University of New Hampshire
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Building Trust, Building Demand for Buildings Energy Improvements

Working Paper #1: Summary of Approaches and Interview Themes

DRAFT WORKING PAPER
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Background

The purpose of this document is to help funders, government agencies, and lenders applying for the EPA Greenhouse Gas Reduction Fund to identify opportunities to support organizations and strategies that help to build trust and build demand in low-income and disadvantaged communities for buildings energy improvements. The report summarizes themes from interviews with organizations that provide technical assistance to building owners to help them with buildings efficiency, electrification, and rooftop solar. Several interviews also focused on organizations that could offer perspectives on workforce development challenges and other thought leaders in the space. In all, 37 interviews were conducted over the spring of 2023. The interviews themselves focused entirely on the question of how to support demand for buildings decarbonization in low-income and disadvantaged communities, although a number of the interviewees have a broader mission than that.

Interviewees worked in a variety of buildings sectors (single family, multifamily, commercial facilities). While there are important differences between sectors, many of these themes seem to have broad applicability.

The report is divided into two sections:

- The "Summary of Approaches to Driving Demand" attempts to inventory the range of strategies that practitioners are using or are currently developing to work in low-income and disadvantaged communities to promote equitable buildings decarbonization through community engagement, outreach, education, and technical assistance.
- The "Interview Themes" provide a more detailed overview of key themes emerging from interviews, alongside illustrative quotes from interviewees.

This is a draft working paper and your comments on it are welcome. The Carsey School Center for Impact Finance intends to continue to help lift up the work of mission-driven organizations who are helping low-income and disadvantaged communities access clean energy through community engagement and technical assistance. If you have thoughts on what would be most helpful, please contact Eric Hangen, the study author, at: erichangen@gmail.com.

Summary of Approaches to Driving Demand

Interviewees are working on a variety of approaches to driving demand for buildings decarbonization. In this section, we attempt to create a taxonomy of approaches and summarize each one, based on learnings from the interviews. Two important caveats apply:

- Many of the organizations described work in ways that span more than one approach, so the examples cited should not be interpreted as examples of an organization that exclusively practices just that single approach.
- The approaches should *not* be viewed as mutually exclusive alternatives. In fact, many interviewees recommended that multiple approaches should be supported or even closely coordinated and integrated to maximize impact. One way to think about an "approach" as laid out in this summary is that each one tries to capitalize on a particular opportunity to help building owners decarbonize.

We have tried to order the approaches, very roughly, from those that reach people in the early stages of issue identification and awareness-building to those that help people bring a project to fruition.

Grassroots Community Engagement

- **Summary:** Trusted advisors from community-based organizations (CBOs) reach out to residents and other community stakeholders to listen to priorities, make connections to opportunities for "going green."

- **Examples:**
  o [Community Climate Shift](#) is a collaboration between grassroots environmental justice groups and TA / energy expert groups.
  o The [DOE Communities LEAP](#) program provides support for community energy planning.
  o [Access Clean CA](#) combines outreach by community organizations with a tech platform; it is currently focused on EVs but could be adapted for buildings decarbonization.
  o "Solarize" campaigns such as those supported by [Solar United Neighbors](#) bring people together and help them reduce costs through group purchasing.

- **Strengths**: Grassroots strategies to drive demand in responding to community priorities. Puts trusted actors directly in touch with community stakeholders early in their decision process about whether and how to go green.

- **Notes and recommendations for use**: Can be resource intensive. Efforts should seek to "bridge the divide" between grassroots groups and energy experts to foster collaboration.

Building Energy Exchanges

- **Summary:** Building Energy Exchanges build networks among building owners, managers, contractors, architects, and other professionals to share knowledge, develop case studies, and promote diffusion of best practices. Some Building Hubs incorporate additional programming including TA and workforce coordination.

- **Examples:**
  - o [NYC Building Energy Exchange](#)
  - o There is a growing [network](#) of Building Energy Exchanges in Washington DC, Kansas City, St. Louis, Chicago.

- **Strengths**: Transforms markets by working with industry decision makers.

- **Notes and recommendations for use**: Could be combined with additional approaches to reach smaller property owners in hard-to-serve communities.

