

New roles for intermediaries: the case of community-owned solar energy development

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ABSTRACT

This dissertation explores the ways that intermediary organizations of various kinds have helped to promote community-owned solar energy development in the United States. These organizations play a much wider range of facilitative roles than most other mediating organizations have traditionally played in the public sector over the past several decades in America. Until recently, energy development in the United States has been dominated by private investors and government regulators, particularly those focused on the construction and operation of investor-owned fossil fuel facilities. Now that renewable energy is economically competitive, indeed in 2020 about 20% of all new electricity produced in the United States was generated from renewable sources, up by 9% from 2019 including small-scale solar (EIA 2022), new investors and new regulators have inserted themselves into the energy development process. Given its ease of installation, solar energy is an attractive option, and many communities are seeking to own and operate new facilities; but, despite its increasing financial competitiveness and recent technology improvements, it is often unclear to many communities, particularly those that are under-resourced, the steps they must take to own and operate solar facilities of their own. Based on interviews with 28 intermediary organizations and surveys of more than 300 members of community solar cooperatives in 15 states, I have been able to determine that intermediary organizations involved in promoting community-owned solar energy development have moved beyond the purely “neutral” facilitating roles that other public dispute mediators have traditionally played. Instead, they have been successful by focusing on (1) enhancing community understanding of the solar energy status-quo (i.e., production and distribution options); (2) informing project design and financing efforts, (3) providing procedural guidance; (4) helping to promote changes in local, state, and federal policies and programs, and (5) supporting local organizational and political capacity-building. Intermediaries in the community solar context include community-owned cooperatives and energy justice organizations along with a variety of governmental support offices. From the data I have collected, I think it is fair to say that community solar focused intermediaries are working primarily to empower under-resourced and under-represented communities by helping them move toward community ownership. They empower communities by helping them apply technical information, mobilize networks and partnerships, and build local movements to promote distributed, decentralized, and democratized energy systems.

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1. Introduction

1.1. The climate problem

The United States (U.S.) is committed to reducing 2005 level greenhouse gas (GHG) pollution by at least 50 percent by 2030 and reaching net-zero emissions by no later than 2050 (Ocasio-Cortez 2019; The White House 2021). The electricity and transportation sectors combined in the US still account for more than half of all GHG emissions (U.S. Environmental Protection Agency 2022). My research focuses on these two sectors: the largest contributors to GHG emissions in the US economy. Among possible ways of reducing GHG emissions are increasing energy efficiency and transitioning from fossil-fuels to renewables in the power sector. Lots of attention is being placed on making the transition to renewables in electricity generation which will have a spillover effect on decarbonizing other sectors. A recent report released by the U.S. Energy Information Administration (EIA) notes that renewables have become the fastest growing energy source in the U.S., reaching 24 percent of all utility-scale electricity generation in the first six months of 2022 (Fasching and Tsai 2022). Other reports indicate that solar accounted for almost 39 percent of all new electricity generating capacity added to the grid in the same period (Davis et al. 2022). Solar energy is moving at the fastest pace in the transition from fossil fuels among all sources of renewables.

1.2. The rise of community solar

While adding more utility-scale renewable energy facilities and phasing out fossil fuel plants are part of America's CO2 reduction plan, large-scale projects are not the only way to achieve these goals. In fact, diversification of project types, such as cooperative, small-scale, and community-owned systems, is also vital to achieving state and national electricity decarbonization targets. For example, community solar projects are beginning to gain traction as we see a gradual uptake of project implementation at various scales and locations (G. Chan, Heeter, and Xu 2021). Community solar projects offer alternative solutions in the face of unpredictability and

detrimental risks posed by grid vulnerabilities caused by natural disasters (Weinrub 2021; C. Huang 2022).

Further, community solar has become more than important because many Americans are not individual homeowners with the luxury of installing their own residential solar (Solar Energy Industries Association n.d.). Community solar provides an alternative while providing renters and low-income individuals an opportunity to contribute to decarbonizing the power sector (contributing to the transition from fossil fuels). In the process, they can also claim benefits such as bill savings by receiving financial credits from their share of solar energy produced by jointly owned solar facilities (Solar Energy Industries Association n.d.). The Solar Energy Industries Association (SEIA) reported that 41 U.S. states and the District of Columbia (D.C.) has at least one community solar project operational with a combined total of 5.1 GW installed so far in 2022. At least 19 states and Washington D.C. have recognized the benefits of shared solar by encouraging its growth through policy and programs (Interstate Renewable Energy Council 2019a). It is estimated that in the next five years the U.S. community solar market will add more than 5 gigawatts of total capacity (Davis et al. 2022).

1.3. Challenges of community-owned solar

We see an increasing uptick in community-owned solar project implementation at various scales and locations. Community-owned solar appears to be an important part of the most likely decarbonization pathway for the U.S. Community-owned solar projects also offer stable energy supply in the face of the serious risks posed by climate change-induced natural disasters. A range of communities – including Tribal nations -- are leading the way as solar energy becomes an additional avenue for wealth building, resiliency enhancement, and participatory decision-making (CEO and Founder, Native Sun). Many under-resourced communities who pay a significant amount of energy bills could benefit from participating in community-owned solar programs.

