

Practitioners' Guide to Community Lending for a Just and Equitable Energy Transition

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I. Executive Summary

Climate change is the challenge of our time, the effects of which disproportionately impact disadvantaged and historically marginalized communities. These “frontline communities” have the least efficient homes and businesses, inadequate energy infrastructure, the oldest cars, and lowest deployment of renewable energy.

Climate change mitigation, adaptation, resilience, and environmental justice should be at the core of every lender’s mission and the backbone of every lender’s business strategy. Every lender has unique abilities, strengths, and community relationships to bring to the table, critical to a just and equitable energy transition. Community-focused lenders are particularly well-positioned to deliver equitable greenhouse gas (GHG) reduction in and for low-income and disadvantaged communities (LI/DACs), and to push beyond GHG reduction to deliver full mitigation, adaptation, resilience, and environmental justice, resulting in “co-benefits” such as an economic development, quality jobs, affordable housing, sustainable food systems, and more.

To be successful at financing these types of projects and initiatives, lenders need market knowledge, a lending track record, capital, community knowledge and relationships, a pipeline in key market segments such as small business, community service, housing to individuals, housing to organizations, consumer. While some lenders may have all these strengths “in house,” we believe that the most sustainable and impactful investment strategies incorporate coordination, cooperation, and collaboration with other organizations *across the project delivery and financing ecosystem*. Such collaboration is particularly valuable for emerging lenders as they develop capacity. Through collaborations, lenders can ensure that all necessary conditions are in place and overcome the challenges and barriers facing them.

There are different types of institutions that serve specific communities, and all are needed. Community Development Financial Institutions (CDFIs) are lenders with a mission to provide fair, responsible financing to rural, urban, Native, and other communities that mainstream finance does not traditionally reach (Opportunity Finance Network [OFN], 2023). Community development credit unions (CDCUs) have a mission to serve low- and moderate-income people and communities that specialize in serving populations with limited access to safe financial services (Opportunity Finance Network [OFN], 2023). Minority Depository Institutions (MDIs) are regulated depository institutions with either (a) majority ownership by minority individuals or (b) majority of the board of directors is minority and the community served is predominantly minority (U.S. Federal Deposit Insurance Corporation [FDIC], 2023). Green Banks are formed to address one or more sustainability objectives, focused on specific markets (Coalition for Green Capital [CGC], 2023).

Our pitch to CDFIs, CDCUs, MDIs, and other community lenders that have not integrated climate mitigation, adaptation, resilience, and environmental justice into their work: business as usual is no longer enough. GHG reduction—i.e., mitigation—is a responsibility that cannot be set aside during value engineering. Risk mitigation and quality assurance—i.e., adaptation—again, is not something that should be considered optional. While more complex, resilience and environmental justice should be goals that community lenders center in their work. These goals—climate change mitigation, adaptation, resilience, and environmental justice—are intertwined with the traditional mission of community development. To meet goals for economic development, quality affordable housing, and healthy,

resilient communities, community development lenders **must** address pollution, the risks and results of severe weather events, unstable and expensive electricity, and the changing economy.

Our pitch to Green Banks and other green lenders that focus on financing the clean energy transition but have not already centered frontline communities and equity in their work: to achieve the deep levels of GHG reduction you seek, you **must** reach these communities, the communities with the least efficient homes and businesses, inadequate energy infrastructure, the oldest cars, and lowest deployment of renewable energy. While green lenders have GHG reduction in their DNA, they too should push beyond GHG reduction to deliver full mitigation, adaptation, resilience, and environmental justice.

This guide is a collection of key resources and references that provides an entry point to clean energy finance for community lending practitioners and to community development finance for green lenders. These resources detail: opportunities and challenges facing communities, different lender types, lender capital sources, community finance markets, GHG reduction approaches, investment types by technology, financing challenges and strategies, and systemwide opportunities to accelerate a just and equitable energy transition. Every lender has unique abilities, strengths, and relationships to bring to the table, critical to an equity-centered approach to GHG reduction. Our hope is to inspire the lenders best positioned to power a just and equitable transition to clean energy to double down on that work: Green Banks, CDFIs, CDCUs, MDIs, and other lenders with the requisite expertise and necessary community trust and relationships. While intended primarily for those lenders, we hope that funders, investors, policymakers, and other ecosystem players actively engaged in the work of community development and GHG reduction will find this paper useful. Wherever a lender is in their journey, this paper is designed to help them get started or further along the path toward financing just and equitable transition, through strategic collaboration.

II. Introduction

This report covers many of the topics most critical for lenders that wish to begin—or to accelerate—their efforts to support a just and equitable energy transition. Each section of the report is designed to review key topics to support a comprehensive approach to financing this transition.

First, we explore the value proposition for investing in climate change mitigation, adaptation, resilience, and environmental justice for low- and middle- income (up to 200% of the Federal Poverty Level) and disadvantaged communities—particularly Black, Indigenous, People of Color, and other disproportionately impacted communities—the frontline communities “who are experiencing climate change first and worst” (Just Solutions, 2023). We describe important pre-existing conditions for frontline communities, the disparate burdens and barriers that call us to action, and we examine why both “green” lenders and community finance institutions should invest in a just and equitable transition. Further, we define key terms and describe the social determinants of health (SDOH), a framework that can help lenders analyze and track the interconnected threats and opportunities in their communities. **For a general introduction to concepts related to climate change and impacted communities, read [Section III](#).**

Then, we evaluate the different lender types best positioned to power a just and equitable transition, describing and differentiating their organizational structures, capitalization strategies, purposes, types of programs and products, regulators, and clients. We also examine the larger pools of capital that can fund these community lenders. The enormous size of these capital pools suggests there is no shortage of capital, although barriers exist in deploying this capital at a community level, as discussed in this paper. **For an overview of community lenders and capital well suited to finance climate-related investments, read [Section IV](#) and [Section V](#).**

Next, we introduce the different market segments using the typology developed by Opportunity Finance Network (OFN) and used in its annual “Side by Side” member analysis (OFN, 2021). This methodology generally aligns with the typology used by the U.S. Department of the Treasury’s CDFI Fund and by AERIS, an independent firm that provides due diligence and rating reports on CDFIs and other investors. **For a summary of potential markets and demand for climate-related financing, read [Section VI](#).**

Having reviewed the challenges facing communities, the capital providers best positioned to help finance solutions to these challenges, and the different market segments that seek funding, we answer the question, *what’s a lender to do?* We describe a widely shared conceptual framework around the types of climate-related investments and suggest a path for getting started toward equitable GHG reduction or doubling down as the case may be.

Next, we dig more deeply into the specific clean energy businesses, technologies, and investments that yield GHG reduction as well as community co-benefits such as economic development, better health outcomes, safer housing, and resilience. The discussion focuses on building energy efficiency and decarbonization, renewable energy, storage and grid solutions, high-performance buildings, and low-emissions transportation.

For these types of investments, we then describe the necessary conditions for successful investments in climate change mitigation, adaptation, resilience, and environmental justice, particularly in and for frontline communities. Then, we examine financing challenges and selected strategies for overcoming

them. In this review, we examine different types of debt financing that are likely to play a key role in climate change mitigation, adaptation, resilience, and environmental justice. **For an outline of potential climate financing strategies, pre-conditions, and challenges, read [Section VII](#), [Section VIII](#), and [Section IX](#).**

Finally, we identify areas of opportunity for achieving a just and equitable transition and call lenders to action. Among these opportunities we highlight eight different types of financing initiatives to increase collaboration, bringing together Green Banks, CDFIs, CUs, MDIs, and others. We hope to make the case that the most sustainable and impactful play for decarbonization requires coordination, cooperation, and collaboration with other organizations across the project delivery and financing ecosystem. **For a summary of considerations and examples of integrating equity into climate-related finance, read [Section X](#).**

III. Pre-Existing Conditions for Frontline Communities and the Value Proposition of Integrating Community Development, Equity, and the Fight Against Climate Change

“We are not all in the same boat. We are all in the same storm. Some are on super-yachts. Some have just one oar.” (Barr, 2020)

In this section, we explore the value proposition for investing in climate change mitigation, adaptation, resilience, and environmental justice for low-income and disadvantaged communities who are the hardest hit by severe weather events and the changing economy, and the least able to recover and respond. These are the frontline communities, the Black, Indigenous, and People of Color, low- and middle-income (up to 200% of the Federal Poverty Level), and other disproportionately impacted communities who are experiencing climate change “first and worst” (Just Solutions, 2023).

Pragmatically, to achieve the necessary deep levels of GHG reduction, we **must** reach the communities with the least efficient homes and businesses, inadequate energy infrastructure, the oldest cars, and lowest deployment of renewable energy. Further, equity and justice demand investment in an equitable transition to a clean energy-based economy. The communities with the highest rates of COVID and asthma, lowest rates of educational achievement, highest unemployment, and lowest incomes are also the communities with the oldest building stock, lowest rates of renewable energy deployment, and highest rates of destruction from severe weather events. Moreover, many of these communities who are most at risk from climate change contributed the least to causing it (U.S. Federal Emergency Management Agency [FEMA], 2023).

A. Key Definitions

First, let’s define our terms. People sometimes use ‘climate change’ and ‘global warming’ as interchangeable terms for describing the threat—but they mean different things.

Climate change refers to “[c]hanges in average weather conditions that persist over multiple decades or longer. Climate change encompasses both increases and decreases in temperature,

as well as shifts in precipitation, changing risk of certain types of severe weather events, and changes to other features of the climate system” (U.S. Global Change Research Program, 2023).

Global warming is a narrower term that means the “observed increase in average temperature near the Earth’s surface and in the lowest layer of the atmosphere. In common usage, ‘global warming’ often refers to the warming that has occurred as a result of increased emissions of greenhouse gases from human activities. Global warming is a type of climate change; it can also lead to other changes in climate conditions, such as changes in precipitation patterns” (U.S. Global Change Research Program, 2023).

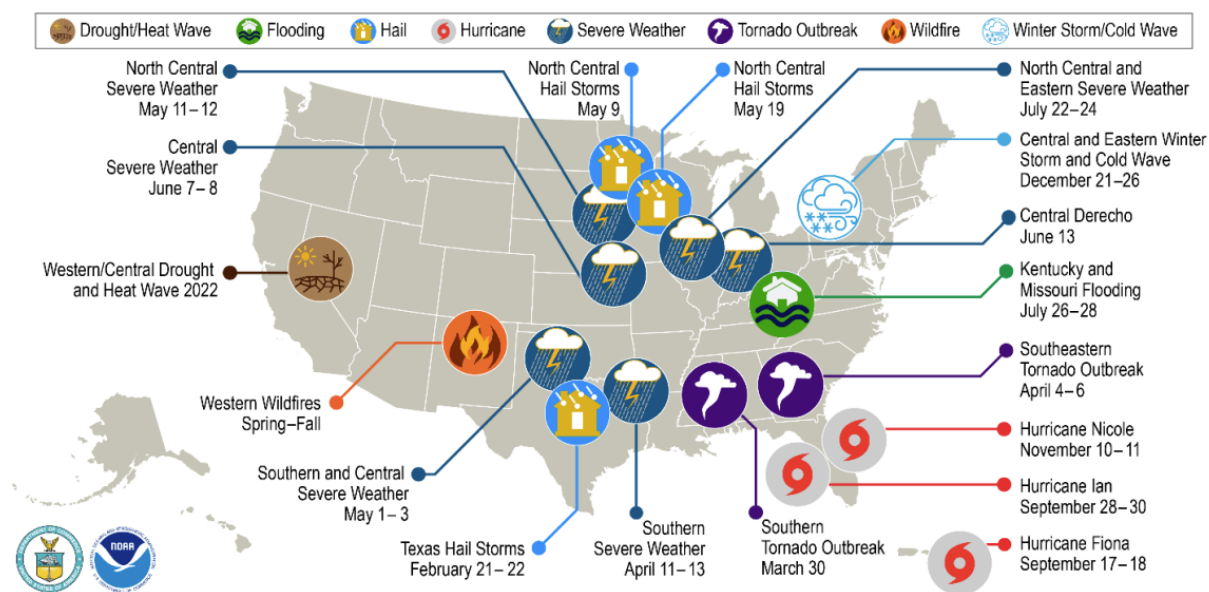
Faced with the impacts of global warming and climate change, individuals and organizations can act and react in several ways. Below are four objectives, each with an example of a typical strategy:

- **Mitigation** is “[m]easures to reduce the amount and speed of future climate change by reducing emissions of heat-trapping gases or removing carbon dioxide from the atmosphere” (U.S. Global Change Research Program, 2023). Strategies that reduce energy usage in a home such as better insulation and newer, energy-efficient appliances are examples of mitigation.
- **Adaptation** is “[a]djustment in natural or human systems to a new or changing environment that exploits beneficial opportunities or moderates negative effects” (U.S. Global Change Research Program, 2023). For example, people adapt to increased numbers and strength of storms by fortifying their homes with windows rated safe for high winds and hurricane straps to hold on their roofs.
- **Resilience** is “[a] capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment” (U.S. Global Change Research Program, 2023). Resilience strategies include those to ensure uninterrupted essential services during or after climate events such as floods, hurricanes, or wildfires. For example, the [CHARGE Partnership](#) is working to make Federally Qualified Health Centers resilient through the addition of solar and energy storage.
- **Environmental justice** is “[t]he fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies” (U.S. Global Change Research Program, 2023). Increasingly considered an effective place-based action for creating strong and livable communities, **equitable development** is an approach for meeting the needs of underserved communities through policies and programs that reduce disparities while fostering places that are healthy and vibrant. (U.S. Environmental Protection Agency [EPA], 2023). For example, the largest community of African American professionals working in the solar photovoltaic (PV) space, Black Owners of Solar Services (BOSS), works to combine and leverage its members’ collective power to lead actionable solutions for sustained access to equitable opportunities in clean energy production, distribution and storage for Black-owned businesses (Black Owners of Solar Services, 2023).

B. Chronic Stresses and Acute Shocks from Climate Change

It's not just your perception—from extreme heat, drought, and wildfires to more severe coastal storms and inland flooding, we are being challenged by more frequent, severe, widespread, and costly disasters (U.S. Federal Emergency Management Agency [FEMA], 2023). According to FEMA, within each of the last five years there was an average of 17.8 “billion-dollar disasters,” disasters in which damages reached at least 1 billion dollars, compared to an average of 7.9 such disasters annually from 1980 to 2022, taking into account inflation adjustments (U.S. Federal Emergency Management Agency [FEMA], 2023).

Figure 1: U.S. 2022 Billion-Dollar Weather and Climate Disasters (U.S. Federal Emergency Management Agency [FEMA], 2023).



This map denotes the approximate location for each of the 18 separate billion-dollar weather and climate disasters that impacted the United States in 2022.

In addition to acute shocks such as hurricanes and wildfires, global warming and climate change can cause and exacerbate chronic stresses. For example, the Gulf of Maine is warming faster than almost anywhere on earth, putting its ecosystem—including its famous lobsters—at risk, as well as all of the fishermen and industries built around that ecosystem (Rosenthal & Ambrose, 2022).

C. Social Determinants of Health Framework

Done thoughtfully, investments in climate change mitigation, adaptation, resilience, and environmental justice for low-income and disadvantaged communities pay off in improved health outcomes, quality of life, and economic development. The framework of the social determinants of health (SDOH) is a helpful way to make sense of the interconnected burdens and opportunities in frontline communities, including the impacts of climate change and strategies for mitigation, adaptation, and resilience. Using a framework like the SDOH can help lenders ensure maximum impact from their investments. The SDOH are “the conditions in the environments where people are born, live, learn, work, play, worship, and age

that affect a wide range of health, functioning, and quality-of-life outcomes and risks” (U.S. Department of Health and Human Services [DHHS], 2023). According to the World Health Organization, the SDOH include the wider set of forces and systems that shape conditions of daily life, such as economic policies and systems, development agendas, social norms, social policies, and political systems (World Health Organization, 2023). The SDOH are shown in the figure below.