Network-based Outreach

- **Summary:** Work with national networks of organizations to encourage adoption of clean energy or decarbonization amongst network members.

- **Examples:**
  - o World Resources Institute's American Cities Climate Challenge [Renewables Accelerator](#) is helping cities procure solar energy.
  - o [CAP Solar](#) is a solar developer seeking to serve Community Action Program agencies.
  - o [Adamah](#) works with Jewish religious and community institutions on sustainability initiatives.

- **Strengths**: Ability to deliver information from trusted sources to organizations with an affinity; potential for efficiencies to the extent network members have similar project designs and face similar challenges.

- **Opportunities to further strengthen**: Some challenges are uniquely local (e.g., finding a good installer; state solar regulations) such that a nationally networked approach cannot address them. Some interviewees raised questions about whether network learning is really driven by network hubs versus peer-to-peer inside networks; they noted the potential for resistance or inaction by network hubs.

Reaching building owners at critical junctures / "capital moments"

- **Summary:** Reach building owners when they are at a critical juncture – buying a property for rehabilitation or new construction, refinance of property, or equipment replacement.

- **Examples:**
  - [Community Preservation Corporation](#) is developing a green mortgage initiative that would work with multifamily affordable housing owners and developers; it currently runs a Climate Friendly Homes program in New York State.
  - The Carsey School Center for Impact Finance "[Financing Equitable Resilience](#)" initiative is creating assessment tools that help CDFI lending programs to identify and evaluate projects with high potential to promote resilience, including climate resilience.
  - The Fannie Mae "[Green Rewards](#)" program provides lower pricing, additional loan proceeds, and a free energy and water audit.

- **Strengths**: Deal economics can be most favorable at these times – construction or equipment purchases may be happening anyway, potential to line up other subsidies. Reaching building owners at capital moments provides an opportunity for lenders to play a key role in helping to drive demand.

- **Notes and recommendations for use**: There is a limited window of time during which to identify energy opportunities and convince the building owner (especially with equipment replacement but in some instances also for refi and purchase transactions) – this may be an area where continued advancements in program design could help to work around this limitation.

Strengthening state and local building codes / create building performance standards

- **Summary:** Interviewees are working with cities and/or states for building performance standards that drive decarbonization. There are also opportunities to strengthen building energy codes for new construction.

- **Examples:** Examples of local or state initiatives to drive building performance include:
  - [NYC Local Law 97](#)
  - [Vermont Clean Heat Standard](#)
  - [Boston Buildings Emission Reduction and Disclosure Ordinance](#) (BERDO)

- **Strengths**: Can drive building owners to seek TA in order to comply and avoid fines.

- **Notes and recommendations for use**: Building Performance Standards may have different levels of political feasibility in different parts of the country. Care needs to be taken in designing standards as moderately-structured changes may just result in building owners paying the fines rather than improving the buildings. This approach should be complemented by a TA infrastructure to assist building owners with compliance, particularly to avoid disparate enforcement impacts on LMI communities.

Tech-enabled approaches for "planting the seed"

- **Summary:** Innovators are building new tech platforms to raise awareness of energy opportunities and facilitate access to rebates and incentives.
- **Examples:**
  - Eli.build provides a digital infrastructure to make it easier for consumers to identify rebates and incentives that can support their pro-climate choices. Its technology was used for the Access Clean California website cited earlier.
  - Rewiring America has created an IRA benefits calculator that helps building owners identify incentives they can access and is developing a personal electrification planner for home energy retrofits.
  - Canopy Climate provides a web platform that supports homeowners in identifying ways they can "remove fossil fuels from their daily lives to save money and the environment."
  - Measurabl helps commercial building owners such as multifamily affordable housing owners to benchmark the energy use of their properties to help identify priority buildings to retrofit.
  - BlocMaps is a web platform provided by Bloc power to help community planners identify locations for energy efficiency measures.
- **Strengths**: Potential to reach large numbers of people; can provide an initial roadmap guiding building owners to their next step.
- **Notes and recommendations for use**: These tech tools may be particularly effective when partnered with more grassroots or community-based efforts to reach people – in other words when used as a "force multiplier" as opposed to a stand-alone technology.