According to the research done by the American Council for an Energy-Efficient Economy (ACEEE), it is estimated that 25 percent of all U.S. households face high energy burdens (by definition those that pay more than 6 percent of income on energy bills), and 13 percent face severe energy burden (those who pay more than 10 percent of their income for energy) (Drehobl et al. 2020). Severe energy burdens seem to be disproportionately concentrated in BIPOC and older adult households living in low-income multifamily housing or manufactured housing, particularly in metropolitan areas (Drehobl et al. 2020). Low-income consumers make up almost a third of all households nationwide, and they account for over 20 percent of all residential energy use (by conservative estimates) (C. Chan, Ernst, and Newcomb 2016). This suggests that community-driven solar could become especially important for these vulnerable communities.

A number of financial factors, unfortunately, limit the opportunity for widened community access for community-driven or community-owned solar. Studies show that LMI communities lack access to clean energy technologies, not only because of affordability, high upfront costs, and other resource constraints, but also because of deeply embedded inequities related to race, ethnicity, citizenship, age, and language fluency (C. Chan, Ernst, and Newcomb 2016; Curti, Andersen, and Wright 2018; Cook et al. 2019).

Observing how community-owned solar projects are commonly developed, I realized that ownership was a much more important consideration than I thought. It is not easy to overcome the usual barriers to ownership. It takes courage, will and persistence. But that even that is not sufficient. There are regulatory, financial, and administrative challenges that make it hard for community members to know where to begin. First, owning such a facility requires generating agreement among community members. There are all kinds of risks that have to be managed. Most of the people involved initially do not know how to read a balance sheet. They do not know how to steer through the multi-level policies and regulations that apply. And, they do not know how to tap the public and private resources that might be available to them. Finally, they do not know where to go for help.

It turns out a variety of intermediaries or intermediary organizations can be of assistance. However, there are questions that must be answered. What do these intermediaries bring to the

table? What do they want in return? Can they be trusted? What is special about intermediaries that focus on community ownership of solar facilities? My goal is to answer these questions from the perspectives of these intermediary organizations as well as from the vantage point of community groups. My goal is to tease out a set of criteria that can be used to identify the diverse roles these intermediaries can play. The criteria are less for judging the success or effectiveness of these intermediaries in helping communities reach their goals. Rather, I want to use them to characterize the different attributes these intermediaries bring to the table so communities can make informed choices about the help they need.

1.4. Anticipated new roles for intermediaries in the public arena

I seek to help conceptualizing the roles that various kinds of “intermediaries” in the renewable energy sector can play. In particular, I aim to (1) categorize the roles that intermediaries can play in winning support for community-owned solar energy in terms of the scale and nature of the interactions they tend to facilitate (the kind of role that resembles more closely to traditional mediating institutions or intermediaries in public dispute mediation); (2) identify and conceptualize the kinds of intermediary organizations that actively seek to help facilitate the joint efforts to advance community owned solar energy development (uncovering the new kinds of mediating institutions in operation in this important new field of community ownership of solar energy); (3) describe how different kinds of intermediary interactions often unfold and suggest several models of intermediary interactivity (i.e., illustrations of intermediary interaction that aims to connect different communities together versus that provides technical expertise by managing the joint fact-finding process involving different experts in the process of community solar development); and (4) investigate the differences in the roles and functions that intermediaries in advancing community owned solar projects have played when contrasted with those of intermediaries in a more traditional setting (in public dispute resolution). My hypothesis is that, with the increase in the accessibility of new technologies like solar energy, and with the relative ease of building facilities using these technologies, many communities on the ground will be in a better position to challenge the status-quo. The status-quo in the solar energy market has been dominated by investor-owned utilities (IOUs) and wealthy corporations. In addition, due to the variability and complexities of regulatory standards, resource availability, and political

challenges across different states in the US, it is often unclear to community members how they can build and maintain a solar facility through the project lifecycle.

My research aims to test a two-fold hypothesis: First, there are important roles for intermediaries to play beyond offering technical assistance. They can enhance social networks and empower groups at the margin. Second, intermediaries need to gather financial and political support as they seek to fulfill their roles at various scales. I propose that different kinds of intermediaries should seek to mobilize grass-roots support and then generate broader political endorsements for community-owned solar development. I examine the perspectives on community owned solar projects of cooperatives (including rural electric Co-ops), Tribal representative groups, non-profit organizations including energy justice and environmental justice groups, state energy agencies, and municipal associations or aggregations. They all are playing the role of intermediaries. I have used participatory research -- moving from initial engagement with actual intermediaries to extensive discussion with groups that might be intermediaries in future community-owned solar development efforts. Within these organizations I have talked with program managers, staff and leadership, surveying community member owners and volunteers who interact with the intermediaries.

In my view, with the help of innovative intermediaries on the ground, many communities can become owners of shared community solar facilities. Based on my observations of some of the intermediary organizations in the field across multiple U.S. states, these entities, while providing facilitative services and building in community buy-in, fulfill three additional roles that conventional mediating institutions have historically avoided: empowering client communities, helping to build the capacity of their community members, and movement building for wider social change. It seems clear that these diverse intermediaries helping to advance the development of community driven, community owned solar energy have a specific mission – one that is not bound by the principle of neutrality – but aim instead to achieve or contribute to social change.