The SDOH really matter. In fact, research shows that the SDOH can be more important influences on health outcomes than health care or lifestyle choices (World Health Organization, 2023). According to numerous studies, the SDOH account for 30-55% of health outcomes (World Health Organization, 2023). This is good news for community development lenders; their investments in safe, decent, affordable housing; in quality jobs; and healthy food systems and food security pay dividends in health and quality of life. [Locus](#), a holding company of two CDFIs, has adopted the SDOH “as a framework for thinking about the complex interactions between our focus areas—like housing, health, and climate—as well as the role of community reinvestment in promoting equitable development in Virginia.” (Locus, 2023).

Figure 2: Social Determinants of Health (U.S. Department of Health and Human Services [DHHS], 2023)



Understanding the critical relationship between energy efficiency and indoor air quality, the U.S. Department of Building Technologies Office, the US Environmental Protection Agency (EPA), and the US Department of Education launched the interagency effort Efficient and Healthy Schools Campaign in 2021 to recognize and provide technical assistance to school districts that seek to implement high-impact air quality and efficiency improvements in their facilities (Office of Efficiency & Renewable Energy, Department of Energy, 2023). Investments in facilities’ HVAC systems can address the danger of airborne viruses such as COVID, reduce asthma, and save energy. Moreover, depending on the process used for such investments, school construction can create quality jobs and further equity. The SDOH framework can help organizations “connect the dots”—to analyze and track these types of interconnected and overlapping direct impacts and co-benefits.

The table below lists the SDOH, identifies key issues, and highlights additional important connections between the SDOH and climate issues.

Table 1: Social Determinants of Health, Key Issues, and Climate Connections

Social Determinants of Health	Key Issues	Examples of Climate Connections
Education Access and Quality	Language and literacy, early childhood development and education, high school graduation, and enrollment in higher education (U.S. DHHS, 2023)	<ul style="list-style-type: none"> • Climate and clean energy literacy • Green workforce development
Economic Stability	Employment, food insecurity, housing instability, and poverty (U.S. DHHS, 2023)	<ul style="list-style-type: none"> • Electricity costs • Insurance costs • Macro-economic effects • Green business formation
Health Care Access and Quality	Access to health services such as hospitals, access to primary care, and health literacy (U.S. DHHS, 2023)	<ul style="list-style-type: none"> • Injury and disease • Asthma and other respiratory health • Cardiovascular health • Stress and mental health
Neighborhood and Built Environment	Environmental conditions, quality of housing, crime and violence, and access to healthy foods (U.S. DHHS, 2023)	<ul style="list-style-type: none"> • Age and condition of the building stock • Stability of the electric grid • Renewable energy uptake • EV and other green transportation uptake • Food production and distribution
Social and Community Context	Civic participation, discrimination, incarceration, and social cohesion (U.S. DHHS, 2023)	<ul style="list-style-type: none"> • Regulatory barriers • Redlining in infrastructure development

IV. Lenders Well Positioned to Power a Just and Equitable Transition

In this section, we describe the different types of community lenders well positioned to power a just and equitable transition, explaining their structure, regulation, markets, funding sources and other characteristics. For ease of reference, we summarize the key characteristics in a chart (see [Appendix A](#)).

What is needed for a lender to be well positioned? To be successful at financing projects and initiatives that support green economic development, lenders need financing and market knowledge, lending track record, capital, community knowledge and relationships, pipeline in key market segments such as small business, community service, housing to individuals, housing to organizations, consumer, and more.

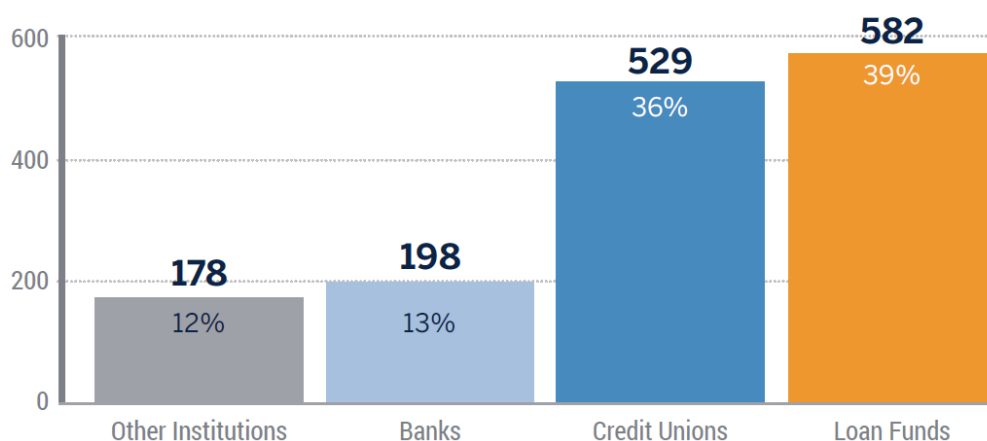
A. Community Development Financial Institutions (CDFIs)

“CDFIs, which include banks, credit unions, and loan funds, play such an important part in our financial services ecosystem because they serve people and places the sector hasn’t traditionally served well”
Janet Yellen, U.S. Secretary of the Treasury (Yellen, 2021).

Since its establishment in 1994, the U.S. Treasury’s Community Development Financial Institutions Fund (CDFI Fund) has been certifying as CDFIs specialized organizations that provide financial services to low-income communities and to people who lack access to credit (CDFI Fund, 2023). CDFIs are non-governmental financing entities and include both regulated institutions like community development banks and credit unions as well as non-regulated institutions like loan funds and venture capital funds (CDFI Fund, 2023). To obtain and maintain certification, CDFIs must have a primary mission of promoting community development; provide development services in conjunction with financing activities; direct at least 60% of their investments to qualified areas or populations (“Target Markets”) based on poverty, income, unemployment, and population decline; and maintain accountability to their defined Target Market (CDFI Fund, 2023). Note, the CDFI Fund is in the process of revising its certification requirements and Target Market methodology.

Nicknamed the *capillaries of the financial system*, CDFIs are a mature network of 1,487 certified community development lenders distributed across the US that has experienced rapid growth in the last five years (Scott, Recto, & Kivell, 2023). The majority by number are credit unions or loan funds (Scott, Recto, & Kivell, 2023). As of Q1 2023, of the 1,487 certified CDFIs, 582 were loan funds, 529 were credit unions, and 198 were banks. Of the 178 “other” CDFIs shown in the chart below, 162 were CDFI bank holding companies (BHCs).

Figure 3: Number of certified CDFIs as of Q1 2023 (Scott, Recto, & Kivell, 2023).

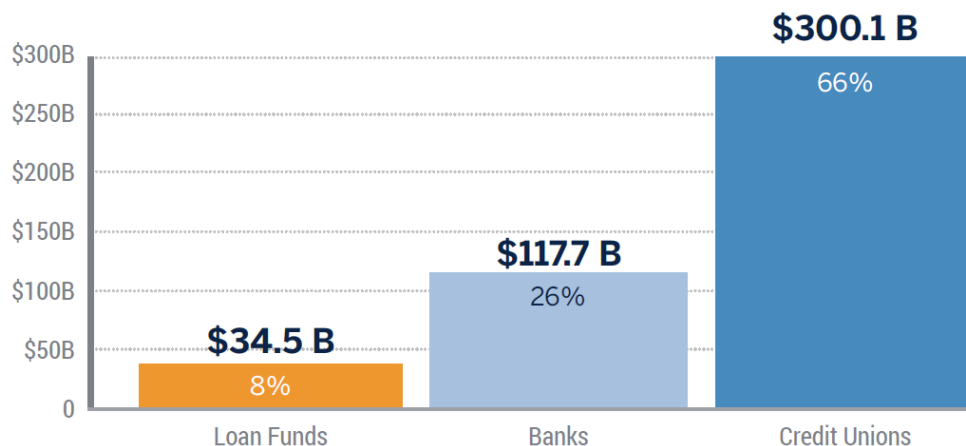


Source: Authors’ calculations. Data from CDFI Fund

As the following chart shows, certified CDFIs are estimated to collectively hold at least \$452 billion in assets with credit unions holding the majority, which is very likely an underestimate because the most current data is based on 2020 financials and does not include all the funding that has flowed to CDFIs

since (Scott, Recto, & Kivell, 2023). The top 10 CDFIs hold \$79.6 billion in assets, with Suncoast Credit Union in Tampa, FL holding the top spot at \$16.9 billion as of Q1 2023 (Scott, Recto, & Kivell, 2023). Also not included in the chart below are venture capital funds.

Figure 4: Assets by CDFI type, in billions (Scott, Recto, & Kivell, 2023).



Source: Authors' calculations. Data from CDFI Fund. Q12023 call reports, 2020 Form 990s.

Certified CDFIs are eligible for CDFI Fund capital and operating grants. Further, conventional banks can get credit toward their Community Reinvestment Act (CRA) requirements for certain investments in CDFIs. Certification has become a positive signal to non-certified banks and impact investors, and many have adopted certification as a prerequisite for grants and investments.

In addition, many CDFIs provide financial education and business coaching, and advocate for policies that benefit the underserved communities or historically disadvantaged they serve. These activities also help stimulate lending pipeline. CDFIs regularly collaborate with other lenders and funders, participating in or referring deals, and leveraging public and philanthropic guarantees, credit enhancements, and tax credits.

A very small percentage of CDFIs have investment ratings. As of May 2023, thirteen CDFIs have issuer credit ratings from Standard & Poor's Global Ratings (S&P), including five within the "AA" category and eight in the "A" category (Balboni, Keefe, & Smukowski, 2023). Additionally, 82 CDFI loan funds are rated by AERIS, a nonprofit organization that provides CDFI ratings and performance data, other data services, and impact management assessments (AERIS, 2023).

Though the size and sophistication of individual CDFIs varies greatly, as an industry, CDFIs are well positioned to power a just and equitable energy transition. The CDFI industry has financing and technical expertise, a successful almost 30-year lending track record, billions of dollars in assets, deep community knowledge and relationships in rural, suburban, and urban areas nationwide, with robust pipeline in key market segments.

The Opportunity Finance Network (OFN) is a major industry association with over 400 CDFI members—primarily unregulated entities (loan funds)—and a network of numerous allies and over 30 years of experience providing advocacy, technical assistance, and capital to CDFIs. These OFN members have

provided over \$100 billion in cumulative financing from inception, with a loss rate of less than 1%. The OFN member financing has helped support more than 696,000 businesses and microenterprises, 2.6 million jobs, 2.3 million housing units, and 13,600 community facilities (Smith, 2023).

As of 12/31/21, OFN members had more than \$42 billion total assets under management (OFN, 2021). In 2021, OFN members deployed \$9.2 billion to borrowers across the country, 83% of whom identified as low-income, low-wealth, or historically disinvested and 61% identified as people of color (OFN, 2021). Generally, CDFIs leverage their capital on an 8:1 basis (Opportunity Finance Network [OFN], 2023).

OFN defines the market segments of its members as: small business, microenterprise, commercial real estate, community service, housing to individuals, housing to organizations, consumer, and intermediary. While some CDFIs specialize in just one market segment, many offer products in multiple market segments, particularly larger CDFIs. Two respective examples are: 1) [Working Solutions](#) in Northern California which is focused on microenterprise loans and 2) [Reinvestment Fund](#) which provides financing in clean commercial real estate, education, health and food systems, housing, and clean energy to borrowers across the country.

As of fall 2022, approximately 55% of OFN's members offered green financing products of one sort or another.

B. Community Development Credit Unions and Cooperatives

Like banks, credit unions accept deposits, make loans, and provide a wide array of other financial services and products. However, the organizational and governance structure of credit unions is very different than banks. Credit unions are not-for-profit, cooperative, membership organizations whose members share a common bond, known as the "field of membership" (MyCreditUnion.gov, 2023). Each credit union defines its own "field of membership" which can include a common employer, geographic area, or membership in a group or organization such as a place of worship, school, labor union or homeowners' association (MyCreditUnion.gov, 2023). Credit unions are owned and controlled by their members, who elect a volunteer board of directors to manage the credit union (MyCreditUnion.gov, 2023).

Credit unions can be federally or state chartered. Federal credit unions are chartered and regulated by the National Credit Union Administration (NCUA), an independent federal agency (National Credit Union Association, 2023). NCUA also insures deposits at federally insured credit unions and protects the members who own credit unions. State credit unions are organized and chartered under the laws of each state. According to NCUA, as of March 31, 2023, there were 4,712 federally insured credit unions with 136.6 million members; of these, 2,950 were federal credit unions and 1,762 were federally insured, state-chartered credit unions (National Credit Union Administration, 2023). Total assets in federally insured credit unions rose to \$2.21 trillion as of the first quarter of 2023 (National Credit Union Administration, 2023).

A community development credit union or CDCU is a credit union with a mission of serving low- and moderate-income people and communities that specializes in serving populations with limited access to safe financial services (Inclusiv, 2023). Most CDCUs in Puerto Rico are *Cooperativas de Ahorro y Crédito*, (Savings and Loan Cooperatives) or *cooperativas*, and are regulated by the *Corporación Pública para la Supervisión y Seguro de Cooperativas de Puerto Rico* or COSSEC. Collectively, *cooperativas* have more than \$12 billion in community-owned assets, more than 1.1 million member-owners (roughly one-third of

Puerto Rico's population), and brick-and-mortar presences in 75 of the 78 municipalities on the island (Arabshahi, 2023). Inclusiv is a certified CDFI and intermediary that provides capital, makes connections, builds capacity, develops innovative products and services, and advocates for member CDCUs (Inclusiv, 2023). Inclusiv's almost 500 member CDCUs serve close to 20 million residents of low-income urban, rural and reservation-based communities across the U.S. and hold over \$255 billion in community-controlled assets (Inclusiv, 2023). CDCUs represent more than a third of the CDFI industry (CDFI Fund, 2022).

Credit unions are playing an increasingly important role in green lending. According to Inclusiv, 338 credit unions offer energy-efficiency, renewable energy, and other green financing, and another 75 credit unions are actively developing new green loan programs (Inclusiv, 2023). Of these green lending credit unions, 59 CDCUs have reported investing a combined total of over \$1 billion in green projects over the last five years (Inclusiv, 2023). One of these, *Cooperativa Jesús Obrero*, has spent the past several years leading in solar finance in Puerto Rico. They are a CDFI and serve 12,500 local residents on the island. The *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. The [Self-Help](#) family of CDFI entities which include the North Carolina-chartered Self-Help Credit Union and the federally-chartered Self-Help Federal Credit Union, as well as the nonprofit Self-Help Ventures Fund, has invested \$420 million in commercial loans that support green lending (including renewable energy, energy efficiency, and green businesses and non-profits), \$42 million in home energy efficiency improvement loan purchases repaid via homeowners' utility bills, and \$6.9 million in Paycheck Protection Program forgivable loans to 63 environmental organizations (Self-Help Credit Union, 2023). The [Clean Energy Credit Union](#) is dedicated to financing the clean energy movement.

By design, credit unions are deeply connected to their communities, the members who they serve and who govern them. These relationships—as well as the significant deposit base, long and diverse lending track record, and robust pipeline in key market segments—make community development credit unions potential powerhouses to help drive a just and equitable energy transition.

C. Community Development Banks

The Community Development Bankers Association (CDBA) is the national trade association of Federal Deposit Insurance Corporation insured (FDIC) banks that are certified CDFIs. The CDBA has a 23-year track record as the sector's lead policy advocacy organization and provider of training, technical assistance and capacity building programming (Community Development Bankers Association, 2023).

Collectively known as “community development” banks, CDBA members devote at least 60% of their total lending, services, and other activities to benefit low-income communities. In practice, this percentage is frequently higher: the CDFI Fund's 2020 Annual Certification Report shows that the “mean percentage of total portfolio count” directed to bank CDFI “target markets” was 81% (CDFI Fund, 2021). Many CDBA members are also Minority Depository Institutions (MDIs), which are discussed later in this report. In addition, CDBA represents a growing cadre of mission-focused banks specifically focused on environmental finance, such as Amalgamated Bank. All CDBA member banks maintain multifaceted mechanisms for community engagement that are comprehensive, frequent, and accessible to ensure their offerings are tailored to community priorities. Further, as regulated financial institutions, community development banks have powerful leverage capacity via access to deposits, private financial

markets, and Federal liquidity sources. Community development banks have access to Federal Deposit Insurance, which enables them to leverage (on average), \$8 in deposits for each \$1 in equity capital. These deposits, in turn, are used to support lending – including clean finance.