Hands-on technical assistance

- **Summary:** Hands-on TA providers provide a "concierge" style service to help a stakeholder understand energy issues, identify and scope projects, access rebates and incentives, manage construction, and commission the energy retrofits**.**
- **Examples:**
  - Elevate Energy, New Ecology, and other Relay Network members provide a broad scope of services including site assessment and technical feasibility studies, financial assessment to determine capital resources, project planning, contractor selection and oversight, post installation inspection and quality control, and solar feasibility analysis.
  - Solar TA providers include Clean Energy Group and Solar One.
  - Green design professionals – a large number of professional engineering firms serve building owners seeking to decarbonize; we interviewed Stephen Turner Inc. and Bright Power.

- The [NeighborWorks](#) network includes many community-based nonprofits operating home rehabilitation programs.

- **Strengths**: This approach can build a high level of trust with customers and help building owners with limited capacity to move forward.

- **Notes and recommendations for use**: Depending on the depth of the engagement; hands-on TA can have high cost per project and be staff-time intensive, yet this approach may also help make the difference when a high degree of handholding is required. It may be useful to consider layered approaches where the highest-intensity TA is reserved for the highest-need customers.

One-stop shops

- **Summary:** One-stop shops conduct outreach, education, and then provide a complete set of services including TA, project management to line up / manage contractors, financing, assistance with accessing rebates & incentives, and other services needed to help the building owner from start to finish. The lines are blurry between this approach and the "hands-on TA" approach described above. The provision of financing is probably the distinguishing factor differentiating the two, but many hands-on TA providers do provide connections to financing programs.

- **Examples:**
  - [NYC Accelerator](#)
  - NeighborWorks of Western Vermont [HEAT Squad](#)

- **Strengths**: Executed well, this approach promises a frictionless solution for customers – ideally, "one phone call does it all."

- **Notes and recommendations for use**: This approach requires a high degree of coordination among partner organizations. To the extent all the services are provided by one organization, which is rare, there is a need to watch for redundancies with existing programs.

Tech-enabled approaches to technical assistance

- **Summary:** Innovators are building new tech platforms to help plan solar and decarbonization projects, as well as to find and evaluate or manage contractors and installers.

- **Examples:**
  - [Momentum](#) is a building decarbonization planning platform being developed by Cadence One-Five. The platform includes data-driven analysis for remote building energy assessments and supports a marketplace for building owners to find and assess contractors.

- The New York City Buildings Energy Exchange provides an [online heat pump planner](#).
- Lawrence Berkeley National Lab's [Better](#) is a software toolkit to help building operators quickly identify the most cost-saving efficiency measures.

- **Strengths**: These types of platforms have the potential to significantly lower costs of providing information, scoping and managing projects. They could also reduce costs and increase customer service speed when used in combination with hands-on TA approaches.

- **Notes and recommendations for use**: A number of promising tools are still in development; this is an area to closely watch for new developments.

Capacity-building for project developers

- **Summary:** Provide grants, training, TA, tools, and templates to help mission-driven project developers. These approaches help community solar developers to build their business, or existing real estate developers to become "green builders" and/or solar developers. Approaches may use a cohort-based approach to help groups of similar organizations, build peer supports.

- **Examples:**
  - The DOE [Community Power Accelerator](#) supports community solar developers with training, technical assistance, a prize program, a workbook with tools and templates, and a web platform where developers, lenders, and philanthropists can make connections around projects.
  - [Enterprise Green Communities](#) is a national green building program created for the affordable housing sector.

- **Strengths**: Provides tools, knowledge, and funding to actors who can then be flexible in their approach to serving their communities; a proven model for how the affordable housing field was built.

- **Notes and recommendations for use**: Solar project developers still need to build demand for the projects they are offering. *Existing* developers can be resistant to changing their building practices.

Efforts to build the contractor base and workforce

- **Summary:** Building the workforce and contractor base may not sound like a strategy for "driving demand" until one recognizes that, traditionally, contractors are the way in which many building owners first learn about opportunities for efficiency. Additionally, difficulties in finding a trustworthy contractor, along with project delays related to workforce issues, can cause consumer dissatisfaction that ultimately dampens demand. To be fair, however, this is a huge topic area with many different strategies and approaches that deserves a lengthy report unto itself. We provide only a few examples here.