They seek to provide new information, resources, and procedural knowledge that empower their client communities. They seek to empower community groups by helping to build community

buy-in. They empower community members by sharing with them what is possible by way of wealth building. Intermediary organizations also help communities understand what they need internally to become successful and provide them with the tools to co-design and implement training and education programs. Lastly, intermediary organizations build coalitions that advocate for system-wide change, advocate for an energy market that is more decentralized, decommodified, and democratized.

In this research, I aim to expand the conventional wisdom regarding the role of mediating institutions that have helped resolve public disputes. I want to show how new intermediaries in the public arena are offering something beyond neutrality while still facilitating shared understanding and advancing project implementation.

1.5. Organization

Chapter 2 first presents the theoretical foundation or the context of theory and practice of the traditional roles and functions of intermediaries in the public arena. In this chapter, the historical evolution of mediating institutions in public dispute resolution is described, illustrating how the work of intermediaries has adapted as they worked on environmental dispute resolution and negotiated rule-making. This chapter lays the basis for evaluating the new roles and functions of intermediaries in the community owned solar energy development context. Chapter 3 then presents the history of community solar as well as trends showing how deeply embedded community solar could become in the near future. The chapter introduces community-based organizations as a type of intermediary that helps to advance community solar in general and outlines the systematic challenges communities face when attempting to develop community solar at specific sites. The chapter reveals that while there is a growing scholarship on the role of various organizations in community solar in general, the study of intermediaries that focus on advancing community ownership of solar energy is a relatively unexplored domain. In chapter 4, the research design is presented and described in detail so that anyone who wishes to carry out similar research in a different context can replicate the methods I have used. My research compares and contrast the perspectives of the intermediaries (the leaders and staff of these intermediary organizations) and the community members they serve. I seek to compare my

findings to the baseline regarding the conventional roles of public dispute mediating institutions. In chapter 5, my empirical findings are presented in the following order: (1) unpacking the intermediary roles illustrated by the case studies of intermediaries (based on in-depth interviews conducted with the leaders and staff of the intermediary organizations), (2) presenting the different models of intermediary interactions with community groups, and (3) laying out what the perspectives of the community members are regarding some of the key roles intermediary organizations set out to provide. Chapter 6 synthesizes my findings and draws some general conclusions that help to answer my core research questions. I draw out the similarities and differences between the perspectives of intermediary organizations and the communities, as well as between conventional intermediaries and these new intermediaries operating in the community solar sector. Finally, chapter 7 presents important takeaways and directions for future research.

2. Intermediaries in the Public Arena

2.1. Short history of the public dispute resolution field.

For over fifty years, the field of public dispute resolution has evolved in multiple directions. Practitioners, public officials, and professionals found innovative ways to adapt and apply dispute resolution techniques in new areas (Susskind and McKearnan 1999). In the early days back in the 1970s, facilitation and mediation services started to get more attention as an alternative to litigation (Susskind and McKearnan 1999). In 1975, a dozen or so so-called dispute resolution centers were filled with requests for mediation assistance across the nation (Susskind and McKearnan 1999). When mediation was first introduced as an approach to resolve environmental conflicts, it was met with some skepticism (Bingham 1986; Susskind and McKearnan 1999). A decade or two later, the same people who might have second guessed mediation assistance as a strategy were one of the first ones to seek assistance from mediation and facilitation experts (Susskind and McKearnan 1999). Also, from a few people to many environmental mediators in the field several decades later now use consensus building as a mechanism to come up with mutually beneficial solutions without jeopardizing the relationships and building agreements in a harmonious way (Susskind and Cruikshank 1987).

According to Susskind and McKearnan (1999), public dispute resolution approaches were first experimented in the following four issue areas in the late 1970s: (1) environmental dispute resolution, (2) negotiated investment strategies for public officials, (3) negotiated rule making for public agencies, and (4) the emergence of community dispute resolution centers. Firstly, employing mediation techniques to help stakeholders come to a mutually beneficial agreement, and allowing the two seemingly opposite sides negotiate a settlement as opposed to going to court, have been tried numerous times to resolve environmental disputes since the late 1970s (Bacow and Wheeler 1984; Bingham 1986; Susskind and McKearnan 1999). Still today, multiple stakeholders around contentious environmental issues including trans-boundary water disputes to siting of waste management facilities seek assistance from professional mediators who can help manage the process of consensus building and create value by exploiting the differences (Susskind and Crump 2009). Secondly, public dispute resolution techniques were also tried when