As of June 30, 2023, CDFI banks had \$119.3 billion in total assets and \$78.9 billion in loans outstanding (Jacokes, 2023). Each bank has a unique mix of business lines and products, but their collective portfolios are comprised of 32% commercial and nonprofit real estate, 24% single family housing, 12% business loans, 11% construction & land development loans, 9% multifamily housing, 7% farm and agriculture production loans, 4% consumer loans, and 1% other loans (Jacokes, 2023). Urban banks typically focus on business, commercial real estate, and multifamily loans, while banks serving rural communities engage in a broad range of commercial and consumer loans.

While the exact share of capital allocated by community development banks to clean energy financing is unknown, as market driven lenders, most CDFI banks report that their institutions have financed green projects. CDBA members have been responding to growing demand over the past 15 years for solar and construction or renovation of buildings that incorporate energy saving technologies and/or sustainable materials. A 2023 CDBA survey found that 73% of those surveyed have a clean financing program and/or loans in their portfolio that are eligible projects under the EPA's Greenhouse Gas Reduction Fund (GGRF), while 22% are interested in expanding their offerings to include these products (Jacokes, 2023). Among clean financing projects, banks have made loans for energy generation and storage, electric vehicle financing (including farm equipment) or vehicle charging stations, and loans benefiting built-environment projects.

Community development banks are in a strong position to leverage private capital to provide financial and technical assistance to projects achieving environmental sustainability goals with specific benefits for low-income and disadvantaged communities.

D. Minority Depository Institutions

The FDIC defines “Minority Depository Institution” as any federally insured depository institution where (1) 51% or more of the voting stock is owned by minority individuals who are US citizens or permanent legal US residents or (2) the institution serves a predominantly minority community and its Board of Directors is majority minority (U.S. Federal Deposit Insurance Corporation [FDIC], 2023). “Minority” individuals include “Black American, Asian American, Hispanic American, or Native American” (U.S. Federal Deposit Insurance Corporation [FDIC], 2023). As of Q1 2023, there were 148 MDI banks across over 34 states, the District of Columbia, Puerto Rico, and Guam, making up approximately 3% of all banks; and over 500 MDI credit unions across over 30 states, the District of Columbia, Puerto Rico, and Guam, making up 10% of all credit unions (Jacokes, 2023).

Of the 198 CDFI certified banks, 32 (16%) are MDIs, with approximately 22% of MDI banks certified as CDFIs. The National Bankers Association (NBA) is the leading trade association for the country's bank MDIs. Their members include Black, Hispanic, Asian, Pacific Islander, Native American, and women-owned and operated banks across the country that are on the front lines of closing the racial wealth gap by providing access to credit to low- and moderate-income (LMI), minority, and underserved communities. Many of their members are also CDFIs.

E. Green Banks

Green Banks are non-depository financial intermediaries formed to address one or more sustainability objectives—usually, but not exclusively climate change mitigation—focused on specific markets, typically in a defined geographic area (e.g., state, county, or city). These institutions may be constituted as a state or local government agency, a non-profit affiliated with state or local government, or an independent non-profit. Green Banks are often capitalized with government funding, supplemented by private sector capital (e.g., loans), and in the case of non-profit Green Banks, augmented by philanthropic support. As such, Green Banks typically constitute a form of either public-private partnership or public-private-philanthropic partnership. The degree to which Green Banks have received initial or ongoing public support varies significantly between Green Banks. As they do not take customer deposits, Green Banks are typically unregulated institutions, with institutional oversight from either a government agency and/or an independent Board of Directors.

A nonprofit with a mission to halt climate change by accelerating investment in clean energy technologies, the [Coalition for Green Capital](#) (CGC) advocates for, creates, and implements “Green Bank” finance institutions (CGC, 2023). According to CGC, Green Banks are “mission-driven institutions that use innovative financing to accelerate the transition to clean energy and fight climate change” (Coalition for Green Capital [CGC], 2023). The CGC explains that “[b]eing mission-driven means that Green Banks care about deploying clean energy rather than maximizing profit” (Coalition for Green Capital [CGC], 2023). Addressing climate change is the priority—in CGC’s words, “[a]ll Green Banks have the mission to address climate change, though many also have additional objectives such as improving resiliency or serving low-income communities” (Coalition for Green Capital [CGC], 2023).

Part of CGC, the American Green Bank Consortium (AGBC) is a membership organization for Green Banks, capital providers, developers, and other clean energy supporters (CGC, 2023). In CGC’s 2022 Annual Report, published in March 2023, it states that the AGBC membership—principally Green Banks—comprised “39 clean energy investors and lenders, both active and not yet funded entities, including local and state Green Banks, CDFIs, credit unions, state-sponsored agencies, and other nonprofit organizations.” (CGC, 2023). The current number of Green Banks is higher, as many jurisdictions have recently formed, or are currently forming, Green Banks. In 2022, active Green Banks invested \$1.51 billion in clean energy projects (CGC, 2023).

The largest Green Bank is the New York Green Bank, established by the state in 2013, with total assets of \$1.04 billion as of March 31, 2023 (NY Green Bank, 2023). Green Banks often co-invest and catalyze other institutions to provide capital through not only their balance sheet lending, but through establishing financing programs for third-party lenders, providing credit enhancement for other capital providers, and other means. As a result, CGC estimated its Green Bank network has caused over \$14.8 billion in investment since 2011 (CGC, 2023).

Early Green Banks include [Connecticut Green Bank](#) (a quasi-public agency, established in 2011), [Solar Energy Loan Fund](#) (SELF) in Florida (created in 2010, both as a Green Bank and nonprofit CDFI), [Michigan Saves](#) (a nonprofit, created in 2009), and [NYCEEC](#) (established in 2010, originally a component unit of New York City government and now a nonprofit). Green Banks vary in their focus, by technology, market segment, loan size, borrower geography, or other characteristics. There are several jurisdictions that have multiple Green Banks to support different areas of focus. Green Banks do not normally maintain separate credit ratings, although Green Banks constituted as government agencies may have an

expressed or implied credit rating equal to that of their state or local government for certain of their financings that benefit from government support.

By definition and design, Green Banks specialize in GHG reduction technologies and financial structures. A relatively new industry, the number, size, and capacity of Green Banks are growing. Some Green Banks, including the early Green Banks mentioned above, are mature, sophisticated lenders with deep relationships, strong track records, and robust pipelines. Other Green Banks have been formed recently to serve certain financing markets gaps in a specified geographic region and are at an early stage of development. Their specialized market knowledge and focus on green lending—in addition to their ability to mobilize other capital providers—make Green Banks a critical part of the ecosystem in financing a just and equitable clean energy transition in communities.

See [Appendix A](#) for a chart summarizing mission-driven lender types (including CDFI loan funds, CDFI credit unions, CDFI banks, CDFI venture capital funds, Green Banks, and quasi- and public institutions) and their characteristics.



[NYCEEC-SunLight General Capital solar project](#) for a Washington, DC house of worship. Photo credit: SunLight General Capital

V. Lender Capitalization

Having reviewed key types of community-facing lenders, this section focuses on typical sources of capital for those lenders.

A. Commercial Banks

Commercial banks lend directly to some community projects—especially in the case of larger projects—but they also fund projects indirectly, by financing the lenders that originate and service transactions in the community in support of climate mitigation, adaptation, resilience, and environmental justice. Commercial banks provide capital to CDFIs and other community-facing intermediaries in support of meeting bank Community Reinvestment Act (CRA) obligations. In short, the CRA, enacted in 1977, requires banking regulators to encourage depository institutions to help meet the credit needs of the communities in which they do business, including low- and moderate- income neighborhoods (Board of Governors of the Federal Reserve System, 2023). Based on an analysis of AERIS-rated loan funds, among mid-sized CDFIs, which was the largest group in the analysis, debt from banks made up near half of total debt (AERIS, 2023).

B. Foundations

In 2021, it was estimated that philanthropic foundations worldwide contributed between \$7.5 billion to \$12.5 billion to climate change mitigation (Helene Desanlis, 2022). Many nonprofit community lenders, including Green Banks and CDFIs, benefit from foundation support for their operations. By law, foundations must give away—or spend on operations—5% or more of their endowment each year.

Foundations may choose to stretch their donations through making Program Related Investments (PRIs) to charitable organizations, an investment mechanism that returns the investment to the foundation, with an expected below-market return (which in turn supports further charitable giving). PRIs must meet Internal Revenue Service requirements including alignment with the foundation's activities. For example, a foundation concerned with climate change and homelessness could provide a PRI in the form of a low-cost loan to a Green Bank, which would in turn make loans to support energy-efficient affordable housing. In 2022, Green Bank [Inclusive Prosperity Capital](#) (IPC) announced that it had raised \$13 million of PRIs from the John D. and Catherine T. MacArthur Foundation, McKnight Foundation, and The Kresge Foundation to finance clean energy deployment (Inclusive Prosperity Capital [IPC], 2022).

C. CDFI Fund

The U.S. Department of the Treasury's Community Development Financial Institutions Fund (CDFI Fund)—the governmental body that certifies CDFIs—makes capital grants, equity investments, and grants to fund technical assistance and organizational capacity-building for CDFIs. Since its inception in 1994, the CDFI Fund has provided more than \$5.5 billion through a variety of monetary award programs, has awarded \$66 billion in tax credits through the New Markets Tax Credit Program, and has guaranteed more than \$2.1 billion in bonds through the CDFI Bond Guarantee Program (CDFI Fund, 2022). CDFIs leverage these funds to magnify their impact in the communities they serve. This is a valuable source of capital that indirectly finances many important activities within communities served by CDFIs.

D. Other Federal Programs

There are a wide variety of federal programs that can support community lenders that seek to finance a just and equitable clean energy transition. For example, the U.S. Department of Energy (DOE) has several grant programs and loan facilities, including the operations of its [Loan Programs Office](#), that support clean energy financing; and the U.S. Department of Agriculture provides grants and loan guarantees for clean energy and efficiency for rural small businesses and farms. More recently, the 2022 Inflation Reduction Act created a \$27 billion Greenhouse Gas Reduction Fund (GGRF) that will provide capital—through three separate competitions—administered by the U.S. EPA (U.S. EPA, 2023). CDCUs, CDFIs, MDIs, Green Banks, and other public sector or nonprofit lenders are expected to be applicants (or part of applicant coalitions) seeking to deploy GGRF funds.

E. State and Local Funding

There are many state and local government funding sources relevant to the clean energy transition. For example, government-imposed charges on customer energy bills collected by utility companies, levies on property owners that exceed legal emissions limits (e.g., as with Local Law 97 in New York City), or funds from the [Regional Greenhouse Gas Initiative](#) (RGGI) – a regional, cooperative “cap-and-invest” initiative in the Eastern United States. In 2021, RGGI invested \$374 million, and total cumulative investment by participating states topped \$3.6 billion as of 2021 (Regional Greenhouse Gas Initiative, 2023). How such funds are invested varies by state and locality and may be through utility programs, state programs, city or county programs, or a combination.

Some local jurisdictions and utilities invest through an intermediation strategy, and not directly. It is difficult to enumerate all the potential revenue streams that can be reinvested in green community lenders, but some state Green Banks were capitalized (or are supported on an ongoing basis) with RGGI funds. For example, Delaware directed 65% of its 2021 RGGI proceeds into the Delaware Sustainability Utility, Delaware’s “Green Bank” (Regional Greenhouse Gas Initiative, 2023). Green Banks and other community lenders capitalized and supported with these funds can make loans supporting clean energy projects, with loan interest and principal repayments used to support still more green investment through the continuous recycling of monies – rather than provide incentives which, once spent, are not returned.

F. Bond Markets

In 2022, the U.S. fixed income market was estimated at \$51.9 trillion of outstanding securities (Securities Industry and Financial Markets Association, 2023). This covers all issuers including federal, state, and local governments; government agencies; corporations; and issuers backed by pools of mortgages or other assets. Some community-facing institutions have accessed the bond market directly, for example, the Connecticut Green Bank in its issuance of Green Liberty Bonds (Connecticut Green Bank, 2023). Many community lenders access the bond market indirectly, for example, when a bank funds a CDFI in support of its CRA obligations and, in turn, the bank accesses the institutional bond market. However, most community lenders have yet to access the bond market, directly or indirectly, at scale. The creation of more standardized loan products in higher volumes that can be pooled and turned into securities (i.e., securitized), could allow community lenders to efficiently access the bond market, whether directly or through selling loan pools to intermediaries who then securitize those assets.

G. Investment Notes Programs

Some mission lenders have investment notes programs that allow individuals to invest in the organization to provide a source of capital. For example, Coastal Enterprise, Inc. in Maine has [CEI Investment Notes](#), a fixed income product for accredited investors. Recently, the global investment firm Calvert Impact launched its [Cut Carbon Note](#), a secured, investment-grade rated, fixed-income product that finances sustainability upgrades for commercial buildings, with the objective of reducing carbon emissions. Depository institutions have certificates of deposit, which can be double- or triple-bottom-line, such as [Self-Help's Green Term Certificate](#) which supports Self-Help's environmentally responsible investments.

Three CDFIs—Capital Impact, LISC, and Century Housing Corporation—have raised a total of \$530 million through their rated note programs (Balboni, Keefe, & Smukowski, 2023). Considerably more CDFIs—19 in total—have unrated note programs with different sales channels, investment minimums, and investor regulations (Balboni, Keefe, & Smukowski, 2023).

VI. Community Finance Market Segments

Here, we describe relevant market sectors as typically segmented by mission lenders, using the typology developed by OFN and utilized in its annual “Side By Side” member analysis. This methodology generally aligns with the typology used by the CDFI Fund and by AERIS, an independent firm that provides due diligence and rating reports on CDFIs. Notwithstanding certain challenges in accessing relevant and comparable industry data, we will approximate the size of each segment and describe the opportunities (OFN, 2021).

The chart below lists market segments by sector based on OFN's typology with 1) the sector definition; 2) the approximate range in total capital for individual lenders that are primarily active in that sector, as reported by OFN members for OFN's fiscal year 2021; and 3) the total financial products deployed by sector, as reported by certified CDFIs to the CDFI Fund for federal fiscal year 2020. While this chart is not an exhaustive accounting of CDFI size or impact, it illustrates the capacity and potential impact of CDFIs in key market segments.