- **Examples:**
  - Elevate Energy and the Kansas City Building Energy Exchange partnered on a "Rising Trades" program that provides diverse trade business owners with mentorship, back office support, and connections to the clean energy space.
  - The Illinois Green Alliance is helping in the development of workforce hubs across the state.
  - A number of CDFIs and other mission-driven lenders provide loans to energy retrofit contractors to help them purchase equipment and grow their business. Small business lending and technical assistance to help build the pool of installers, contractors, and other small businesses needed to decarbonize buildings could also help create entrepreneurship and wealth-building opportunities for people in low-income and disadvantaged communities.
  - GRID Alternatives provides equitable workforce development programs to help people from low-income and disadvantaged communities build a career in the solar industry.

- **Strengths**: Contractors are naturally motivated to make the sale and are widely viewed as the 'sales force' by most energy retrofit programs, according to a forthcoming publication on "Driving Uptake" by the Lawrence Berkeley National Lab.

- **Notes and recommendations for use**: Interviewees noted that coordination between workforce programs and employers often needs to be improved. Both pre-apprenticeship programs and wraparound services (such as child care and transportation) are needed to provide opportunities for low-income job seekers. Lastly, some interviewees argued that workforce investments need to be carefully timed, to avoid creating prospective employees for job opportunities that do not yet exist. Other interviewees believe that it is important for building owners to have a neutral party they can turn to for advice, rather than someone who will turn a profit from selling a project, in order to build trust and avoid the potential for bad actors.

Interview Themes

Financing is not the only barrier / issue that needs to be addressed to promote buildings decarbonization in low-income communities. Interviewees talked about a number of other pressures and barriers that building owners (whether homeowners, small landlords, or small commercial property owners) face. Effective programs will need to meet customers where they are at and help them solve the challenges as experienced by customers.

- "Climate is everybody's 7th most important issue – after asthma, rent, car payments – if we get climate to address that stuff, we can really make progress. We can't just devolve all the work to LMI communities, we need to collaborate."
- "Energy and energy justice is important but there are so many other things that community groups are thinking about – gun violence, poverty, etc."

- "People don't want to do upgrades generally – energy efficiency is invisible, you're not going to spend money to bring your bills down just a little. It has to be a major problem or be replacing a system anyway."
- "A car may need a tune up or have old tires but if it still goes, you drive it without realizing. In a building if people have heat and AC you don't think further. Building owners don't view the return from improving performance as worth it. They use their limited staff to do other things."
- [quote referring to need for early-stage support when people are first thinking of a project] "How do we make sure money doesn't pass by the LMI communities we are focused on? Make sure they have the starter-support and starter-money to get to having investable projects."
- "Weatherization barriers need to be addressed. This is a much larger issue than traditionally has been recognized – there are repair needs that WAP will not cover but that prevent weatherization from being done. You need to help people get these fixes done on the spot."

Building owners large and small perceive risk in moving forward with a decarbonization project. In order to take action, they need to hear from people they trust and about successes achieved in similar situations to their own.

- "People have given away community solar and people don't trust it – if you don't have the right messenger. That's why working with these networks is such a critical piece: neutral, third-party entities who are just trying to do the right thing."
- "Real estate is a risk averse industry. But on the other hand, we can lean into that – people like 'rinse and repeat' strategies, developers build the same things over and over again. There is a finite number of building typologies, especially in the residential sector."
- "I don't know about having 'experts at the top' – the trusted advisor part is a really big deal and knowledge is regionally specific."
- You have to "go through trusted partners – churches, community action agencies. Sell comfort over savings."

One way to address this dynamic is through a "diffusion" strategy that seeks to socialize knowledge and ideas about building decarbonization among building owners, managers, contractors, and other stakeholders.

