporate offset markets are a flawed solution and don't provide the same stakeholder effect anymore." For that reason, this interviewee reports strong interest in co-investing from corporates, including investments where foundations are participating, which strengthens the "brand" of that investment opportunity.

Many interviewees we spoke with were excited about the possibility for community-based lenders to collaborate to aggregate portfolios and raise capital at scale—such as (although not necessarily limited to) creating rated bond offerings that would be available on Wall Street to a broad range of mainstream investors. Mission-driven capital intermediaries who can play this role include larger Green Banks, larger CDFIs (several of whom already function as capital intermediaries in the community development field), mission-oriented banks such as Amalgamated, and State Housing Finance Agencies.

The most efficient route to scale may be for community-based lenders to partner with an issuer who is able to aggregate similar assets across multiple states. This niche of the ecosystem is an area that will need multiple kinds of support from philanthropic partners, starting with R&D or business planning money to develop the structures and partnerships that will work best, and following through with credit enhancement and actual investment to show the way and reduce reputational risk for corporate co-investors.

Conclusion: the Importance of "Ecosystem Builders" and Three Recommendations About Where to Start

The key to building a thriving ecosystem is to connect the various sectors, roles, or niches across their boundaries. The individual niches identified in our tour represent the elements of an ecosystem, but many of them remain nascent and or disconnected from other actors in the ecosystem. Their networks may be small, siloed, or fragmented and their cultures may lack trust, and social cohesion.

When such gaps exist, key leaders within these niches need to consider the whole ecosystem and work to enhance each of its elements. These "ecosystem builders" connect, empower, and collaborate with others to build the whole system. They are system entrepreneurs, working to lift up the ecosystem helping the underserved clean energy achieve its potential. The ecosystem builders play multiple roles, including system architect, advocate, and convener. Ecosystem builders must seek opportunities for different groups within the ecosystem to come together, learn about each other's work and challenges and engage in learning how they can work together to address the challenges.

Ecosystem builders focus on building consistent, collaborative connections and engagement. They foster conversations; enlist collaborators; articulate ecosystem values; connect people across niches; and research and disseminate documentation of issues and progress. While some institutions may have a role exclusively as ecosystem builders—such as our own Carsey School Center for Impact Finance—many others can make important contributions to ecosystem-building even as they play other roles. For example, ecosystem builders may also perform work as funders, policymakers, community advocates, community finance institutions, and capital intermediaries.

Work is needed to build the whole ecosystem if we want to have many impactful and investable projects to which dollars can flow. But less that daunting mission cause us to delay our important work, we offer some thoughts of where to begin:

First, we suggest that it may make the problem more manageable to think about how to build ecosystems around specific "impact verticals" or types of clean energy projects. For example, a group of stakeholders could define a vertical they all care about as being solar and efficiency for multifamily properties; small business C&I solar; community-owned community solar; or residential home electrification. A good first step would be to convene people who care about one such arena, and work together to assess each ecosystem niche, identifying who is currently active, and how to strengthen connections and capacities. A good set of conversation questions to ask each participant in an ecosystem-building conversation would be:

» What role do you see your organization playing—what are you able to bring to the table?

» What (being as specific as you can) do you need from other players in the ecosystem in order to succeed?

» What roles aren't being filled by the people "around the table"? Who can we encourage to step forward to play these needed roles?

» What values and principles should govern how we work together?

Second, we suggest that working from "bottom to top" to build an ecosystem may make the problem more manageable. That is, first focus on how to support communities to create investable projects, then productize financing tools to fund the projects and build operating platforms for lenders, and finally to build financial structures to flow capital at scale. Our reasoning to support this order of prioritization is as follows:

» For most types of clean energy projects, it appears to us that some level of capacity is already in place in most niches, so it is viable to focus on one layer at a time.

» It feels to us that the biggest challenge we heard in our interviews—especially from community-level finance providers, who are conveniently located in the middle of the ecosystem—was about the need to create more investable deals. As we heard from one thought leader, "shovel-ready pipeline is the key." This pipeline can only be achieved by investing in the grassroots level of the ecosystem.

» Many community-level finance institutions are effectively "sitting on the sidelines" and not developing clean energy financing products. Most of these institutions develop products in reaction to expressed demand. In a recent survey by the Richmond Federal Reserve Bank, the most common reason cited by CDFIs for not engaging in solar lending is that they had not heard about a demand for solar energy in their community. While it certainly may be the case that CDFIs themselves need to learn more about the many opportunities for viable solar projects in their community, we do believe that this sector, which tends to be very grounded in the communities it serves, would respond with more innovation if more communities and developers were asking them to engage.

- We do not wish to downplay the importance of the capital intermediation function, and an expanded array of funding platforms will ultimately be needed to help clean energy projects access capital most efficiently—but that infrastructure will starve if the other levels of the ecosystem aren't built up to create investable projects.
- We sense, in conversations with funders and policymakers, that many people are focused on the capital intermediation role—in part, perhaps, because so many funders and policymakers have a background in the financial markets, and relatively few of them have worked as project developers or at the community level. But financial structuring is the final question, not the first question—and perhaps, even, the easiest question. There will be nothing to structure financing for if the rest of the ecosystem is not supported first to do its job.

We also urge funders and policymakers to support a diversity of organizations and strategies even as they seek scaled solutions. If a robust ecosystem is necessary to deliver clean energy projects to low-income and underserved communities, the corollary is that ecosystems need diversity to thrive. This is especially true in the clean energy space, where new technologies and changing market and regulatory conditions mean that not every business model currently in place is adaptive, and new adaptations may emerge that will work better. We think that this principle applies across all levels and niches of the ecosystem, even regarding the creation of different structures for financial intermediation. At the same time, it is important to make the lessons from these diverse strategies accessible to others in the field—to promote an "open source" sharing of frameworks that others can use as the basis for further innovation.

Finally, as we stand on the cusp of potentially momentous corporate and government investment into climate equity, we hope that funders and policymakers will consider how to promote funding and governance mechanisms that listen to, and are accountable to, the underserved communities that we are all charged to better serve. One broad, simple principle we would suggest is this: regardless of your organization's role or where it sits, consider how your own choices of who serves on your board and staff can help you to better connect with and understand other organizations who sit in other niches of the ecosystem, and especially how to deepen your organization's connections and accountability to players at the grassroots level of the ecosystem.

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