Table 2: Market Segments by Sector – Definitions, Lender Capital, and Total Products

Sector & Example of Green Lending	Sector Definition	Range in Total Lender Capital, for OFN FY21	Total Financial Products, for Federal FY20
<p>Microenterprise an equipment loan for an energy efficiency appliance or commercial vehicle</p>	<p>“Financing to for-profit and nonprofit businesses that have five or fewer employees (including the proprietor) and with a maximum loan/investment amount of \$50,000. This financing may be for the purpose of start-up, expansion, working capital, or equipment purchase/rental” (OFN, 2021).</p>	<p>\$500,000 – \$207 million (OFN, 2021)</p>	<p>\$1 billion (CDFI Fund, 2021)</p>
<p>Business a working capital loan for the start up or expansion of a clean energy business, such as a solar installer</p>	<p>“Financing to for-profit and nonprofit businesses that have more than five employees OR financing in an amount of greater than \$50,000 or financing for the purpose of expansion, working capital, or equipment purchase/rental” (OFN, 2021).</p>	<p>\$800,000 – \$251 million (OFN, 2021)</p>	<p>\$10.7 billion (CDFI Fund, 2021)</p>
<p>Commercial Real Estate a construction loan for the energy efficient renovation of a commercial building, possibly including roof replacement and solar</p>	<p>“Financing for construction, rehabilitation, acquisition or expansion of nonresidential property used for office, retail, or industrial purposes” (OFN, 2021).</p>	<p>\$9 million – \$98 million (OFN, 2021)</p>	<p>\$10.4 billion (CDFI Fund, 2021)</p>
<p>Community Service an equipment loan for a solar array plus storage and charging infrastructure, as an investment in organizational and community resilience</p>	<p>“Financing to community service organizations such as human and social service agencies, advocacy organizations, cultural/religious organizations, health care providers, childcare providers, and education providers, regardless of tax status. Uses include acquisition, construction, renovation, leasehold improvement, and expansion loans as well as working capital loans and lines of credit” (OFN, 2021).</p>	<p>\$4.5 million – \$574 million (OFN, 2021)</p>	<p>\$5.6 billion (including charter school and community and health care facility financing) (CDFI Fund, 2021)</p>
<p>Housing to Individuals a line of credit or refi loan for energy efficient home improvements, possibly including roof replacement and solar</p>	<p>“Financing to individuals to support homeownership and home improvement. Home equity loans are not included here unless the purpose of the home equity loan is to finance housing-related activities (e.g., home</p>	<p>\$550,000 – \$146 million (OFN, 2021)</p>	<p>N/A</p>

Sector & Example of Green Lending	Sector Definition	Range in Total Lender Capital, for OFN FY21	Total Financial Products, for Federal FY20
	repair, purchase of another home). All other home equity loans should be classified based upon the purpose of the loan” (OFN, 2021).		
Housing to Organizations a lower interest rate and/or longer term on a wholesale loan for energy efficient housing construction or financing	“Financing to housing organizations for purposes such as predevelopment, acquisition, construction, renovation, lines of credit, working capital, and mortgage loans to support the development of rental or for-sale housing, service enriched housing, transitional housing, and/or residential housing” (OFN, 2021).	\$1.49 million – \$953 million (OFN, 2021)	\$38 billion (including all residential real estate financing) (CDFI Fund, 2021)
Consumer a car loan for an electric vehicle	“Credit extended for personal (secured and unsecured) loans to individuals for health, education, emergency, debt consolidation, transportation, and other consumer purposes” (OFN, 2021).	\$300,000 – \$26 million (OFN, 2021)	\$41.5 billion (CDFI Fund, 2021)
Intermediary a lower interest rate and/or longer term on a wholesale loan for any kind of green lending to the end beneficiaries	“Financing provided to other CDFIs” (OFN, 2021).	\$2.5 million – \$48.5 million (OFN, 2021)	\$335.6 million (CDFI Fund, 2021)

VII. Roadmap for the Equitable Greenhouse Gas Reduction Journey

CEI President Keith Bisson’s message to other CDFIs: “Make climate resilience and mitigation central to your organization’s mission.” (Bisson, 2022)

Above, we defined the key terms in a widely accepted conceptual framework around different types of climate-related investments—mitigation, adaptation, resilience, and environmental justice. In this section, we dig into those concepts and suggest a path for getting started with mitigation, progressing to adaptation, or moving further towards resilience and environmental justice, as the case may be.

For Green Banks, their organization’s mission is typically to finance climate change mitigation, adaptation, and/or resilience. Many Green Banks have also excelled at serving low-income and disadvantaged communities. For example, NYCEEC reports that 84% of the projects they have financed

are in or supporting LMI communities (New York City Energy Efficiency Corporation [NYCEEC], 2023). IPC's mission is to "provide a gateway to inclusive prosperity by engaging with communities impacted most by climate change" (IPC, 2023). For some other Green Banks, low-income and disadvantaged communities are a newer or growing market segment.

Similarly, some community lenders are leaders in energy finance and climate solutions—some were even founded as triple-bottom-line organizations. Founded as "Natural Capital Investment Fund" in 2000 as a supporting organization to The Conservation Fund, [Partner Community Capital](#)'s initial goal was to address the lack of access to capital for small businesses and farms in rural communities adjacent to rich natural resources (Partner Community Capital, 2023). Over time, that goal has evolved into a focus on locally owned triple-bottom-line small businesses because they build wealth for entrepreneurs and their families, create steady employment, are committed to their community, and operate in concert with the environment (Partner Community Capital, 2023). The [Triple Bottom Line Foundation](#) even has that three-pronged mission in its name: the Foundation "creates triple bottom line (economic, environmental, and social) benefits through the financing of green upgrades at multifamily affordable housing and Indigenous communities" (Triple Bottom Line Foundation, 2023). For other community lenders, "green" lending may represent an expansion of their lending activities.

Below, we discuss certain key elements associated with organizational strategies focused on climate mitigation, adaptation, resilience, and environmental justice.

A. Climate Change Mitigation in the Community Development Context

First, do no harm. Tread lightly and leave no trace. While it is impossible to fully achieve these principles, they are worthy aspirations. Mitigation should be the floor—one that all responsible lenders embrace wholeheartedly and incorporate throughout their operations and practices. According to the UN Environment Programme (UNEP), Climate Change Mitigation "refers to efforts to reduce or prevent emission of greenhouse gases. Mitigation can mean using new technologies and renewable energies, making older equipment more energy efficient, or changing management practices or consumer behavior." (UN Environment Programme, 2023).

Lenders can improve their communities through financing rooftop solar, energy efficiency, or other mitigation interventions without undertaking the challenging work of measuring their own environmental footprint or that of their portfolios. But to have the greatest impact—and to attract the greatest amount of funds for mitigation efforts in their community—we recommend that lenders develop the capacity to assess and disclose GHG emissions. Community lenders should use that assessment data strategically to manage risk, identify opportunities associated with GHG emissions, benchmark against peers, and work towards decarbonization (Partnership for Carbon Accounting Essentials, 2023).

Measuring GHG emissions can be very straightforward or exceedingly complicated. The most straightforward way is the measurement and tracking of energy generating technologies such as wind and solar. Investments in energy efficiency are more difficult to measure—determining whether reductions in energy consumption are attributable to the interventions financed or to changes in occupancy, weather, or other variables—although measurement and verification tools do exist. Other clean energy investments may be more difficult still, complicated by determining an appropriate baseline (i.e., what would have happened if the clean energy project was not undertaken).

To help address these concerns, the World Resources Institute (WRI) and World Business Council for Sustainable Development have developed the Greenhouse Gas Protocol, a corporate accounting and reporting standard. To help delineate direct and indirect emission sources, improve transparency, and provide utility for different types of organizations and different types of climate policies and business goals, the Protocol defines three “scopes” for GHG accounting and reporting purposes (WRI, 2004).

- **Scope 1** emissions are the direct GHG emissions that occur from sources that are owned or controlled by the company, for example, emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc. (WRI, 2004).
- **Scope 2** emissions are the GHG emissions that result from the generation of purchased electricity—the electricity that is purchased or otherwise brought into the organizational boundary of the company—that is consumed by the company (e.g., for lighting, appliances, etc.) (WRI, 2004).
- **Scope 3** includes all other indirect GHG emissions that are a consequence of the activities of the company but occur from sources not owned or controlled by the company (e.g., emissions associated with employee commuting) (WRI, 2004). For lenders, the main source of Scope 3 emissions is financed emissions, the GHG emissions from the buildings, businesses, and other projects financed by an organization’s loans and investments.

To create transparency and accountability, the Partnership for Carbon Accounting Financials (PCAF) Global Core Team developed the Global GHG Accounting and Reporting Standard, which is comprised of three parts, A, B and C (Partnership for Carbon Accounting Financials, 2023).

- **Part A—Financed Emissions:** In this category, the PCAF standards provide a detailed methodology to measure and disclose GHG emissions associated with seven asset classes as well as guidance on emission removals: (a) listed equity and corporate bonds, (b) business loans and unlisted equity, (c) project finance, (d) commercial real estate, (e) mortgages, (f) motor vehicles loans, and (g) sovereign debt (Partnership for Carbon Accounting Financials, 2023).
- **Part B—Facilitated Emissions:** PCAF is developing guidance for measuring and reporting the GHG emissions associated with the capital markets transactions (Partnership for Carbon Accounting Financials, 2023). Green and community lenders are unlikely to have much by the way of these emissions, but this source may increase as these lenders grow in size and sophistication.
- **Part C—Insurance-Associated Emissions:** PCAF provides methodological guidance for measuring and reporting the GHG emissions associated with insurance or reinsurance underwriting (Partnership for Carbon Accounting Financials, 2023). These emissions are unlikely to be an important consideration for most community lenders.

Three CDFIs—Coastal Enterprise Inc., Self-Help, and Partner Community Capital—collaborated to create a [step-by-step working guide](#) that financial institutions, particularly CDFIs, can use to get started on their GHG accounting journey. Several examples of CDFI PCAF disclosures include:

- [CEI's full PCAF disclosure](#)
- [Self-Help's Greenhouse Gas Analysis For Self-Help Operations, Commercial Real Estate And Loan Portfolio, Calendar Year 2020](#)
- [A Carbon Impact Analysis of VCLF's Loan Portfolio, November 2020.](#)

PCAF is, of course, just one methodology to assess the GHG impact of financing activities. Other measurement systems exist, and others are likely to evolve in response to the needs of community lenders and other stakeholders.

B. Climate Adaptation in the Community Development Context

Adaptation, according to the Intergovernmental Panel on Climate Change (IPCC), is, “in human systems, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities.” (Intergovernmental Panel on Climate Change, 2019). In plain language, adaptation is about risk mitigation and ensuring reliable performance. Through a commitment to and investments in adaptation, lenders can maximize the impacts they seek and minimize financial losses.

As discussed above, climate change, including global warming, is increasing threats from acute shocks like severe storms, wildfires, and extreme heat waves as well as the chronic stresses of changing ecosystems and the economies dependent on them. These changes affect individuals, organizations, and communities—and surface as climate risk for lenders.

Meaningful engagement with borrowers and their communities can help community development lenders understand climate threats and invest in adaptation strategies such as fortification, stormwater management, and better infrastructure. Traditionally, lenders have relied on the regulatory process—particularly building codes—to set standards for their borrowers and then transferred and mitigated remaining risks through insurance, reserves, and collateral. However, in 2020, FEMA estimated that 65% of counties, cities, and towns across the U.S. had not adopted modern building codes (U.S. FEMA, 2020). Lenders should investigate whether their local codes are modern hazard-resistant codes that require buildings to withstand their area's increasing threats such as high winds and flooding. If local building codes are not hazard-resistant, the lender can adopt and finance higher building standards, thereby protecting borrowers and mitigating its own climate risk. FEMA estimates that the additional cost of hazard-resistant building features such as roof-tie-downs, window protection, strengthened walls and roof coverings is on average less than 2% of total construction costs (U.S. FEMA, 2020). Lenders committed to climate adaptation develop and finance best practices for high performing buildings and businesses, insisting on investments that reduce property damage, save lives, and promote healthy, vibrant communities—even if that means going above and beyond minimum code requirements.

Currently, there are no standardized reporting methodologies used widely by community lenders to measure the impact of climate adaptation investments. Adaptation is, by its nature, highly contextual—for example, similar actions taken to address sea level rise in different communities may have a very different impact depending on each community's location and other characteristics—unlike mitigation, where impacts can be measured using the common denominator of GHG emissions. Nevertheless, we hope to see certain frameworks evolve over time to support increased transparency and accountability in community lender efforts to finance climate adaptation.

C. Resilience

According to IPCC, resilience is the “capacity of interconnected social, economic and ecological systems to cope with a hazardous event, trend or disturbance, responding or reorganising in ways that maintain their essential function, identity and structure” (Intergovernmental Panel on Climate Change, 2019). The IPCC emphasizes: “Resilience is a positive attribute when it maintains capacity for adaptation, learning and/or transformation.” (Intergovernmental Panel on Climate Change, 2019).

Resilience includes but goes beyond climate change mitigation and adaptation, seeking not just to survive but to thrive. In the words of the [Resilient Community Development Finance Initiative](#) (ResCDF Initiative), “we envision a world in which communities are socially, economically, and environmentally safe and healthy with the capacity to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience and where all people—especially communities of color, Native Nations, and those who are under-resourced—are able to reach their full potential, supported by equal access to responsible capital” (University of New Hampshire, 2021).

While there are no standardized reporting methodologies used widely by community lenders to measure the impact of investing in resilience strategies, the ResCDF Initiative is working to provide the necessary tools and resources and facilitate their adoption. In 2019 the ResCDF Initiative, building on the work of [100 Resilient Cities](#), with support from [Bank of America](#), [Rockefeller Philanthropy Advisors](#), and [The Rockefeller Foundation](#) and led by [OFN](#) and [Precovery Labs](#), set out to help impact investors, CDFIs, and related partners identify, evaluate, and finance projects that have high potential to improve the systemic resilience of vulnerable communities in the United States. For its work, the Initiative developed a concept of “resilient community development,” one that “includes both *resilience* – the capacity of individuals, communities, institutions, businesses, and systems to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience – and *community development*, the capacity to provide social, economic, and environmental ‘dividends’ to communities beyond the basic functions of a given project.” (University of New Hampshire, 2021). In the first phase, the ResCDF Initiative developed and tested beta versions of a Resilience Assessment Tool for CDFI Lending Programs and an Implementation Guide, both of which are available [here](#). In the second phase of the ResCDF Initiative, now underway, partners are investing in research, impact measurement, and data management; developing resources to raise awareness and building capacity around equitable resilience; and optimizing the existing beta resources and developing additional resources to increase utility and accessibility (University of New Hampshire, 2021).

Lenders could—and we believe should—“normalize resilience” by integrating the assessment of resilience into development services and underwriting, as well as promoting a new type of value engineering—one that seeks to increase the impact of every loan by identifying opportunities to build a return on resilience value. Because decisions are being made and funds are primed to flow, often leveraged by government and private entities, capital moments are the perfect time to assess and build resilience.

Many community lenders are already financing projects and businesses and providing services that build resilience. Here is an example of full resilient community development finance in action: NDN Fund uses a Resilience Impact Assessment® to prioritize sustainable finance through its multilevel approach to evaluate and strengthen Indigenous businesses and large-scale projects’ resilience (NDN Collective, 2023). NDN Fund identifies eligible borrowers and capacity building clients using the Resilience Impact

Assessment© to evaluate the potential to have social and environmental impact that align with NDN Fund's values (NDN Collective, 2023). Using these practices, NDN Fund's CDFI arm invested \$1.57M of loan capital in the Passamaquoddy Tribe at Indian Township in Maine to build sustainable infrastructure for traditional eel harvesting, leaving a ripple effect of economic and cultural healing (Solloa, 2023).

Further, as outlined above, frameworks such as the social determinants of health can help organizations make sense of the interconnected and overlapping challenges facing communities and the direct and co-benefits possible from thoughtful investments.

D. Environmental Justice

"The environmental justice movement—championed primarily by Black people, Latines, Asian Americans, Pacific Islanders, and Indigenous People—was born of a statistical fact: Those who live, work, and play in America's most polluted environments are commonly people of color and those living in poverty."
(Skelton, 2023)

Environmental justice includes but goes beyond climate change mitigation, adaptation, and resilience. Currently, there are no standardized reporting methodologies used widely by community lenders to measure environmental justice in their policies, practices, or investments.

In October 1991, delegates to the First National People of Color Environmental Leadership Summit drafted and adopted 17 [Principles of Environmental Justice](#). In a 2013 report, the U.S. Environmental Protection Agency (EPA) grouped strategies that connect environmental justice, smart growth, and equitable development under seven common elements:

- Facilitate Meaningful Community Engagement in Planning and Land Use Decisions
- Promote Public Health and a Clean and Safe Environment
- Strengthen Existing Communities
- Provide Housing Choices
- Provide Transportation Options
- Improve Access to Opportunities and Daily Necessities
- Preserve and Build on the Features That Make a Community Distinctive (U.S. EPA, 2023)

Created in 1993 "to fight the lasting legacy of redlining, the illegal and systemic practice of excluding communities of color based on their race," the Greenlining Institute recently proposed four equity principles to consider before advocating for, investing in, or otherwise supporting emerging technologies (Greenling Institute, 2023):

1. Provide direct benefits to priority communities
2. Eliminate harms to communities
3. Promote community-driven projects
4. Advance wealth-building opportunities for communities (Abdul-Khabir, 2023)

Just Solutions Collective—a BIPOC-led, national climate organization that partners with communities disproportionately impacted by climate change to turn their priorities and ideas into policies and law—describes their principles as follows:

- **Community Self-Determination:** Those most harmed by climate change should lead the design and implementation of solutions.
- **Racial & Economic Justice:** Climate solutions are inextricably rooted in the fight for racial and economic justice.
- **“Yes” Proposition:** Leading with equitable solutions provides the most effective policy roadmap for addressing the climate crisis.
- **Shifting Power:** The climate movement can only succeed if justice-centered movement leaders have the power and resources to shape and lead policy strategy and implementation at the federal, state, and local level (Just Solutions Collective, 2023).