- "We're still in a peer-to-peer mode to diffuse innovation, peer-to-peer learning is best for that. BE-Ex hubs can lean into that – mitigate risk where a building owner can see five other buildings of their same type who've done this and here are the contractors they've used."
- There is a "need to continually create a strong education platform – demystify ideas around high-performance buildings, understand the value of these buildings. Education can give us a broad reach. Use education to get as many eyeballs as we can on the ideas."
- "Our members are the folks who've been 'early adopters' of green building. In that process, they've developed a lot of expertise beyond what other folks have. If there are going to be laws people have to comply with, how can we tap the knowledge of our

membership to help these other folks? When the City passed a benchmarking ordinance a few years ago, we offered to the City that we would find people to do pro bono benchmarking for buildings that needed help – we found 50 volunteers who helped these building owners with that."

Partnering with community leaders and community-based organizations can help to bridge divides between LMI communities and buildings decarbonization programs.

- "Partner with a local organization with roots in the community that understands the people they want to connect to and knows what resources/information they need."
- "How do we build better relationships across the frontline divide? If we get that right, we can unleash a lot of demand."
- "Tools need to be connected to local community groups. If you are a community group and you're familiar with these toolsets, maybe you are able to help local building owners or businesses."
- "You have to be thoughtful about your engagement – you have to get building owners to make upgrades and not pass the costs on. Often, CBO relationships are more with the residents, but you have to understand the building owners. The residents do have, however, expertise in the neighborhoods – understanding their lived experience is valuable, they need to have a safe place for them to talk about issues with landlords."

New approaches may be needed to work in rural environments.

- "Work with economic development agencies, not energy folks, around rural economic development. Don't be afraid of the rural bankers and their relationships – they can package in energy efficiency."
- "Building Hubs are a very 'metro area' tool." [The commenter went on to talk about the need to think through how they could be adapted for rural areas.]
- "It's the perfect time to come up with a model" for Buildings Hubs to serve rural and native communities. "With the Bipartisan Infrastructure Law funding for broadband there will be a new economic development boom in rural areas. Rural banks can be a good partner. The need for housing and the condition of existing housing are pressing issues. Who can be the technical provider to rural counties?"

Many building owners need hand-holding to navigate the complex steps and processes you have to go through to identify energy improvement measures, plan projects, manage the project to completion, get access to rebates, etc.

- "We feel that one-on-one TA is needed, not just high-level resources even though there are some folks who just need that."
- One layer "is to hone in on folks who are super under-resourced, like affordable housing providers, and use that as a space for navigating conversations, providing energy audits – offer this service for the underserved markets."
- "Just because you build a hub doesn't mean that owners will come to it. The top tier of owners will come, but you won't get at the whole sector, and you really won't get at the

buildings we care about the most, like smaller multifamily buildings. They fly under the radar, are hard to find."

- "NYC has the NYC Accelerator which does hand holding and one-on-one consulting – they help facilitate projects. It is very labor intensive and expensive work. It can be very helpful when it is done right, for sure."
- One interviewee noted that at the same time, the level of TA "varies by sector." Small projects need a "quick and dirty" approach, while "for larger projects there is generally a professional team on the job. We're coordinating all the local resources, whether there needs to be other applications or documents prepared to meet city guidelines / zoning guidelines." And "then you have the middle ground – smaller multifamily properties, the owners don't have the ability to project manage this scope of work and it's not financially viable. That is the part where you need to build out this kind of TA provider network."

A number of practitioners have developed or are seeking to develop "one-stop shops" that provide access to all the services a building owner might need to decarbonize within a local community.

- "We're playing around with what an anti-poverty retrofit accelerator might look like. Do the marketing, connection, support, hand-holding, but also thinking about directing the IRA dollars to the consumers and contractors that need this the most – one-stop-shop model but a little more geared towards equity."
- "A lot has to happen at the local level. At a minimum, this has to happen at a regional – meaning county or smaller – level. The building stock is different, the utility incentive programs are different, and there are networks of CBOs and neighborhood associations that you need to tap into. I know that people think you can't build that network of one-stop shops, but I think it will actually work."
- "A true one-stop shop would pull together building modeling, loan origination… together with their community outreach and community outreach tech. At that point there is still a handoff though – someone has to install the heat pump, someone has to make the loan for it – so you have to think through the points of handoff and integration in order to give someone a smooth ride."
- "The idea with Access CA is that you need technology to play a key role – you use community engagement to sell the benefits to the community, and then the call to action is to go to a one-stop-shop website and figure out the right path for you. It can't be nine different websites, it has to be a simple pathway."