government officials were jointly making difficult budgetary decisions (Susskind and McKernan 1999). Many differences in the related requirements, demands, and standards across different levels of government led the government officials to try out a new method that could be used to work out the differences, and yield a better and more resilient outcome (Susskind and McKernan 1999). The core of this method again is the help of a neutral facilitator who helped convene the representatives of each office, and manage the process of joint fact-finding and consensus building (Susskind and Cruikshank 1987). This process dubbed as “negotiated investment strategy” begun to get implemented in different levels of government (Susskind and McKernan 1999). Thirdly, in a very similar way, federal agencies begun trying out a collaborative process of rulemaking by inviting all parties likely to be impacted by the decision rule to participate in the joint fact-finding and in the process of jointly suggesting specific provisions (Susskind and McKernan 1999). One of the first agencies to experiment this idea is the Environmental Protection Agency (EPA), in the early 1980s (Susskind and McKernan 1999). While the process was initially met with some pushback, after several months of carefully structured negotiation and joint fact-finding managed and assisted by a professional neutral mediator, the participating stakeholders reached a consensus (Susskind and McKernan 1999). Negotiated rule-making since then gained legitimacy because the decisions made reflect the fingerprints of every stakeholder involved, those that are mostly likely to be impacted by the decision rule (Susskind and Cruikshank 1987; Susskind and McKernan 1999). Lastly, the public dispute resolution field saw a development of community dispute resolution centers (Susskind and McKernan 1999). It is certainly not a new phenomenon to see two or more people seeking the help of a neutral to help them find a resolution (Susskind and Cruikshank 1987; Susskind 2006). This can probably be traced back to the ancient times when leaders of groups are often appointed to fulfill this role. Since the late 1970s, this has first become institutionalized (Susskind and McKernan 1999). Susskind and McKernan (1999) explain that Neighborhood Justice Centers (NJs) were the first ones to provide the avenues for public dispute resolution. Volunteers from the community provided mediation assistance for civil disputes before the conflict was taken to Court (Susskind and McKernan 1999). Interestingly, there seems to be some evidence that this program in a way empowered the communities because not only the community members themselves participated in the process, the participation seems to have enhanced the quality of relationships and made the bonds stronger (Susskind and McKernan

1999). In my view the key is in the process. The process of direct participation and communication could have been the main drivers of community empowerment. The idea of community empowerment will be further explored in the context of community owned solar development where intermediaries can take deliberate moves to empower the communities involved.

Following the experiments in different fields as described above, Susskind and McKernan (1999) claim that five initiatives took place in the 1980s that solidified public dispute resolution as a thing: (1) the emergence of theoretical and empirical work that became the foundation for the field, (2) expansion of mediation and facilitation services, (3) growing support from national foundations and corporations, (4) development of new training and education programs on conflict management skills, and (5) the formation of the network and communities of individuals and professionals who shared their common interests in the field of public dispute resolution. The development of the public dispute mediation or public dispute resolution field has transformed the way in which contentious decisions or conflicts have been handled at local, regional, and national scales. For example, the community dispute resolution centers continued to evolve and helped to resolve community scale disputes beyond the traditional interpersonal disputes among members of the community (Susskind and McKernan 1999). These include battles over highway plans and settling neighborhood development disagreements (Susskind and McKernan 1999). Professional mediators or facilitators that helped to resolve environmental disputes continued to expand their involvement in other substantive fields. After fifty years, the field has evolved and new applications are actively being tested as different communities seek assistance with new conflicts or challenges (around the use and implementation of new technologies for example).

2.2. The theory of public dispute resolution.

Mediating institutions or intermediaries are invited to intervene in crises – stakeholders who need some way out invite neutral, qualified intermediary assistance (Moore 1986). Mediating institutions are the ones “knowledgeable in effective negotiation procedures, and can help people in conflict to coordinate their activities and to be more effective in their bargaining” (Moore

1986). Moore (1986) and Young (1967) make explicit that stakeholders must approve the intermediary's interaction and be willing to accept their assistance.

Conflicts in the public arena usually involve multiple stakeholders (represented by different agents) and a range of issues, and therefore are considered to be more complex than most legal or contract bargaining situations (Susskind and Cruikshank 1987; Susskind 2006; Susskind and Crump 2009). This is primarily why disputes in the public sector usually require someone neutral to manage the interaction (Susskind and Cruikshank 1987). Without someone who is dedicated to managing the process, it is likely that the process will end up in a continuous battle or zero-sum bargaining without resolution (Susskind 2006).

Other than engaging in quarrels or on-going argumentation that can end up in court, an alternative option is consensus building which is often more successful when the process is managed by a professional mediator or facilitator (Carpenter and Kennedy 2001; Susskind 2006). Stakeholders in the public dispute mediation arena seek the help of a mediating institutions or intermediaries to help manage the process and ensure deliberation and fairness through adequate representation and participation (Susskind 2006). The intermediary invited to intervene often performs a full-fledged stakeholder assessment first, to make sure that all the people who ought to participate get consulted and brought to the table (Susskind and Cruikshank 1987).

Susskind and Cruikshank (1987) explain that carefully structured consensus building efforts can produce fairer, more efficient, wiser, and more stable results – even when the political power is not evenly distributed among the parties. The services of various kinds of mediating institutions and intermediaries that have emerged since the late 1970s rest on several key principles: (1) the intermediaries are neutral and nonpartisan with regard to the conflict (and therefore neutrality is their source of legitimacy), (2) they are committed to agreement getting which usually involves joint fact-finding and joint problem-solving, and (3) they do what they can to ensure that agreements are implemented by the stakeholders based on the decisions jointly agreed to by all.

2.2.1. Neutrality

Mediating institutions or intermediaries in the public dispute resolution model are organizations that provide neutral services, i.e., those that have “no authoritative decision-making power to assist parties in voluntarily reaching their own mutually acceptable settlement of issues” (Moore 1986). Stakeholders in a traditional public dispute resolution context seek an intermediary’s assistance because they believe that the intermediary has sufficient procedural expertise and at the same time is not biased towards a particular outcome or does not have a personal position or conflict of interest (Moore 1986). Young (1967) explains that impartiality implies that the intermediary favors neither side (Young, 1967). The principles of impartiality and neutrality expect intermediaries to completely separate their personal opinions about the outcomes from assisting the stakeholders to come up with their own decisions (Young 1967; Moore 1986; Susskind and Cruikshank 1987).