Recently, through a case study approach, Just Solutions has developed a Prioritizing Frontline Communities Framework for considering and measuring the adaptive capacity and resilience of frontline communities as they confront climate change (Just Solutions Collective, 2023).

A nonprofit membership organization that supports and empowers Black CDFI CEOs, the [African American Alliance of CDFI CEOs](#), leads the Community Builders of Color Coalition to ensure low-income and disadvantaged communities can equitably benefit from the EPA’s GGRF (African American Alliance of CDFI CEOs, 2023).

VIII. Clean Energy Businesses, Technologies, and Investments that Yield Greenhouse Gas Reduction and Community Co-Benefits

In this section, we identify some of the clean energy technologies and investments that could and should be incorporated into all community development lending lines of business—strategies to implement the goals of climate change mitigation, adaptation, resilience, and environmental justice. This section is not meant to be a comprehensive list—and we suggest that lenders looking to finance clean energy technologies connect with the leaders in their sector for actionable best practices. Instead, we introduce important categories that lenders should consider. We discuss timing and other issues related to each project type—e.g., deep energy retrofits may require that the building be vacant while installing parking-lot mounted solar is less intrusive. We demonstrate that while these investments all perform a climate change mitigation function, they also support resilience and adaptation goals. We address the important co-benefits of these investments beyond their benefits to the environment (e.g., human health, job creation, mobilizing capital in low-income and disadvantaged communities).

According to Bloomberg New Energy Finance (NEF), energy transition investment was estimated at \$1.1 trillion globally in 2022, which was made across a wide range of sectors including electrified heat, electrified transport, hydrogen, energy storage, nuclear and renewable energy (BloombergNEF, 2023). The \$1.1 trillion annual estimate highlights the enormity of the economic opportunity associated with transitioning to a clean energy economy. The same report notes that the US was responsible for \$141 billion of this investment, second only to China with \$546 billion of investment (BloombergNEF, 2023).

Much of this kind of investment in the US is made within communities—urban, suburban, and rural areas—where local populations benefit directly. Communities may benefit through improved energy access, energy cost savings, reductions in harmful emissions, increased resilience to extreme climate events, or local job creation. Not all energy transition investments offer each of these benefits; investments in utility-scale renewable generation or transmission lines, for example, may primarily

benefit distant communities that are the beneficiaries of increased renewable energy supply. Yet there are numerous examples of investments that principally benefit the local community.

For example, building energy efficiency projects—e.g., building envelope, lighting, or HVAC (heating, ventilation, air conditioning) improvements—often employ local contractors, provide energy cost savings for utility customers, improve tenant comfort, decrease energy loads on the grid, and reduce emissions from local generation sources (e.g., fossil fuels used for heating), co-benefits that can be analyzed and tracked through the social determinants of health, as discussed above. As another example, rooftop solar projects also create jobs for local installers, reduce fluctuations in homeowner or business energy bills and often lessen them, decrease energy loads on the grid, and reduce emissions from less-clean generation sources. When coupled with energy storage—typically batteries—distributed renewable energy can ensure energy reliability for the home, business, or community facility served, guarding against service interruption, protecting essential medications, and otherwise providing resilience.

This discussion will focus on the deployment, rather than the manufacturing, of clean energy technologies, because the benefits of deploying technologies such as increased energy access, improved resilience, and reduced local emissions are often felt throughout the community. The following sections summarize common areas of community-centered clean energy investment.

A. Building Energy Efficiency and Decarbonization

The energy that we *don't use* is the cheapest and cleanest. According to the American Council for an Energy-Efficient Economy (ACEEE), energy efficiency is an important utility system resource, one that has yielded significant energy and economic benefits to the utility system and utility customers, typically at a lower cost than supply side investments (American Council for an Energy Efficient Economy [ACEEE], 2023). Particularly in dense urban areas, building energy efficiency offers the greatest opportunity to reduce emissions and avoid costly investments in generation, transmission, and distribution infrastructure. In New York City, for example, approximately two-thirds of GHG emissions are attributable to buildings according to the Mayor's Office of Sustainability (NYC Sustainable Buildings, 2023). Building energy efficiency investments include HVAC investments, efficient lighting, envelope improvements (e.g., walls, doors, windows, roofs), control systems that optimize building energy use, and energy-efficient appliances.

Investments in buildings can be categorized in many ways, including building type and whether the project involves new construction or renovation of an existing building. Building types can include single-family residential (typically 1-4 family), multifamily (normally, greater than 4 units), commercial, industrial, and institutional (e.g., academic, government, religious). Further subdivisions are possible, for example, multifamily housing may include rental buildings, condominiums (where tenants own a real property interest in a portion of the building) or co-operatives (where tenants own shares in a co-operative corporation that entitles them to lease a particular unit). Each property type involves certain considerations. For example, lending to single-family residential homeowners requires compliance with a greater range of consumer protection laws than lending to buildings owned by private sector, public sector, or not-for-profit organizations.

New construction projects, while more expensive and generating significant emissions during their construction, are often easier to fund because the building design and capital structure can incorporate

green measures from the outset. Renovations of existing buildings may require incremental capital—which often raises intercreditor issues—or could require the building to be recapitalized to reflect the new investment. Moreover, existing building renovations are often more complicated from a design and operations perspective because they must be incorporated into the existing building structure and systems. Notwithstanding the increased difficulty of renovating existing buildings, they are essential to achieving climate goals: approximately 80% of today's buildings will exist in 2050 (Grainger, 2023). Further, reusing existing buildings and materials reduces embedded emissions; as a result, building renovations typically generate 50-75% less emissions than new buildings generate (Larry Strain, 2017). Additionally, immediate carbon reductions have more value than reducing carbon at some date in the future, since greenhouse gases accumulate in the atmosphere and we have limited time to avoid the worst impacts of climate change (Martinez, 2023).

Energy efficiency investments vary from relatively discrete measures (e.g., furnace upgrade) to integrated strategies (e.g., smart appliances and building control systems). These investments also vary depending on climate zone, local building codes, and building characteristics. The most integrated and significant form of building energy efficiency investing—often coupled with on-site renewable energy production and energy storage—produces high-performance buildings, which are discussed later in this section.

B. Renewable Energy

Renewable energy generation can occur at or near the site of consumption (e.g., rooftop solar photovoltaics supply a portion of a building's energy) or through large "utility-scale" plants that provide energy delivered through transmission and distribution systems to many different users. Utility-scale renewables, in order of US aggregate energy production, include wind energy, hydropower, solar, biomass, and geothermal (U.S. Energy Information Administration, 2023). While utility-scale renewable energy projects generally enjoy economies of scale, given their reliance on transmission and distribution systems to deliver energy to communities, they often deliver fewer direct benefits to communities consuming their output. Distributed renewable generation located within communities typically generate more local jobs in their construction, operation, and maintenance. Further, distributed renewables—especially when paired with storage or microgrids—can increase resilience by reducing the likelihood of blackouts caused by interruptions in centralized generation resources or by transmission and distribution system failures.

The most frequently deployed distributed renewables in the US involve solar energy. Solar photovoltaics are used to produce electricity and may be building-tied (dedicated to producing energy for, and reducing grid-sourced energy at, a building) or community solar (where the owner of a larger system may offer local subscribers an opportunity to share in its energy output). Declines in the cost of solar photovoltaics since the early 2000s, as well as business models such as providing power purchase agreements for customers to pay for their solar energy over time rather than needing to finance installations upfront, have significantly increased the adoption of solar photovoltaics. Less commonly, solar energy may also be used for solar water heaters, to reduce the energy otherwise needed for domestic hot water.

Other important technologies include wind energy, which is more commonly seen in less densely populated areas, and like solar photovoltaics, may benefit a single building or a broader community through sales of subscriptions in community wind installations. Modern wind turbines turn kinetic energy from the movement of wind into electrical energy but evolved from traditional windmills that convert kinetic energy into mechanical energy used for other applications, such as milling grain. While

small-scale wind turbines can produce up to 100% of the energy needed for the average U.S. home, you need enough of a wind resource which can vary significantly based on local terrain, in addition to space and friendly local zoning regulations (Office of Energy Efficiency & Renewable Energy, 2023).

Given the relatively constant temperature of the earth just below its surface, geothermal installations can be used to provide cost-effective building heating and cooling. Unlike wind energy, these systems benefit from greater building density, and when applied throughout an area, can produce district heating systems. There are also utility-scale geothermal systems that capture pressurized steam flows beneath the earth in a steam turbine to produce electricity, as with The Geysers facility in California (Calpine, 2023). These types of systems operate only in certain regions of the world that have the proper geology; they are mentioned here only as an example of geothermal energy generation, not as a widely available source of community-scale renewable energy.

Hydropower systems also provide energy, predominantly through large utility-scale plants that capture water through a reservoir and use gravity to power a turbine. Run-of-the-river (or run-of-river) hydropower primarily utilizes the natural current to generate energy, unlike large hydropower stations with a large reservoir. Some of these systems may be small enough to operate at a community scale where adequate flow exists. These plants are not dissimilar from traditional gristmills located adjacent to rivers, except the kinetic energy from flowing water is now used to produce electrical energy, rather than mechanical energy. That said, there can be various negative environmental impacts from hydropower, such as damage to wildlife habitat, which would have to be mitigated as well (Energy Sage, 2019).

C. Storage and Grid Solutions

Energy storage is used to address the intermittency of most forms of renewable energy generation (most obviously, solar and wind which are often unavailable) and can provide various other services to ensure energy quality, and to address energy supply and demand imbalances. Within the community, energy storage is generally situated within or near a building. Currently, lithium-ion batteries are the most commonly used energy storage technologies within communities, although other technologies such as flow batteries or fuel cells may also be employed.

An important form of energy storage in the U.S. is pumped storage hydropower (or simply pumped storage). In these systems, there are two reservoirs of water at different elevations: when energy is readily available from other sources at attractive prices, energy is used to pump water to the upper reservoir from the lower reservoir, and when energy is in short supply and priced accordingly, water from the upper reservoir is released to the lower reservoir and used to produce energy as with a conventional hydropower plant. Although these systems are normally utility-scale, there are related technologies used in community applications.

For example, ice storage systems are used in some buildings. In this instance, the building procures energy from other sources to produce ice when energy is priced affordably, and then uses the ice to help cool the building when energy prices are higher (limiting the need for air conditioning and other energy-intensive measures), saving building owners money and reducing peak energy needs in a region. These thermal systems, unlike other forms of storage, do not, however, store electricity, limiting their flexibility.

Microgrids (normally for a multifamily residential or small commercial development) and minigrids (for larger applications such as a university campus) are seeing increased deployment. Both are localized grids that, when paired with local sources of energy, can disconnect from the traditional grid and operate independently while the main grid is down, function as a grid resource for faster system response and recovery, and reduce energy losses in transmission and distribution (U.S. Office of Electricity, 2023). In and of themselves, these systems do not reduce emissions directly, but can support the efficient use of renewable generation and storage, as well as minimize the likelihood of energy interruption due to failures of centralized generation facilities or transmission systems. As a result, microgrids and minigrids can be essential for resilience and environmental justice, particularly for communities with unreliable electrical infrastructure. For example, Green Bank NYCEEC joined other capital providers in financing a microgrid, fuel cell, battery storage, and rooftop solar installation at Marcus Garvey Apartments, reducing energy costs and enhancing resiliency for the 625-unit affordable multifamily housing complex in Brooklyn, NY (NYCEEC, 2017).

Electric vehicle charging infrastructure is seeing increased capital flows and may be available for community members as well as commercial or institutional uses (e.g., delivery services, public transit). Other forms of grid investment include smart metering which, although not addressing energy supply or demand directly, can permit time-of-use metering or other policy solutions that may modify customer behavior and help address energy supply and demand imbalances within a region.

D. High-Performance Buildings

High-performance buildings incorporate many of the measures described above in the discussion of building energy efficiency—in addition to specific design, construction, and operating principles—to achieve very high energy-efficiency and/or significant emission reductions through their operation and potentially their construction. Both renovations of existing buildings and new construction projects can produce high-performance buildings, although renovations are relatively less common as the integrated design features needed to achieve maximum energy and emissions benefits are often difficult to integrate into existing buildings. High-performance buildings frequently incorporate rooftop solar, energy storage, electric vehicle charging equipment or other clean energy elements into their design. While there is no universal definition as to what qualifies a building as “high-performance” there are several standards often seen in projects.

One standard is electrification. Electrification is constructing or renovating a building so that all energy used in its operation is in the form of electricity produced on-site or delivered through the grid. This requires, for example, cooking, space heating, and water heating to be powered through electricity rather than the burning of natural gas. Electrification is often, but may not necessarily be, relatively more energy-efficient; buildings may still use significant amounts of energy, although they avoid producing emissions locally that would be generated through the burning of fossil fuels on-site. Of course, if the electricity used by these buildings is generated from the burning of fossil fuels, there may be negligible benefits to a region (or to the planet) as a whole. That said, given the decreasing proportion of grid-sourced electricity expected to be produced from fossil fuels in the future, electrification is generally expected to produce much greater emissions savings over time. [ReWiring America](#), a leading electrification nonprofit that “helps Americans save money, tackle emissions goals, improve health, and build the next generation of the clean energy workforce,” provides tools and data to help electrify homes, businesses, and communities (Rewiring America, 2023).

Another standard is net zero. Net zero energy buildings are those where, on an annual basis, the on-site production of electricity is expected to meet or exceed on-site energy demand (U.S. Department of Energy [DOE], 2023). Although these buildings, over time, consume no net energy, they frequently produce net GHG emissions because they often draw power from the grid at times of peak demand (and peak emissions given the need to mobilize dirtier peaking sources of generation) while supplying power to the energy grid at times of low energy demand (and relatively lower emissions given the ability to deploy cleaner energy generation sources). For these buildings to produce net zero emissions, they must match their on-site energy supply with demand, most likely through the use of energy storage.

There are other standards for high-performance buildings, some of which are certification programs which require buildings to undertake a series of measures. These measures may achieve energy or emissions reductions, in addition to providing other benefits (e.g., improving indoor air quality).

- **Passive House** projects use a combination of techniques including use of certain materials and design features (e.g., orienting buildings to take advantage of daylighting and solar heat gain through windows), in addition to more commonly used measures, to achieve significant energy reductions plus other benefits including thermal comfort. [Passive House Accelerator](#) aims to be a catalyst for zero carbon building through the cultivation of a collaborative platform for sharing innovation and thought leadership in Passive House design and construction (Passive House Accelerator, 2023).
- [Enterprise Green Communities](#) claims to be the only national green building program created with and for the affordable housing sector (Enterprise, 2023). To date, nearly 230,000 affordable developments nationwide have achieved Green Communities certification which translates to healthy, sustainable, affordable homes for over 1 million people (Enterprise, 2023).
- [Leadership in Energy Efficiency and Design \(LEED\)](#) is a voluntary rating and certification system developed and operated by the U.S. Green Building Council, that covers the design, construction, and operation of all types of buildings (U.S. EPA, 2023). The LEED system is widely accepted for measuring building sustainability, with specifications supporting health, economic, and environmental benefits including using less energy and water, and producing fewer indoor air pollutants (U.S. DOE, 2023)
- [Living Building Challenge](#) is a framework that creates buildings that reconnect occupants with nature; buildings that generate more energy than they use, capture and treat all water on site, and are made using healthy materials (International Living Future Institute, 2023). This standard, unlike many others, considers the energy and environmental impacts of building construction, not just operation of the building, as well as other considerations including building beauty, occupant health and happiness, and equity considerations.

E. Low-Emissions Transportation

Low-emissions transport within a community generally means electric vehicles (EVs), although larger investments could be made in light rail transit or other technologies. EVs can be categorized in several ways such as vehicle type (e.g., bike, bus, passenger vehicle, scooter), technology (e.g., battery EVs, fuel cell EVs), or application (e.g., public transit, rideshare, taxi, etc.). The ability of these vehicles to produce energy or emissions savings depends on certain factors.