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.

- "When are people thinking about investing in their properties? When they are purchasing, refinancing, or when something breaks. Inject yourself into the mortgage process and make the green case/give people a better interest rate. Make the 'green thing' economically attractive and people will jump through some hoops."
- "If you can buy down interest rates on financing, that can also drive demand. We did a pilot program with VSECU with a 50 bps interest rate break for people who were willing to invest at least 10% of their loan in energy improvements like air sealing, insulation,

heat pumps, or solar, as well as repairs needed to do those things. We found that given that opportunity, people actually spend 25% of the loan amount on energy improvements and the average loan amount went up to $66k. This is with a small sample though. Some interesting lessons – offering interest rate reduction is a demand driver but it is also a win-win because the lender makes more money by making a larger loan."

- "We found that most people will not come to 'whole-home electrification / energy retrofits' easily. You have to understand the pathways people actually come to this through, like 'my water heater broke.' When these events happen, we need to have a good mechanism in place."
- Some commenters pointed out how this kind of approach puts the lender in more of a central role with the customer. There is an advantage to this, in that the lender is in the best position to understand the financial parameters that have to be met before a deal is financeable. In other interviews conducted by the author for other projects, some lenders have expressed the need to make sure that TA providers understand lender parameters so that they can refer viable deals for financing. Early lender involvement, as happens with a "capital moment" approach, helps to address this challenge.

If the "carrots" are sweet enough, many interviewees believe that financial incentives will help to get building owners interested in decarbonizing. Some comment, though, that incentives have to be very deep to work.

- "The best strategy for GGRF is to increase incentives. There is a direct correlation between incentive levels and customer uptake."
- "[Our organization] found a lot of success when the GSEs and HUD came out with green rebate programs. They all vary a little but, generally, if you can show your building is at a certain level of energy performance they will reduce the interest rate on your loan by 25 bps, roughly. That was a big change in owners caring at all about building energy performance. The interest rate reduction was a big motivator for people – a good carrot."
- "When people make moves, they make moves because of these utility incentive programs. There's a guy who does HERS ratings and solar. The utility came to him and said we'll pay you $135k to convert your home to heat pumps so he did. But most utility incentive programs aren't aggressive enough to get us to where we want to go."
- "In Delaware, we've had a program to retrofit existing affordable housing, where we've had RGGI funds to pay for 50% of the costs of upgrades and we have NO TAKERS. We've just ramped up the subsidy to 90% of the upgrade costs. We'll pay for it until we run out of money."

At the same time, interviewees also felt that "sticks" in the form of local building regulations are needed to get building owners interested in decarbonizing.

- "A lot of folks assume the policy will drive the demand – e.g., local building performance standards. There's a lot of opportunity to think about that type of policy."
- "We have seen a huge increase in interest in helping buildings comply with mandatory city and state requirements, like Local Law 97 in NYC. These laws are important."
- "What needs to happen is that for the existing building stock to transform there needs to be BERDO-like [Buildings Emissions Reduction and Disclosure Ordinances] and regulations everywhere. Like NYC local law 97."

Contractors are seen as being in the lead on the marketing challenge. Supporting contractors to grow – and to adopt clean energy technologies – is another area where interviewees are seeking to build their efforts.