These mediating institutions rarely provide alliance building, community organizing, technical assistance or training, and policy or social change advocacy. They are focused on ensuring that all relevant parties get a chance to participate in producing fair, and mutually beneficial, outcomes (in the eyes of the parties).

Questions remain whether the unofficial, interpersonal, opinion-based side comes out more strongly in the mobilization efforts of community-based intermediaries than strictly mediative ones, although several scholars introduce the concept of “activist” mediation or advocacy mediation to show that the interpretive side of intermediary influence can co-exist (along with the professional side) in mediative efforts as well (Young 1967; Forester and Stitzel 1989; Susskind and Ozawa 1984). Susskind and Ozawa (1983) argue that in the public sector in particular, mediators have some responsibility to ensure that stakeholders who are often excluded from the conversation or are under-resourced can participate effectively in the consensus building process, and are in fact invited and have had equal opportunity to voice their concerns. To Susskind and Ozawa (1983), the mediators are neutral as regards the outcomes but are making sure that the so called under-resourced or disadvantaged stakeholders have a level of preparedness that allows them to meaningfully participate just like any other stakeholder. Others argue that this undermines their neutrality in the eyes of the other stakeholders who might not be

receiving the extra assistance required because they have sufficient expertise and resources to participate in the joint problem-solving process. Mayer and Font- Guzmán (2022) add to this debate by claiming that neutrality in fact can be too focused on getting to a resolution. In their view neutrality limits the ability of the mediator or facilitator to contribute to social change as part of engaging with the conflict (Mayer and Font- Guzmán 2022). In the traditional theory and context of public dispute resolution, aiming for systemic or social change is often not part of the widely accepted responsibilities of mediating institutions or intermediaries.

2.2.2. Agreement getting – including joint fact-finding and collaborative problem-solving.

Agreements do not always have to be in written form. Mediating institutions or intermediaries can contribute to an enhanced understanding by the stakeholders of each other's concerns (Susskind 2006; R. J. Lewicki and Litterer 2009). Enhanced understanding includes first sharing the perceptions of the other stakeholders of the problems they face, then clarifying individual interests, and finally generating options for mutual gain by making trades (Lewicki and Litterer 2009).

Joint fact-finding and joint problem-solving are foundational to the process managed by neutral mediating institutions. This is what gives legitimacy to the outcomes which may well include a written agreement (in the form of a contract). The fact that the participants have contributed to gathering factual information or appointed an expert committee to be in charge of providing the factual information required to come up with a joint decision, means that it is more likely that the public will accept the outcome. Stakeholders who have a particular interest are unlikely to accept a group of experts selected by their counterparts. While joint fact-finding is usually included as part of the process of consensus building managed by a mediating institution or intermediary, it can also take the form of a stand-alone process. Joint fact-finding or joint problem-solving often begins with agreeing on the right questions to answer (Susskind and Cruikshank 1987; Carpenter and Kennedy 2001). Then it moves to choosing an agreed upon method of analysis or information gathering and, finally, to coming up with a plan to deal with making judgments based on the information gathered. Joint fact-finding alone does not guarantee a settlement, but

rather provides a platform upon which the stakeholders can make an informed judgements and build trust (Susskind 2006; Susskind and Crump 2009).

Again, the fundamental assumption is that mediating institutions or intermediaries are not committing to achieve social change or system change. Indeed, this is one of the complaints against traditional dispute resolution efforts: the intermediaries do not try to change the underlying (power) relationships among the stakeholders. They accept those as given and assist in pursuing agreements that meet the minimum acceptable outcomes for all sides

2.2.3. Agreement implementation – continuing role of the neutral in putting agreements into effect.

Agreement implementation efforts include crafting agreements that are “nearly self-enforcing”, anticipating future risks and uncertainties by coming up with reasonable contingencies (Susskind and Cruikshank 1987; Susskind 2006). Experienced mediators or mediating institutions try to build as many mechanisms as they can into each agreement so that the costs and resources required to alter the agreement in the future, if new issues have to be renegotiated, are kept to a minimum (Susskind and Cruikshank 1987; Susskind and Crump 2009). The continuing role of the intermediary (even after agreements are signed) is to make sure that all the parties follow through on their commitments. While intermediaries do not have enforcement powers, merely by monitoring implementation, and calling the parties back together is when there are problems, they can remind the parties of what they originally agreed. Monitoring and serving as a “witness” to what was agreed is often sufficient to get agreements back on track.

2.2.4. Mediating institutions in the public arena

Mediating institutions or intermediaries of different kinds, including professional public dispute mediators have helped resolve conflicts over policy choices at local, state, and national levels (Susskind and Hulet 2007). These mediating institutions have ranged from various professional firms like the Mediation Institute or the Consensus Building Institute to state offices and city departments that have mediating capabilities like the New York City Department of Public

Housing that mediates tenant landlord disputes (Susskind and McKernan 1999; Susskind and Crump 2009). From their study of leading public dispute resolution organizations, Susskind and Hulet (2007) report that indeed there was a market for public dispute resolution where nine mediating institutions they studied generated \$40 million in revenue in 2005. These organizations focused on providing mediation and consensus-building assistance and their geographical scope was primarily regional and national (Susskind and Hulet 2007). Their primary source of revenue was the government, as most of their funding came from state or federal agencies (Susskind and Hulet 2007).