The first factor is the point of comparison. An EV may produce fewer emissions than a gasoline-powered vehicle, but taking a passenger EV is likely to produce greater emissions than taking electrified public transit. The second point, similar to evaluating building electrification, is understanding the source of electricity used to charge an EV. An EV charged using solar photovoltaics may offer significant emissions reductions versus a fossil fuel-powered vehicle, while an EV charged at a home where the majority of grid-sourced energy is derived from the burning of fossil fuels may offer limited emissions reductions.

While these contextual points are important to understand in transitioning to a clean energy economy, electrified transportation is growing at a significant rate and is expected to continue to grow with technology improvements and more favorable economics. Electrified transport generally offers important efficiencies even when the electricity is produced from less clean sources, for example, through avoiding emissions that result from idling fossil-fuel powered vehicles or using regenerative braking to lessen EV energy needs. Moreover, as noted above with building electrification, given the decreasing proportion of grid-sourced electricity expected to be produced from fossil fuels in the future, the benefits of electrified transport should increase over time.

Further, electric vehicles are essentially big batteries on wheels—batteries that may sit idle much of the time and could be used for energy storage and management. EV batteries can be accessed to power homes, buildings, or the grid itself through bidirectional chargers—and in some jurisdictions that value as a battery can be monetized. In a first-in-the-nation pilot, CDFI [BlueHub Capital](#) is using bidirectional chargers to make EVs affordable for all, while providing resilience to affordable housing developments in Massachusetts (BlueHub Capital, 2022).

IX. Financing Challenges and Strategies for Investing in Climate Change Mitigation, Adaptation, Resilience, and Environmental Justice

In this section we describe the necessary conditions for successful investments in climate change mitigation, resilience, adaptation, and environmental justice, particularly in low-income and disadvantaged communities. Further, we will map the main challenges and barriers unique to green finance and clean energy finance that have kept many community lenders on the sidelines to date as well as the best practice strategies developed by Green Banks and successful green lenders of all types. We will include a chart that lists typical energy loan products and financing strategies, such as property assessed clean energy (PACE). We will show how typical loan products can finance any stage of an energy project (e.g., pre-development, acquisition, construction, permanent) and can have different collateral structures (e.g., debt of a special-purpose entity, corporate loan).

A. Necessary Conditions for Successful Investments in Climate Change Mitigation, Adaptation, Resilience, and Environmental Justice

As described above, there are countless opportunities to mitigate climate change, invest in adaptation, build resilience, and advance environmental justice through energy efficiency strategies, renewable energy, and more. To translate these opportunities into a robust, performing portfolio, there must be:

Pipeline: Lenders are in the business of making loans; to be successful, they need a continuous source of deals—feasible projects that are well-suited for the lender's products. To turn any one of these opportunities into a successful investment, there must be an individual, corporation, or other

organization that recognizes the opportunity and is willing to “sponsor” the project. A clean energy investment could begin with a homeowner wanting rooftop solar panels, a corporation exploring electrification of its vehicle fleet, or a not-for-profit evaluating building energy efficiency measures. The sponsor may be motivated by considerations including policy directives, economic returns, environmental and societal benefits, or a combination of factors. But, lenders may discover that energy efficiency, renewable energy, and investments in resilience prove to be a hard sell. Building owners have many pressures and issues competing for their time and attention and may perceive risk in moving forward with a decarbonization project (Hangen, Building Trust, Building Demand for Building Energy Improvements Working Paper #1: Summary of Approaches and Interview Themes [Draft Working Paper], (2023)).

Directly, or through partners, lenders may provide supports for project development as a way of maintaining pipeline. Through 37 interviews in the spring of 2023, UNH Fellow Eric Hangen identified a range of approaches to driving demand for building decarbonization including grassroots community engagement; network-based outreach; engagement with building owners at capital moments; creating building performance standards—particularly through strengthening state and local building codes; hands-on technical assistance; and one-stop shops (Hangen, Building Trust, Building Demand for Building Energy Improvements Working Paper #1: Summary of Approaches and Interview Themes [Draft Working Paper], (2023)).

Capacity: Lenders need projects to be built according to the agreed upon specifications, on budget, and to perform as intended. The key here is securing a sponsor with the capacity to complete the project as promised or to engage a project developer (e.g., green real estate developer, solar developer) with such capacity. To make the necessary decisions to structure, construct, and finance a project, the sponsor or developer must be conversant in the technology(ies) involved, relevant energy markets (e.g., current and expected energy costs, availability of utility incentives), policy and regulatory considerations (e.g., required approvals, carbon charges), as well as sectoral considerations (e.g., understanding industry dynamics).

While some sponsors that have undertaken similar projects will have the requisite market knowledge, many would-be-sponsors do not. Market knowledge and needed capacity may be sought from assistance programs established by government agencies, specialized not-for-profit organizations, or for-profit companies or consultants that may advise on the market, legal, tax, or technical aspects of projects. Equipment suppliers, project developers, contractors, and capital providers may share market knowledge, but should not be relied upon exclusively by sponsors as there may be a conflict of interest given their economic opportunities if a project is undertaken. Sponsors without the requisite capacity may choose to engage a third-party project developer to drive the project to fruition. These partners, who oversee development, installation, and operation of the project, often determine its success or failure: whether the project is completed on-time, finalized on-budget, and delivers expected benefits.

CDFIs are required to provide development services alongside their financing activities. These technical assistance services help strengthen projects and build borrower capacity. For example, a CDFI might hold a workshop on the benefits of clean energy, provide a potential borrower a list of qualified contractors, and/or provide financial assistance to cover the cost of an energy audit if needed. Lenders can also tap into capacity-building for project developers provided by others such as the US Department of Energy’s Community Power Accelerator or Enterprise Green Communities (Hangen, Building Trust,

Building Demand for Building Energy Improvements Working Paper #1: Summary of Approaches and Interview Themes [Draft Working Paper], (2023)).

Workforce: No project reaches fruition without contractors, equipment suppliers, advisors—the specific workforce needed for each project. The development team must identify, vet, and engage the necessary parties to complete the transaction. These parties may be engaged directly by the sponsor or indirectly through other project participants. Sponsors should undertake appropriate due diligence to evaluate the legal, technical, and financial capabilities of contractors, advisors, and key equipment suppliers, just as lenders evaluate the credentials of their borrowers. Lenders and others wishing to drive demand may also invest in efforts to build the contractor base and workforce, a strategy that takes advantage of the fact that traditionally, contractors are the way building owners first learn about opportunities for efficiency (Hangen, Building Trust, Building Demand for Building Energy Improvements Working Paper #1: Summary of Approaches and Interview Themes [Draft Working Paper], (2023)).

Community Engagement: There are added requirements when working in low-income and disadvantaged communities.

- First, many such communities have been marginalized, and project participants may need to devote more time and resources to build trust and support for community projects; there may also be an increased need for independent advisers to engage with community members.
- Second, participants should understand the needs within communities; without such understanding, projects may fail to generate the expected environmental, social, or economic benefits.
- Third, participants should recognize the significant challenges often faced by community residents (e.g., education, health, political representation, safety) and the often-limited resources available to address them, which may increase the time, effort, and expense to complete clean energy projects.
- Fourth, participants should not confuse income and credit quality as borrowers from low-income and disadvantaged communities may be very creditworthy. Thoughtful credit analysis is needed in all situations.

All four aforementioned activities can support a community's environmental justice objectives.

Financing: A sponsor must also engage capital providers: typically, one or more lenders to provide debt financing, although other capital providers could include tax equity providers, utility companies offering incentives, or government agencies providing grants. This sponsor may borrow the money to complete the project, or other participants (e.g., equipment lessors) may be willing to provide necessary equipment and other assets in exchange for receiving ongoing service payments (e.g., lease).

Assuming there is a capable and committed project sponsor or sponsors, adequate information to permit project evaluation, necessary participants to undertake the project, and appropriate consideration given to the needs of the community—especially low income and disadvantaged communities—then the final component is determining an appropriate financial product for the project. While common financial products for clean energy investing will be discussed elsewhere in this report, there are some **key principles** needed for engaging lenders and accessing their financial products:

- First, there must be lenders willing to finance the kinds of projects, in the required sizes, and for the types of borrowers relevant to the community.

- Second, lenders should have a clear understanding of the risk associated with transactions based upon skillful due diligence, disciplined underwriting, and track records lending to similar project types and/or borrowers.
- Third, lenders should also clearly understand the community benefits associated with projects—including climate change mitigation, adaptation, resilience, and environmental justice considerations—to ascribe appropriate value to these factors.

B. “Greening” Routine Capital Moments

“Finding customers at a “critical capital moment” – such as when they are seeking to get financing or equipment has just broken – may provide a unique opportunity to promote decarbonization”

(Hangen, Building Trust, Building Demand for Building Energy Improvements Working Paper #1: Summary of Approaches and Interview Themes [Draft Working Paper], (2023)).

While community lenders can and should develop ‘green lending’ programs and products that finance projects that directly and primarily support climate change mitigation, adaptation, resilience, and environmental justice—including distributed renewables and storage, electrified transportation, and building decarbonization—such programs are not enough. Climate change mitigation, adaptation, resilience, and environmental justice should be at the core of every lender’s mission and the backbone of every lender’s business strategy. As discussed above, lenders should develop and commit to ever-higher standards along the path to environmental justice, starting with mitigation, progressing to adaptation, and then moving further towards resilience and environmental justice *in everything they do*, not just in their energy finance program.

The lender’s organizational commitment should be translated into underwriting and investment practices integrated across all the lender’s lines of business in all market sectors. For example, when a community lender is asked to finance a small business owner’s new manufacturing equipment, appropriate attention should be given to the energy efficiency of the equipment being acquired. When financing new home construction, the lender should ensure that the home is built to appropriate hazard resistant standards, no matter what is required by the local building code. The easiest, cheapest, and most efficient time to finance green measures is at routine capital moments—acquisition, refinance, construction, and as part of a more comprehensive rehabilitation or reinvestment. Community lenders that incorporate green lending practices into all their financing activities should soon be able to identify numerous opportunities to deploy more capital, reduce borrower operating costs, and support community environmental, social, and economic goals. As discussed above, lenders can refer to the [ResCDF Initiative](#) for more information on integrating resilience into their overall development services and underwriting.

C. Challenges and Barriers in Green Finance

If only it were that easy! There are numerous barriers to the routine incorporation of climate change mitigation, adaptation, and resilience measures into the development and financing of businesses, buildings, and projects that are seen regularly.

The table below outlines some of the key barriers and potential mitigants to address them. For the barriers, there are often long-term mitigants to these problems if short-term solutions are unavailable.

Table 3: Barriers to Green Financing and Potential Near- and Long-Term Mitigants

Potential Barrier	Near-Term Potential Mitigants/Solutions	Longer-Term Potential Mitigants/Solutions
Project economics (i.e., inadequate expected returns for project sponsor(s))	<ul style="list-style-type: none"> • Utility or government incentives • Grant funding for projects • Concessionary debt financing from certain government or mission-driven lenders 	<ul style="list-style-type: none"> • Project cost declines with technology improvements and/or with growing economies of scale in clean energy
Limited resources of building owners (e.g., staffing, capital)	<ul style="list-style-type: none"> • Technical assistance provided by government or not-for-profit groups • Collaboration with similarly situated sponsors with experience doing comparable projects 	<ul style="list-style-type: none"> • Government funding for increased technical assistance • Turnkey solutions vetted by trusted, independent groups
Poor credit quality of borrowers (real or perceived)	<ul style="list-style-type: none"> • Third-party guarantees (government or philanthropic providers) • Presence of community lenders (e.g., CDFIs, Green Banks) with green lending expertise that may evaluate project more favorably 	<ul style="list-style-type: none"> • Improved underwriting tools • Increased data supporting efficacy of investments • Increasing number of community lenders with green lending experience
Uncertain capabilities of clean energy developers and contractors	<ul style="list-style-type: none"> • Obtaining references from reputable sources • Government certification or licensing standards • Engaging an owner's rep to act as the building or project owner's advocate and represent their best interests 	<ul style="list-style-type: none"> • Increased certification or licensing requirements • Larger pool of seasoned developers and contractors • Insurance products
Prerequisite infrastructure to support clean energy investment (e.g., replacing roof before installing solar PV)	<ul style="list-style-type: none"> • Working with experienced developers/contractors • Contacting lenders (e.g., some CDFIs and Green Banks) with proven collaboration track records to finance all needs • Utility or government incentives that fund necessary, related work 	<ul style="list-style-type: none"> • Increased collaboration between funders with different focus areas (e.g., affordable housing and solar PV) • Increased number of entities with integrated green lending capabilities
Other sponsor priorities (e.g., basic building maintenance, tenant health and safety) that limit ability to manage project	<ul style="list-style-type: none"> • Managing timeline expectations of lenders and other participants • Engaging lenders that understand impact of other priorities on project timelines 	<ul style="list-style-type: none"> • Leveraging experiences of other sponsors facing similar circumstances to reduce time, effort, and expense to complete projects • Integrating green measures at routine capital moments

Potential Barrier	Near-Term Potential Mitigants/Solutions	Longer-Term Potential Mitigants/Solutions
Borrower capital structures that limit debt (e.g., housing agencies' potential unwillingness to allow incremental borrowing)	<ul style="list-style-type: none"> • Innovative financing products (e.g., ESA/PPA, lease, PACE financing) • Third-party guarantees to support borrower repayment and reduce risk for capital providers 	<ul style="list-style-type: none"> • Increased interest in holistic financing solutions as value proposition for clean energy investment improves
Limited borrower tax capacity (i.e., inability to use accelerated depreciation and tax credits may depress relative returns for borrowers with no or low taxes)	<ul style="list-style-type: none"> • Structures involving parties with significant tax capacity (e.g., as lessors or tax equity providers) to utilize tax benefits 	<ul style="list-style-type: none"> • Tax law changes to support borrowers with no or low taxes (e.g., direct pay structures for Investment Tax Credits)
Impact measurement challenges (i.e., determining the short- and long-term environmental, social, and economic benefits of projects)	<ul style="list-style-type: none"> • Engaging mission-driven lenders that attempt to quantify impacts • Accessing low-cost technology to track energy impacts 	<ul style="list-style-type: none"> • Technological improvements (e.g., through automation) to improve impact measurement • Increased number and standardization of completed projects in industry should increase reliability of impact estimates
Subscale community lending activities to support the energy transition	<ul style="list-style-type: none"> • Encouraging collaboration between lenders 	<ul style="list-style-type: none"> • Increased capital availability through government programs • Improved project economics over time should attract more lenders of all types • Growth of community lenders that finance clean energy solutions

D. Green Loan Products

There are a variety of loan products suitable for financing climate change mitigation, adaptation, and/or resilience measures. These measures may be financed in the development of a new project, or in the acquisition, construction, refinancing, or rehabilitation of an existing project. Lenders may use these products to lend directly to the end-user of the project (e.g., building owner pursuing electrification, family acquiring an EV), or to project developers, contractors, manufacturers, or equipment suppliers that deliver projects to end-users (e.g., renewable energy developer, EV manufacturer, battery supplier,

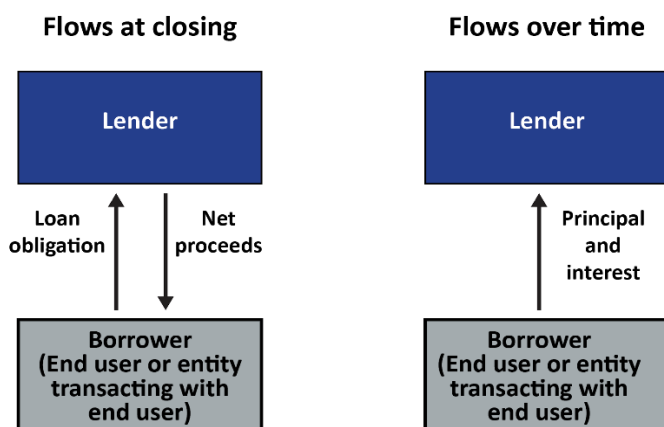
or construction firms specializing in high-performance buildings). There are numerous permutations of financing structures.

The discussion below attempts to summarize the major types of loans used to finance the five project types summarized earlier in this report, namely: building energy efficiency and decarbonization, renewable energy, storage and grid solutions, high-performance buildings, and electrified transport.