- "We need $ to be able to provide wraparound services for contractors – help them use their LOC. We're piloting a product where we provide a high level of service – financial coaching, helping them with back-office systems, how are they doing invoicing, etc."
- "With all this money, we have an opportunity to convince existing construction companies and others that there is finally a long-term business road ahead for them. This provides tremendous long-term market transformation opportunities if we can get our foot in the door with traditional construction and HVAC contractors."
- "What Connecticut did, which has some good potential and has led to high demand – they've reached out into the community and partnered with existing contractors, most of them are insulation/window/retrofit contractors, to become the de facto staff for the utility program. Because these contractors are already in the community, they have relationships, they are more trusted, there's a lot of word of mouth, and they hire workers from within the state."
- "There are issues contractors have there [in New Mexico] – the insurance costs for them are too much, the cost of getting certifications is too much. You need to fund these soft, tangential things that are barriers to entry."
- On Clean Energy Works in Portland – "It was an interesting model of how to drive demand through a collaborative market intervention – a nonprofit set up with a contractor pool and some lenders in the mix and state energy incentive folks, streamlining the whole thing. We went out and swarmed to try to create demand."
- "Make sure the contractor knows what a heat pump is. There is a real need to animate, activate, inject the new forms of capital into the contractor networks and ensure that they are on board and are helpful."

Information technology (e.g., AI, new web-based tools, data-driven approaches, etc.) is offering new possibilities promising to make the work of helping programs reach and serve more building owners easier, cheaper, and faster. Many interviewees discussed opportunities to integrate tech tools into other approaches as a way of supporting those approaches. Many of the new platforms are still in development.

- "We need simple screening tools. We want to decarbonize buildings – are there maybe 10 questions we can put forward for a simple screen? This could potentially include AI-driven tools that help you get to an answer quickly – e.g., remote audit tools."
- "We have additional aspirations: a personal electrification planner (online tool) that maps out what your electrification plan would look like. You can then find the rebates, and get a plan for how to maximize your tax credits and rebates over time."
- "Easier access to data is a huge challenge for any type of building across the country. Getting utility data is a nightmare and that is key to creating baselines and measuring performance. There are lots of solutions out there but they vary in terms of expense. Right now the way we get utility data is that we scrape utility data websites using the user password. But utility websites and passwords change so we are constantly fixing those

connections; so using AI to help us with that would be good – helping us scrape data more easily."

- "An AI-driven energy audit seems interesting. A product like that could help someone see the opportunity – 'Here's the value for you of an energy retrofit.' You still have to get them aware of it, get them to trust you, and then get them to commit."

Some interviewees are working through networks of nonprofit organizations in multiple communities (e.g., networks of churches, of health clinics, of Community Action Programs, etc.) to help the network nonprofits themselves decarbonize.

- "We talk a lot about schools, churches. If a national group can be a partner and help communicate down to their members, that will help them to execute. The national groups don't have the local intelligence – just use the national group to connect with a local person who does. The action plan is how do you work with the local church or chapter."
- "We have a synagogue in Detroit doing all this work; a mile down the way is a church without the resources. A little bit of money could help these institutions buddy up to work on a project together."
- "National CAP provides trainings, certifications, and several times a year there are conferences. There's no central entity per se, just 1,100 different agencies out there in a community. Individual projects would be hyper local, you are looking at the potential of thousands of applicants… CAP Solar is the official solar developer for community action agencies." They "function as a national developer and identify national EPCs to partner with and work with localized co-developers."

Interviewees saw some utility in creating tools, resources, or infrastructure that could support efforts across localities – but also significant limits to just how useful it could be, with local relationships seen as an irreplaceable resource.

- "We don't think the whole end product of a 'one-stop shop' can be a national thing. But we did realize that the most difficult digital infrastructure needed to create those products can be built at a national level."
- One interviewee was "totally skeptical" about the idea of a national, unified solution – "The building industry is not that. The way buildings get built is different across locales and building types. Some places the driving force might be a business association, other places it might be an AIA chapter. Why did one building do a deep retrofit and another not? It is usually one person who was a champion – we need to find and give those people more tools. Set up a structure where you are open to identifying those local people and structures, feed them resources and water them, help them grow."
- "It can be powerful not to center one solution but to bring the lessons learned from all of them. What will be important is having real learning conversations – not skin-deep 'best practice' memos. The power of the funders is instead of having people give quarterly reports, to convene the people – fund a few different approaches at scale and get the different approaches together, both for obvious opportunities to collaborate but also to hear what did and more importantly what didn't work in a Chatham House rules type of way. That would be huge."
- "You shouldn't require any program to use anyone else's stuff. It could be that the messaging needs to be different or the building types are different – so that it doesn't

land. You'll only know if it lands if you have local folks involved who can tailor to their audience or be inspired by something. So there needs to be some flexibility on that. And there is value in allowing innovation to happen."