Others suggest that mediating institutions can take on the role of interpreting public inputs for the purposes of priority setting. Investigating the Oregon Health Services Commission in the state of Oregon in the U.S., and the National Health Committee in New Zealand, Tenbenschel (2002) shows that these bodies served as mediating institutions essential to priority-setting processes, embodying the values of the public. He argued that these mediating bodies provided rationality and legitimacy in the health policy agenda setting processes (Tenbenschel 2002).

So, building off of this theoretical frame, I aim to investigate new intermediary institutions in the context of community-owned solar development that seem to depart from the basic model while still serving a range of facilitative roles. My hypothesis is that intermediaries in this context have to operate differently to help client communities achieve their core interests. These intermediaries do not appear to be constrained by the concept of neutrality; they seem to be committed to achieving social change that disrupts the status-quo. The new roles being played by these intermediary organizations in the field of community solar development, in my view, challenge and expand the fundamental theory and practice of public dispute resolution.

2.3. Intermediaries in renewable energy and energy transitions.

2.3.1. The emergence of intermediaries in the energy sector.

The concept of renewable energy transition or low-carbon economy transition attracted the attention of those who were initially wary of what sounded like a push for radical shifts to

cleaner technologies (Warbroek et al. 2018). In some of the early writings, particularly those assessing the local acceptance of wind energy, NIMBYism was often referred to as one of the explanations for local opposition to renewable energy development (Giordono et al. 2018). However, in the context of renewable energy development, the NIMBY phenomenon has been limited in scope, and in some ways is a misreading of most local opposition when it does occur (Giordono et al., 2018; Stadelmann-Steffen & Dermont, 2020). Local communities are generally supportive of the idea of installing solar or wind energy. Opposition is less about social acceptance of renewable energy development or technology, and more a question of particular design, siting, and financing decisions.

Studies have shown that opponents feel offended when the term NIMBY is used in this context. It feels like their legitimate concerns are being ignored, thereby undermining any chance of collaboration or meaningful consultation (Devine-Wright 2009; A. A. Jami and Walsh 2017). Resistance to renewable energy technology goes well beyond NIMBYism – which can often be thought of as blanket resistance to change or selfish opposition to something that will benefit the larger region. Communities are more likely to support projects if they are directly involved both politically and economically in helping to design and site them and in figuring out ways to minimize their adverse impacts (Stadelmann-Steffen and Dermont 2020). Community members are very likely to oppose projects that have not made an adequate effort to ensure public engagement or public consultation (Chilvers et al. 2021); Stadelmann-Steffen & Dermont, 2020). Every project and locality face slightly different concerns because adverse project impacts will vary in every case (and they all will have some adverse impacts for some stakeholders) (Leiren et al. 2020). Management of such collaborative processes benefit significantly from the involvement of intermediaries of various kind because consultations by project proponents or regulatory agencies are viewed by stakeholders as biased.

Busch and Hansen (2021) argue intermediaries can play a transformative role in energy transition processes. They say that transformative intermediaries can range from individuals (i.e., local champions), to non-governmental organizations (NGOs), to public agencies, and private energy consultants (Busch 2021; Busch and Hansen 2021). The role of intermediaries may differ based on the political, social, environmental context, actors involved, scale and maturity of the

project, or regulatory context, but generally their role is to manage problem-solving conversations among the parties, echoing previous studies on the roles played by mediating institutions. Scholars define transition intermediaries as actors that link other actors or a network of actors that want to initiate new collaborations within existing regimes, systems, and technologies (Kivimaa et al. 2019; Sovacool et al. 2020). Transition intermediaries seem to encompass platforms for societal change as well, not just connect actors and activities, which is vastly different from intermediaries in the traditional sense.

Karhinen et al. (2021) examine the Finnish Hinku (Towards Carbon Neutral Municipalities) network and suggest that the municipality network as an intermediary helped lower the level of greenhouse gas emission by participating. They found that the intermediary network functioned as experts while providing peer-to-peer support among the participants (Karhinen et al., 2021). Interestingly, they also found that the intermediary's effort contributed to influencing the national government on climate policy and creating new opportunities for resource allocation for local climate action (Karhinen et al. 2021). Investigating three Swedish municipalities and their intermediation roles between local and national or international levels, they found that municipalities can act as a bridge in both directions (top-down and bottom-up) from local to national and/or international levels. For example, one of the case study municipalities facilitated experimentation with niche energy technologies by assigning specific tasks to those who could handle the while also giving the parties the freedom to operate. Two other municipalities were able to build strong coalitions with other local actors. This closely resembles building new networks or utilizing existing networks.

Contrastingly, Kundurpi et al. (2021) argue that local governments are often disengaged from working with small and medium sized enterprises (SMEs) to take on sustainability transition initiatives. SMEs often require external assistance to make progress on sustainability transitions (Kundurpi et al. 2021). Other types of intermediaries are needed to build linkages and enrich collaborative problem-solving. These other organizations include non-governmental organizations (NGOs), charities, community groups, and universities (Kundurpi et al., 2021). They explain that these intermediaries serve two primary functions: facilitating the establishment of new SMEs and knowledge sharing with existing ones (Kundurpi et al., 2021). Looking at solar

energy storage technology deployment in Australia, Page and Fuller (2021) find that industry actors (i.e., local solar systems installers, renewable energy consulting firms, and utility companies), effectively act as intermediaries between industry and government, industry and industry, and industry and consumer spaces. All of this goes beyond their traditional role as commercial contractors. They show that these intermediaries primarily serve as interfaces for knowledge sharing, innovation, and consumer services (Page and Fuller 2021).