1. Direct Loans

Direct loans are loans where (a) the end-user (e.g., individual, business, not-for-profit) is the borrower and assumes loan obligations including payment of interest and principal, or (b) an intermediary entity (e.g., financing company) is the borrower—which then makes a loan, lease, or similar financial instrument to the end-user—and the intermediary assumes loan obligations including payment of interest and principal. The basic structure of a direct loan is shown in Figure 5.

Figure 5: Direct Loan Flows at Closing and Over Time



Direct loans can take a variety of forms, which vary based upon several factors including their use of proceeds, when in the project life they are accessed, and typical collateral. The table below summarizes some common direct loan products.

Table 4: Direct Loan Products, Use of Proceeds, and Typical Collateral

Loan Product	Use of Proceeds	Typical Collateral
Acquisition loan	Land for construction project (e.g., green building)	<ul style="list-style-type: none"> • Acquired land • Guarantee from project sponsor
Pre-development loan	Costs to assess project feasibility (e.g., preliminary engineering costs) and project design	<ul style="list-style-type: none"> • Commitment to refinance pre-development loan through construction or permanent loan • Guarantee from project sponsor
Construction loan	Construction costs	<ul style="list-style-type: none"> • Acquired land and project under construction

Loan Product	Use of Proceeds	Typical Collateral
Mortgage loan (permanent financing)	Total building cost	<ul style="list-style-type: none"> • Building (may be a secured or unsecured obligation) • <i>Note: loan may be senior or subordinated to other building lenders</i>
Equipment or vehicle loan	Equipment (e.g., solar PV, battery storage, EV charging equipment) or vehicles (e.g., electric buses or trucks)	<ul style="list-style-type: none"> • Equipment or vehicles funded
Incentive bridge loan	Project costs that are expected to be all (or mostly) repaid through utility or government incentive	<ul style="list-style-type: none"> • Guarantee from project developer • Assets associated with project • Assignment of incentive payments

2. PACE Loans

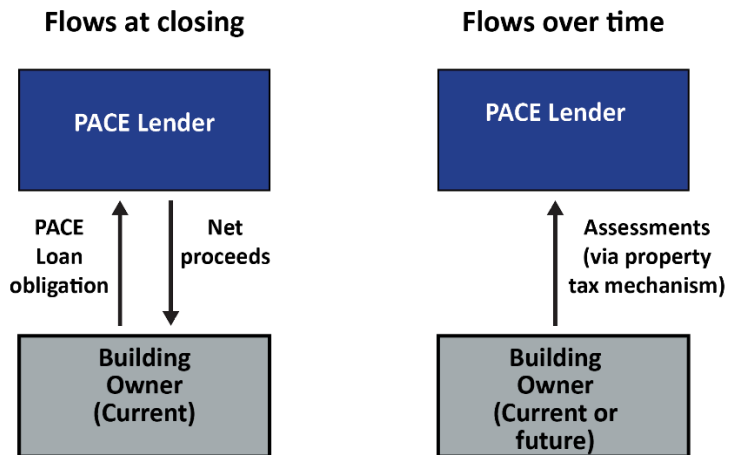
Property Assessed Clean Energy (PACE) loans are available only in jurisdictions that have authorized PACE financing. PACE loans can finance approved categories of expenditures (e.g., energy conservation measures, rooftop solar) associated with new or existing buildings. Depending on the jurisdiction, PACE loans are normally permitted up to a certain percentage (e.g., 20%) of the assessed property value. End-users that finance projects with a PACE Loan are obligated to repay debt service through a separate charge on their property tax bill. These charges are typically collected by the government agency that levies property taxes and are remitted to the PACE lender (directly, or indirectly through a program administrator).

In some jurisdictions, PACE is available for single-family residential homes; this financing product is commonly referred to as “R-PACE”. In most jurisdictions PACE is only available for commercial properties (which may include rental buildings and certain other types of multifamily housing); this financing product is normally referred to as “C-PACE”.

PACE loans are not a direct loan obligation of the borrower, but rather, effectively represent an obligation of the entity that owns the building and is responsible for property tax payments. While building owners that take out a direct loan are normally obligated to repay the loan upon a sale of the subject property, building owners that take out a PACE loan would not repay the PACE loan upon a sale of the property; rather, the new owner of the property would then become obligated to repay the PACE loan. PACE loan charges or liens, like other property tax assessments, are normally senior in right of payment to ongoing debt service on any mortgage loans. For this reason, the consent of the mortgage loan provider is normally required before building owners can receive a C-PACE Loan. For R-PACE transactions, it may be impractical to seek consent of the mortgage holder—including government-sponsored enterprises such as Fannie Mae and Freddie Mac—so other approaches may be needed to mitigate incremental mortgage lender risk associated with buildings incurring the additional (R-PACE) indebtedness.

The basic structure of a PACE Loan is shown in Figure 6.

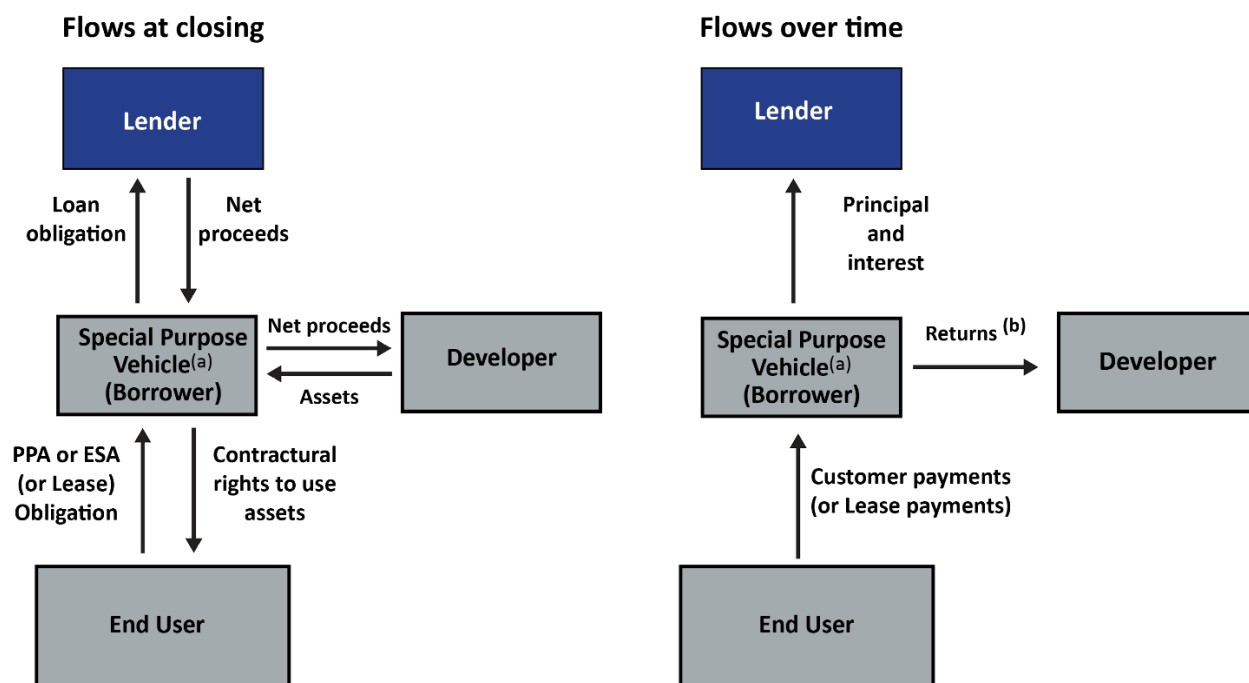
Figure 6: PACE Loan Flows at Closing and Over Time



3. Project Finance Loans

Project finance loans are where the end-user (e.g., building, business) is not the borrower, but instead, enters into a long-term payment obligation to compensate the project developer (e.g., renewable energy developer, energy services company). In these cases, the loan is arranged by the project developer that enters into a long-term contract with the end-user. The borrower is normally a special purpose vehicle, established by the project developer, that holds the clean energy assets as collateral (e.g., solar panels, other equipment). Special purpose vehicles are used to segregate the collateral from assets of the developer; this simplifies lender credit analysis because the collateral is held in a separate entity rather than commingled with other developer assets and liabilities. The basic structure of a project finance loan is shown in Figure 7.

Figure 7: Project Finance Flows at Closing and Over Time



(a) Ownership interests in SPV are normally held by the Developer.
 (b) Ongoing cash flow after debt service, payments for ongoing services, or otherwise.

Project finance loans can take a variety of forms, which may vary based upon several factors including their use of proceeds and typical collateral. Table 5 summarizes common types of project loans.

Table 5: Project Finance Asset Type, Use of Proceeds, and Typical Collateral

Asset Type	Use of Proceeds	Typical Collateral
Lease	Equipment or vehicles (e.g., battery storage, electric bus, solar PV)	<ul style="list-style-type: none"> • Equipment being leased • Lease with end-user
PPA (Power Purchase Agreement)	Solar PV installation	<ul style="list-style-type: none"> • Equipment that the end-user uses subject to the terms of the PPA • PPA
ESA (Energy Service Agreement)	Energy efficiency equipment	<ul style="list-style-type: none"> • Equipment that the end-user uses subject to the terms of the ESA • ESA
Other Assets (e.g., building, equipment, vehicle)	Assets that generate revenues through other means (e.g., public EV charging stations)	<ul style="list-style-type: none"> • Specified assets • Agreements governing operation of assets

4. Structural Variations

Within the basic categorizations of direct loans and project finance loans described above, there are many variations. For example, loans may be:

- Secured by certain collateral (e.g., building) on either a senior or subordinated basis.
- Supported by credit enhancement (e.g., personal guarantees from individuals with controlling interests in companies, corporate guarantees from borrower affiliates, surety bond from a financial guarantor, or a debt service reserve fund capitalized by the borrower).

These and other loan features can be negotiated between borrower and lender to mitigate the risk assumed by the lender (and/or reduce the cost of capital paid by the borrower).

E. Summary and Implications of Financing Challenges and Opportunities

As discussed in this section, there are necessary preconditions to the successful completion of projects that address climate change mitigation, resilience, adaptation, and environmental justice. For certain types of clean energy investment in a geographic region, the local community may contain sufficient opportunities with capable project sponsors, requisite capacity, necessary workforce, and sufficient financing, including lenders with suitable financial products, all responsive to the needs of the community. Unfortunately, this is not the case for many communities. However, there are an increasing number of mitigants available that address common barriers. Financial products are one key ingredient in addressing these barriers, and as discussed, there are varied financial products to support clean energy investment.

More broadly, we need to see all types of financial intermediaries embracing community lending for a just and equitable energy transition. Private sector lenders that may focus on larger or more replicable near-term opportunities should recognize the capital needed to address community needs and pressing environmental concerns. Green lending intermediaries that focus on clean energy projects should ensure that low income and disadvantaged communities are fully engaged as partners in their deployment strategies. Traditional community lenders that have long-served local residents and businesses should ensure that projects with significant environmental benefits are a core—and integrated—product offering. If all lenders rise to this challenge, we have an unprecedented opportunity to realize significant environmental, social, and economic benefits throughout our society.

X. Opportunities for Achieving a Just and Equitable Transition

The preceding section outlines many effective approaches to support green community lending. Yet, the scale of green lending falls far short of the enormity of the challenges facing communities. Accordingly, stakeholders should pursue opportunities that can dramatically accelerate the level of community lending in support of climate change mitigation, resilience, adaptation, environmental justice. There are several guiding principles that stakeholders should consider in developing these opportunities:

- **Democratic, community accountability**, with a transparent and fair process at all levels, consistent with the fundamental environmental justice principle of self-determination (Hangen, Swack, & Poole Johnson, Greenhouse Gas Reduction Fund Request for Information, 2022).

- **Utilization of existing capacity**, including the vast network of community development organizations across the country to reach low income and disadvantaged communities and drive market transformation (Hangen, Swack, & Poole Johnson, Greenhouse Gas Reduction Fund Request for Information, 2022).
- **Prioritization of strategies that demonstrate meaningful community-level coordination, cooperation, collaboration, and capacity building across the project development, financing, and implementation ecosystem** (Hangen, Swack, & Poole Johnson, Greenhouse Gas Reduction Fund Request for Information, 2022).
- **Strategic market building** that addresses non-financial barriers through community planning and outreach efforts, capacity building, workforce development, contractor support, shared infrastructure, and early-stage predevelopment financing (Hangen, Swack, & Poole Johnson, Greenhouse Gas Reduction Fund Request for Information, 2022).
- **Flowing dollars to communities on the terms they need** while prioritizing the smaller-dollar, community-serving projects that struggle to access funding (Hangen, Swack, & Poole Johnson, Greenhouse Gas Reduction Fund Request for Information, 2022).
- **Maximization of impact and minimization of risk using diffuse deployment strategies** (Hangen & Swack, Will a new EPA fund serve low- and moderate-income people? Five principles to promote success, 2022)

Beyond these guiding principles, there are specific lending strategies that should be considered to achieve these principles. The paragraphs below summarize some of the key opportunities to increase the scale of these activities.

A. Standardized Lending and Underwriting Approaches

In certain segments of the capital markets there are highly standardized loan products such as conforming single-family mortgages (i.e., those meeting Fannie Mae and Freddie Mac guidelines). This level of standardization simplifies loan origination, underwriting, and servicing. This simplification reduces transaction costs for homeowners and for lenders that securitize or otherwise finance mortgage loans. Standardization supports increased scale, and both scale and the resulting level of market liquidity support attractive borrowing rates. Yet there are other segments of the capital markets that are less standardized. Commercial mortgages, for example, can vary significantly with respect to property type (e.g., hotels, office buildings, shopping malls) and terms (e.g., amortization schedules, interest type, loan-to-value, maturity, optional repayment). Yet there are enough similarities across commercial mortgages, or different types of commercial mortgages, that the overall market is relatively efficient.

Green lending products also vary in their degree of standardization. Some—such as mortgage loans for high-performance buildings, or auto loans for electric vehicles—are simply conventional loan products financing energy-efficient assets. PACE loans—as well as residential solar PV loans, leases, and PPAs—are newer products that differ somewhat between originators, but that have many common elements. Still other green loan products often have very different terms and approaches to underwriting. Going forward, greater standardization across all product types should reduce interest rates and lower transaction costs, which could improve transaction economics and support greater deployment of clean energy measures. At the same time, just as the traditional loan markets have segments with greater or lesser degrees of standardization, we should expect green lending products to maintain differing standardization levels to allow the diverse needs of borrowers to be met.

Some of this standardization will occur naturally over time, as

1. Large lenders enter the market and establish a de facto standard
2. Lenders merge and begin to standardize their loan product offerings
3. More lenders enter the market and decide to offer lender products that are well-established rather than develop their own products, and
4. Larger borrowers that work with multiple lenders may effectively force lenders to offer more consistent loan products.

Further standardization can also be supported through increased transparency of loan product offerings by lenders, industry groups that encourage more uniform standards for lenders, more established borrowers or lenders working with newer market entrants to offer best practices, or the emergence of service providers that offer standard platforms that support more consistent loan product offerings.

B. Diverse Base of Capital Providers

While increased standardization and scale can, among other things, reduce borrower costs, financing a just and equitable energy transition also requires ensuring that diverse borrower profiles, technology solutions, and implementation strategies can all obtain loan capital on reasonable terms.

For example, there must be lenders with lower cost structures—or subsidies—that can originate smaller loans. There should also be lenders willing to assume the risks (or at a minimum, reduced liquidity) associated with financing newer technologies. Similarly, geographic diversification of capable lenders is also essential. Otherwise, if given a choice, national lenders may focus on larger market opportunities and ignore smaller markets or those with a less favorable environment for clean energy deployment. Moreover, given the importance of local context in clean energy lending—e.g., available incentives, building codes, energy costs, and suitable technologies—and in understanding community needs, local lenders are essential to achieving widespread, just, and equitable clean energy deployment.

The emergence of different lenders willing and able to support different loan characteristics, geographic regions, and technologies should occur naturally with increased clean energy deployment and the follow-on demand for lenders to fill gaps that emerge. Lender diversity can also be supported through (i) state and local government policy that encourages the formation of new lenders—or the expansion of activities of existing lenders—to address market gaps, (ii) advocacy by would-be borrowers in communities where clean energy lending is largely unavailable to encourage capital access, and (iii) engagement of businesses, governments, and not-for-profits to create platforms, tools, and trainings that support new clean energy lenders—or the expansion of activities of existing lenders—in underserved communities.