- "The best organizations are often local. There are some intermediary organizations that act as coordinating bodies between employers, employees, and unions… But there aren't really national organizations that are actually doing stuff on the ground. There are national organizations who have networks" that can be helpful.

A number of interviewees suggested that multiple approaches should be valued to promoting buildings decarbonization.

- "BE-Ex hubs, TA providers, tech tools – they should all work together in a complementary way."
- "In an ideal world, this is a 'both/and' where you both having buildings hubs working with building professionals to educate them, encourage innovation and adoption, and also you have the accelerator-type model to really work with the people who are not on the leading edge – work with that mom-and-pop building owner in Brooklyn who is just hanging on and freaking out about Local Law 97 or maybe not even aware of it."
- "Don't pick one pony. Pick ten ponies – give them all enough traction to really get somewhere. The different approaches will work in different markets in different ways. We actually do need multiple solutions, leverage and play off of that."

Workforce development needs were broadly seen as a significant challenge to IRA implementation.

- "People are scared that we can't hire enough people now to do the work we have – where are the people going to come from that we need to do this?"
- "Workforce policy is a simple policy area – you want the training to be as responsive to employer needs as possible, that provides wraparound support (like childcare and transportation) and is often paid training so people can leave their minimum wage jobs. The bigger thing rather than funding that is preventing there from being sufficient workforce opportunities is the complexity and lack of coordination that prevails."
- "We need apprenticeships but even to channel people into apprenticeships you need a robust workforce ecosystem – get people in at a basic level where they can move into apprenticeship opportunities. A lot of folks may not have a high school diploma or formal work experience in any industry, they need base-level skills to be able to apply for an apprenticeship program."
- "If you invest in workforce development, you'll help develop the community, help to work with the workers you just created, and serve them with your financial institution."
- "Community College training programs can cost $10-20k – we need to have more subsidized loans or grants for low-income folks to attend these training programs."
- "We do not have sufficient trained, available workforce in many locations to do the volume of work that is coming. The problem is you can't just go out and recruit and train people. We've put too much emphasis on a successful career path being going to college instead of technical school or apprenticeships."
- "We under-value maintenance – "maintenance worker" is a pejorative term. But in Europe there are people who work on building maintenance who have PhDs. When jobs

having to do with existing green buildings morph and become as esteemed as an IT job – that's when we'll be able to get somewhere. Until then we will build overly-complex buildings that fail early in their life because we don't have an adequately trained workforce."

Interviewees feel that their own organizations have limited ability to grow without partnerships.

- "We can't think in terms of 'we're competing with others', rather that everyone is going to get some support. Let's raise up as many organizations as possible at the national and local level so that this work can get done. We can't hit scale required totally on our own at SUN – no one can – so how do we build up as many organizations as possible?"
- "We want to be able, when products are rolling out in states, to make it our mission to inform installers in those states about the products that are available. We don't know how to do that beyond the states where we currently operate."
- One interviewee "worries that folks who receive big grants will just staff up rather than partner up. People are used to the methods they've used in the past."

Appendix: List of Interviewed organizations

- ACEEE
- Adamah / Jewish Climate Leadership Coalition
- All Electrify
- Boundary Stone
- Breakthrough Energy
- Bright Power
- Building Electrification Institute
- Cadence One Five
- Canopy
- CAP Solar
- Clean Energy Group
- Delivery Associates
- Elevate Energy
- Eli.build
- Energy Futures Group
- GRID Alternatives
- Harvard Law School
- Housing Sustainability Advisors
- Illinois Green Alliance
- Institute for Market Transformation
- Invest in Our Future
- IREC
- Janet Joseph, consultant
- Kansas City BE-Ex
- Lawrence Berkeley National Lab
- Measurabl (Wego Wise)
- New Ecology
- NRDC
- NYC BE-Ex
- One Ethos
- Rewiring America
- Seth Cousins, consultant
- Solar One
- Solar United Neighbors
- Stephen Turner Inc.
- Upright Consulting
- World Resources Institute