Looking at the UK public procurement frameworks for energy service contracts, Nolden, Sorrell, and Polzin (2016) identify and describe how intermediary organizations can play a vital role in reducing various costs for both the clients and contractors, what they call the “economies of intermediation” (Nolden, Sorrell, and Polzin 2016). Intermediaries as such, like the Carbon and Energy Fund, provide informed assistance to clients at every step of the contract process, including identifying interested contractors from its member pool (Nolden et al., 2016).

2.3.2. Common roles and functions provided by energy sector intermediaries

One of the most common functions of intermediaries helping to develop renewable energy projects is brokering among different actors or managing the process of engagement (A. Jami and Walsh 2017; Warbroek et al. 2018). These intermediaries often intervene as non-partisan neutrals, with the primary aim of facilitating or mediating the process (Warbroek et al., 2018), particularly when tensions arise between different stakeholders. Mediation usually involves a professional or a team of professionals trained to facilitate discussion among the parties and help generate a mutually agreeable solution to one or more conflicts (an alternative to litigation or political campaigns and demonstrations) (Caputo et al., n.d.). For example, CBI has served as a mediator in various renewable energy siting conflicts, managing stakeholder engagement processes and collaborative decision-making. Seeking the help of mediative intermediaries (individuals or organizations) that can help facilitate consensus building is a nationally recognized way to proceed.

(Akita et al. 2020) show that sometimes local governments can also act as intermediaries in certain conflicts over renewable energy when local government officials have sufficient

knowledge and skill. Local governments can be a different kind of intermediary (probably non-neutral in most situations) that may be able to undertake conflict management in situations where, for example, agricultural land has to be protected against accelerated solar energy development, for example. On the islands of Vinalhaven and North Haven in Maine, driven by an intermediary who was neither neutral nor a professional mediator, the community agreed to the construction of three wind turbines generating electricity for about 1,500 residents (Powell 2011). In this case an individual (i.e., a Harvard Business School professor) facilitated the entire siting process, helping to solve the problem of unstable and costly electricity transmitted from the mainland (Powell 2011). In Iowa, what is known as a conservative promoter of clean energy, the Iowa Land & Liberty Coalition, launched an initiative to counter local opposition to wind and solar developments (Uhlenhuth 2020). The group acts as another kind of regional intermediary to support landowners and farmers seeking “the freedom” to develop wind or solar projects on their land, in spite of various restrictive ordinances and moratoriums (Uhlenhuth 2020).

Other intermediaries described in various published studies connect communities with external entities including energy providers, users, and regulators (Warbroek et al., 2018). These intermediaries operate at the so-called inter-community level, as intermediary organizations, connect communities most directly impacted by proposed renewable energy development with nearby communities (Warbroek et al., 2018). Intermediaries may serve as knowledge brokers between external parties and community members, or provide additional local knowledge in the best interest of all parties, raising awareness of contextual factors as well as increasing credibility from the standpoint of local community groups (Howells 2006; Hodson, Marvin, and Bulkeley 2013a; Frølund and Ziethen 2016; Guerreiro and Botetzagias 2018; Warbroek et al. 2018). Intermediaries fostering relationships within a community play important roles.

Intermediaries provide a wide range of expertise, including technical knowledge (factual information) and assistance when the local community the project is meant to serve may not be familiar with renewable energy technology involved (Ruggiero, Onkila, and Kuittinen 2014; Jami and Walsh 2017). The support intermediaries can provide goes beyond technical or regulatory and legal advice, to include guidance on the best way of approaching permit applications and project (Ruggiero, Onkila, and Kuittinen 2014; Warbroek et al. 2018). A study

in South Asia reiterates the important role an intermediary organization can play in building community ownership, transferring knowledge and technology, enhancing technical and administrative capacities, and establishing innovative financing models (Guerreiro and Botetzagias 2018). Zaunbrecher et al (2021) show that intermediaries (particularly craftspeople) can have a positive impact on clients' decisions regarding energy efficiency measures when they are retrofitting their homes. Their research found that groups such as energy consultants, craftspeople, and architects effectively served as intermediaries between the market/government pressures and homeowners, and played a crucial role in implementing energy efficiency measures (Zaunbrecher et al. 2021). They identify expert knowledge and trust as key determinants of the intermediary's success in influencing homeowners' decision to adopt energy efficiency measures in retrofitting (Zaunbrecher et al., 2021). Similarly, energy service contract intermediaries possess administrative, legal, financial, and technical expertise in the public sector (Nolden, Sorrell, and Polzin 2016). These intermediaries provided clients with savings including search costs (i.e., finding contractors), bargaining costs (realized from standardized procurement procedures), and opportunism costs (achieved by reducing asymmetry in information between clients and contractors thereby limiting opportunistic behavior from both sides) (Nolden, Sorrell, and Polzin 2016).