All of the types of lenders described in Section III above—CDFIs, community development credit unions and cooperatives, community development banks, Minority Depository Institutions, and Green Banks—have important roles to play as they engage customers, community relationships, capacity, and capital for a just and equitable energy transition.

C. Low-cost and Easily Accessible Independent Sources of Technical Assistance

Many project sponsors (or would-be-sponsors) are interested in clean energy measures. For example, a building owner exploring battery storage that provides back-up power for greater resilience, generates

income from utility demand response programs, and reduces environmental impacts by storing solar energy at times of peak supply to lessen the use of dirtier energy sources during times of peak grid demand. However, many building owners will not pursue battery storage in the near term because they may lack credible information on the (i) pros and cons of battery storage, (ii) pathways to access available incentives, (iii) different technologies and equipment suppliers, (iv) qualified contractors in the area, and (v) availability of debt financing.

In the near term, there are different ways to increase such technical assistance (TA) for project sponsors.

- First, lenders could themselves provide some of the necessary TA—and many do. CDFIs are required to provide “development services” or TA alongside their financial services. CDFIs that are leaders in the energy finance space provide TA through staff or partnerships with outside partners, including but not limited to Coastal Enterprises Inc., Partner Community Capital, and [Craft3](#). Similarly, many Green Banks excel at providing TA to their borrowers and would-be borrowers, such as [Montgomery County Green Bank](#). At the same time, since lenders are likely participants in these transactions where they are providing TA, project sponsors may also require the advice of independent parties that do not have an economic stake in transaction outcomes.
- Second, companies and industry groups supplying or supporting clean energy technologies should be encouraged to provide additional information to potential consumers (e.g., electric utilities on electric vehicles, battery suppliers on storage). While this should not be the sole source of information given potential conflicts of interest, these interested parties can play a role in educating local residents. An alliance of mission-based nonprofit organizations, the [Relay Network](#) is a national network of energy efficiency implementors who promote knowledge sharing, facilitate collaborative partnerships, and encourage joint innovation (Relay Network, 2023).
- Third, local higher education institutions could, through service-learning programs or otherwise, provide such expertise, leveraging the schools’ students and faculty, technical knowledge, and local footprint. For example, as part of the National Community Solar Partnership, the Center for Impact Finance at the University of New Hampshire offers a [Community Power Accelerator Learning Lab](#): free online training for non-profit organizations, cooperatives, and mission-driven organizations interested in building out a business line to develop community solar projects.

Finally, government and nonprofits should consider creating information hubs to support project sponsors pursuing mission-aligned technologies. In New York City, for example, the [NYC Accelerator](#) (an initiative of the Mayor’s Office of Climate and Environmental Justice) “provides free, personalized guidance to make cost-saving, energy efficiency upgrades and reduce carbon emissions” (NYC Accelerator, 2023).

D. Flexible Range of Products

While as noted above, greater standardization may result in a lower cost of capital, it is also true that flexibility is needed to accommodate the wide range of borrowers, transactions, or technology types that seek debt financing. Lenders, whether profit-seeking or mission-driven, should have an incentive to develop appropriate products demanded by the marketplace as this is aligned with their own goals. There may, however, be gaps in the market and prospective borrowers that are unable to find financial

products that meet their needs. Further, these prospective borrowers may be under-resourced or under-represented to reach out to lenders (or stakeholders that might influence lenders) to ensure that they can access needed financial products.

To ensure that the lending markets offer the products needed by project sponsors, several actions could be taken. First, lenders should reach out to existing debt capital providers active in their community—whether CDFIs, CUs, Green Banks, economic development authorities, or otherwise—to explore the available options to see what might be available (or made available). Second, if existing lenders seem unlikely to support these goals, community groups should, wherever possible, advocate for reasonable financial products that can finance their climate change mitigation, resilience, adaptation, and environmental justice needs. Third, non-profits and government agencies should support convenings to bring together prospective lenders, borrowers, and other stakeholders with a goal of facilitating greater communication and ultimately increasing clean energy deployment.

E. Guidelines Around Impact Measurement

Currently, green lending is pursued by a diverse range of lenders including:

1. agencies sponsored by federal, state, or local governments
2. not-for-profit organizations
3. private sector enterprises

Similarly, there is considerable diversity among borrowers. As a general matter, there is relatively little consistency in how expected impacts (e.g., environmental, social, and economic) are evaluated. Moreover, there is less consistency in how actual impacts (i.e., once projects are completed) are measured, if they are measured at all.

Take, for example, a public school district that is exploring the installation of rooftop solar on some of its buildings. To secure the requisite budgetary approvals, school trustees or government officials will want to understand the expected environmental, social, and economic benefits of the project. Yet there is not necessarily consensus on how these impacts are reported. Although the energy expected to be generated from the system is relatively predictable, the costs of grid energy purchases in the future that are avoided by having the solar PV system are not. Similarly, the environmental impacts of avoiding these energy purchases are also unclear; if the grid is powered principally by coal-fired generation, the environmental benefits could be significant, but if the grid is powered principally by hydroelectric generation, the environmental benefits could be much less. With respect to social benefits, although short-term job creation from the project is estimable, any human health or other benefits from avoided emissions are difficult to predict. Of course, the actual performance of the project and other variables may cause realized benefits to differ from expected benefits, however estimated.

Lenders—whether CDFIs, credit unions, Green Banks, or otherwise—also need to determine how their projects support environmental, social, and economic goals. Much of this involves gathering information from borrowers for each loan they provide. However, there are other complexities faced by lenders. For example, most lenders will want to report the amount of capital they have mobilized for the clean energy transition. But if two (or more) lenders provide capital to the same project, each lender may include the full project cost when evaluating its capital mobilization if each is essential to the project. Of course, if both lenders take this approach, total project costs are double counted for purposes of aggregated impact reporting.

Impact measurement will never be perfect, although stakeholders reasonably expect project sponsors and green lenders to provide information for decision making purposes. To support this, several recommendations should be considered. With respect to estimated project benefits, project participants should agree on an appropriate impact reporting framework and be transparent in describing the underlying assumptions. As suggested above, project participants may wish to think broadly and comprehensively about the potential impacts of a project, using a framework such as the social determinants of health. Also, groups that report data (government agencies, nonprofits, or businesses) should similarly be transparent in the data they collect and report and should work with other groups to develop common reporting frameworks (such as the reporting frameworks discussed earlier in this report). With respect to measuring actual project benefits, stakeholders should first understand all the costs associated with pursuing greater precision; for example, systems to track homeowner energy use not only involve added time, effort, and expense in their implementation, but may also raise legitimate privacy concerns from building owners or occupants. Notwithstanding these concerns, there are frameworks and technology solutions that can support impact reporting, where the benefits of doing so outweigh the costs.

F. Increased Scale of Lending Intermediaries Supporting a Just and Equitable Energy Transition

There is currently a significant amount of capital available to support the clean energy transition. Much of it, however, is controlled by large financial institutions looking to invest hundreds of millions (or billions) of dollars in transactions. Currently, the loans financing a just and equitable clean energy transaction at a community scale (e.g., supporting community solar, electrified buses, or building decarbonization) are often too small to be of interest to these players. Even aggregated portfolios of these loans may be too small or heterogeneous to be of interest to these large institutions that need to efficiently deploy massive amounts of money. Accordingly, these loans are often originated by smaller players: CDFIs, CUs, or Green Banks. While some of the large commercial banks have, in turn, directly or indirectly financed these intermediaries (often to support Community Reinvestment Act requirements), there remains a gap between the scale of lending undertaken by smaller intermediaries versus the scale of investing opportunity that can attract large asset managers, banks, insurance companies, and pension funds.

There are several ways to bridge this gap. First, government programs that provide support or capital to help these smaller financial intermediaries grow—such as the EPA's GGRF—can play a critical role in increasing and accelerating the benefits associated with the clean energy transition. Second, increased standardization of loan products by smaller lenders can help larger lenders more easily aggregate larger loan portfolios of consistent products. Third, as noted above, more and diverse lenders can help ensure that there is a consistent pipeline of transactions to aggregate, and a consistent pipeline of growing lenders to underwrite those transactions. Over time, many of these smaller lenders may consolidate their green lending activities (through merger or otherwise) to further close the gap between large and small financial intermediaries, just as the U.S. banking sector has consolidated 86% over the last century (Emmons, 2021).

G. Initiatives to Increase Lender Collaboration

While a certain level of competition among lenders is important to spur the creation of innovative financial solutions and to ensure that borrowers receive reasonable terms, some lender collaboration is needed to create the mechanisms that support just and equitable clean energy lending within communities. For example, lenders need to collaborate to effectively and efficiently address some of the items discussed in this section (e.g., more standardized documentation, effective impact measurement). This sort of collaboration in more mature segments of the loan market is supported through industry groups and conferences, driven by third-party vendors that establish platforms available to all lenders, and fostered through specific collaborative initiatives among lenders such as industry-wide training and certification programs, or protocols for data and transaction reporting.

There are many different strategies that capital providers can use to finance a just and equitable energy transition through collaborations with other lenders and/or other participants in the project development and financing ecosystem. Some of the more commonly used strategies in green lending are summarized below.

- **Deal by deal leverage of capital and capacity:** two or more institutions co-lending on a specific transaction or one lender selling, assigning, or participating all or a portion of a loan to another lender (see [Multifamily rooftop solar project in Montgomery County, MD financed by Montgomery County Green Bank, NYCEEC and Locus](#)).
- **Program and product partnerships:** two or more institutions co-lending (or one lending and one providing other services such as project development) for a program that targets multiple borrowers for a specific project or in a specific market (see Energy Savers program [with Community Investment Corporation \(Chicago\) partnered with Elevate Energy](#))
- **Platform strategies:** a lender provides a standardized product offered through a network of local lenders and may also provide other standardized elements such as approved contractors (see [IPC Smart-E loan program](#)).
- **Collaborative fund strategies:** multiple lenders agree to provide loans through a common platform available to prospective borrowers, facilitating matches between borrowers and lenders that are well-suited for each transaction (see [Southern Opportunity and Resilience \(SOAR\) Fund](#))
- **Public-private partnerships:** one or more lenders enter into an arrangement to support project(s) originated or supported by a public sector entity (see [Florida SELF collaboration with the City of St. Petersburg](#))
- **Intermediation strategies:** a capital provider provides loans or other financial instruments to one or more lenders that finance transactions (see NY Green Bank [\\$250 million Community Decarbonization Fund \(CDF\) for CDFIs and other specialty lenders](#))
- **Secondary market strategies:** a capital provider purchases loans—or securities collateralized by loans—originated by one or more community lenders (see [Self-Help Credit Union purchase of energy efficiency improvement loans from Craft 3](#)).

- **Credit enhancement strategies:** one or more capital providers provides a full or partial guarantee, or loan loss reserve, to mitigate the credit risk taken by one or more lenders (see [The Kresge Foundation loan guarantee to accelerate the market development of solar PV plus battery storage technologies in historically underserved communities](#))

At the industry level, these forms of collaboration can promote more consistent underwriting and documentation and engage new lenders in community clean energy lending. This is in addition to the individual institutional benefits that may include increasing the impact per dollar of capital deployed (by recycling funds), reducing risk exposure, validating loan pricing and other terms, and increasing loan liquidity.

At an industry level, there should be increased efforts to educate lenders on the community clean energy opportunity, and whether (and how) to pursue it. There should be an expansion of industry groups and events and, more importantly, active efforts to work across industry silos to share best practices, for example, including more Green Banks at CDFI events and more CDFIs at Green Bank events. Specific initiatives, for example, improving impact measurement or loan standardization, should be undertaken by diverse types of lenders focused on financing environmental justice, mitigation, resilience, and adaptation. Finally, policymakers and philanthropic organizations should, wherever feasible, encourage and support these efforts to develop foundational structures for just and equitable clean energy lending that will support community lending now and in the future.



[NYCEEC-NYC Joint Ownership Entity \(JOE\) community solar project](#). Photo credit: NYCEEC

XI. Conclusion

There are different types of institutions that service specific communities. Community Development Financial Institutions (CDFIs) are lenders with a mission to provide fair, responsible financing to rural, urban, Native, and other communities that mainstream finance doesn't traditionally reach (Opportunity Finance Network [OFN], 2023). Community development credit unions (CDCUs) have a mission to serve low- and moderate-income people and communities that specialize in serving populations with limited access to safe financial services (Inclusiv, 2023). Minority Depository Institutions (MDIs) are regulated depository institutions with either (a) majority ownership by minority individuals or (b) majority of the board of directors is minority and the community served is predominantly minority (U.S. FDIC, 2023). Green Banks are formed to address one or more sustainability objectives, focused on specific markets.

Our pitch to CDFIs, CDCUs, MDIs, and other community lenders that have not integrated mitigation, adaptation, resilience, and environmental justice into their work: business as usual is no longer enough. GHG reduction—mitigation—is a responsibility not an amenity that can be set aside during value engineering. Adaptation is risk mitigation and quality assurance—again, not something that should be considered optional. While more complex, resilience and environmental justice should be aspirational goals that community lenders center in their work. These goals—climate change mitigation, adaptation, resilience, and environmental justice—are intertwined with the traditional mission of community development. To meet goals for economic development, quality affordable housing, and healthy, resilient communities, community development lenders *must* address pollution, the risks and results of severe weather events, unstable and expensive electricity, and the changing economy.

Our pitch to Green Banks and other green lenders that focus on financing the clean energy transition but have not already centered frontline communities and equity in their work: to achieve the deep levels of GHG reduction you seek, you *must* reach these communities, the communities with the least efficient homes and businesses, inadequate energy infrastructure, the oldest cars, and lowest deployment of renewable energy.

Every lender has unique abilities, strengths, and community relationships to bring to the table, critical to an equity-centered approach to GHG reduction. We believe that the most sustainable and impactful investment requires coordination, cooperation, and collaboration with other organizations across the project delivery and financing ecosystem. Such collaboration is particularly valuable for emerging lenders as they develop capacity. Through collaborations, lenders can ensure that all necessary conditions are in place and overcome the challenges and barriers facing them.

XII. Acknowledgements

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NYCEEC and UNH will continue to help lift up and support the work of mission-driven organizations who are helping low-income and disadvantaged communities access clean energy and participate in a just and equitable transition. If you have thoughts on what would be most helpful, please contact Tina Poole Johnson, at: tina.johnson@unh.edu.

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Appendix A

Mission-Driven Lender Types and Characteristics

Table 6: Mission-Driven Lender Types and Characteristics

	CDFI LOAN FUNDS	CDFI CREDIT UNIONS	CDFI BANKS	CDFI VC FUNDS	GREEN BANKS	QUASI- & PUBLIC INSTITUTIONS
STRUCTURE	Nonprofit	Nonprofit cooperative owned by members	For-profit w/community representation on Board of Directors	For- or nonprofit w/community representation	State or local government agency, or nonprofit (often affiliated with state/local govt.)	Federal, state, or local agencies or offices that provide capital to projects with certain criteria
CONTROLLING BODY	US Treasury's CDFI Fund and independent Board of Directors w/community representation	CDFI Fund, National Credit Union Administration and/or state agencies; for most, deposits NCUA-insured	CDFI Fund and combination of FDIC, Federal Reserve, and other federal and/or state agencies; deposits FDIC-insured	CDFI Fund, SEC and Board of Directors w/community representation	Government appointed and/or independent Board of Directors	Government appointed
TYPICAL MARKETS	Microenterprise, small business, housing, and community service organizations	Consumer and, sometimes, small business	Consumer, business, housing, commercial real estate, and community service	Small and medium sized business	Consumer, residential, commercial, industrial, governmental, or institutional	Small businesses, large corporations, projects, or otherwise
CAPITAL SOURCES	Public and private funds including CDFI Fund and other federal agencies, philanthropy, impact investors, and banks	Members as well as CDFI Fund and other federal agencies	Customers and non-member depositors as well as CDFI Fund and other federal agencies	Fund investors as well as CDFI Fund and other federal agencies	Public funds (e.g., federal grants, state revenues); private sector (e.g., loans); and philanthropic funds (for nonprofit Green Banks)	Public funds