Most theoretical and empirical studies of intermediaries in the public arena (in the energy sector) are concentrated in Europe. The applicability of these findings to the U.S. context may be limited. There are still very few studies done on intermediaries in the context of community-scale (locally induced) solar and wind energy projects. I am eager to map out the new roles and functions of these intermediaries. I especially want to see how intermediaries that assist communities that want to build and own solar energy projects challenge one of the key attributes of public dispute mediation: the concept of neutrality. Finally, I aim to examine a special function of intermediaries, which is, enabling learning within and across localities. Both the pragmatic functions and institutional values (i.e., advocating for social change) that intermediaries provide require further investigation.

3. Community Solar

3.1. Short history of community solar

3.1.1. What do we mean by community? (Location-based or identity-based)

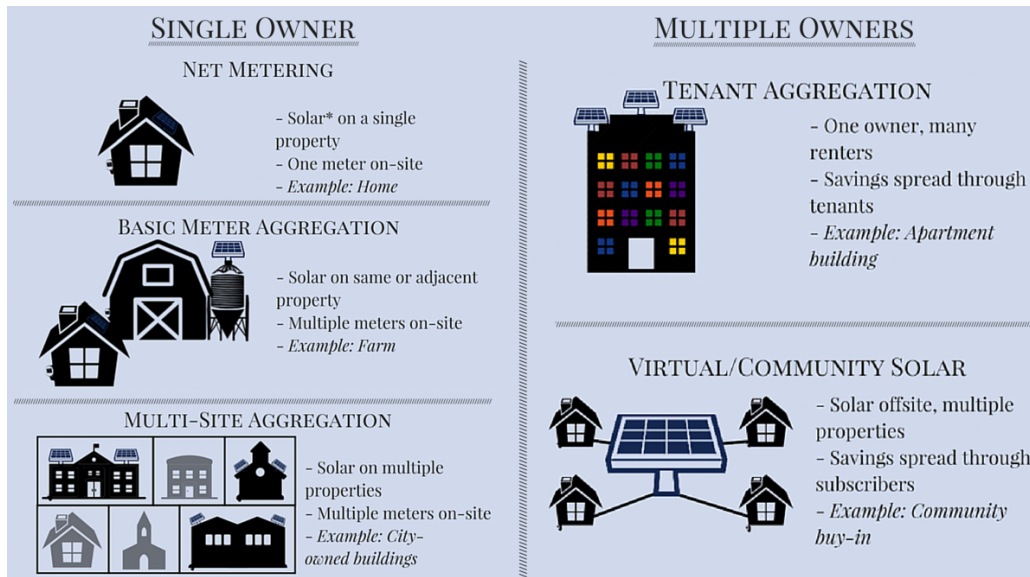
A community or sense of community is often associated with characteristics such as “a sense of place, common interests and perspectives, identity, social ties, or joint action in geographical locations or settings” (MacQueen et al. 2001). One attempt at describing what we mean by a community in the community solar context might be a group of people that have a common space and interact with one and another, at least occasionally. In most cases people who belong in the same community are located in the same geographic area or neighborhood. But this does not mean that when people share a geographic area, they automatically become part of the community. There may be multiple communities within the same space, depending on shared identity, ethnicity, language, culture, and ideology. Sometimes, it is possible that people act as a community with a common sense of purpose regardless of their geographic proximity or identity. In summary, identifying a community can be difficult, but in the context of community solar, in my view, there seems to be a general agreement that whether it concerns sharing a geographic area or values towards clean energy, a common goal is owning a solar project.

The General Manager of Cooperative Energy Futures (CEF) in Minnesota sees a community as “partly a process, the process of ongoing interaction and relationship building, or story building.” He believes that CEF as an intermediary strives to bring people who are already in some kind of community relationship together to build a shared story. This can involve different race or ethnicity-based communities working together for a common (energy) goal. One example might be a group of white rural farmers, a manufacturing co-op in one town, and a group of immigrants in a third town coming together with the common purpose of becoming shared owners of a solar facility and sharing the co-created benefits.

3.1.2. What do we mean by community solar?

There are two different ways one can explain what community solar means (General Manager, CEF). Community solar could be defined based on what is required in a particular location to be designated a community solar project, or it could be more generic (what it means conceptually) (General Manager, CEF). A generic version of community solar might be -- solar energy projects in which a broad base of community members is using, receiving the benefits from, or participating in the development of solar energy production (G. Chan, Heeter, and Xu 2021). The simplest way to describe community solar or a shared solar system is imagining a way for consumers who do not want or are unable to install their own rooftop solar system to collectively own a solar production facility (Zientara 2021). So, instead of installing solar panels on the rooftops of their individual homes, a group of community members can come up with a way to build and own a shared solar array often known as a community solar farm or community solar garden (Feldman et al. 2015). Community solar does not always have to be ground mounted, they can be located on a rooftop of a leased or public building (Coughlin et al. 2012; Feldman et al. 2015; Paulos 2017). When a solar system is built in a city with a lot of building space, it can be built on a roof. In a rural area, it is usually ground mounted in open space. A distinction can also be made between offsite and onsite community solar (Initiative for Energy Justice n.d.). In a community solar facility built offsite, in a nearby lot for example, the electricity generated is shared by multiple households and users. Community solar onsite can be on rooftops of a multi-family apartment complex. The electricity generated can be shared by the residents or sold to a third-party who ends up consuming the electricity while the community collectively owns the facility (see Figure 1).

Figure 1. Community solar types



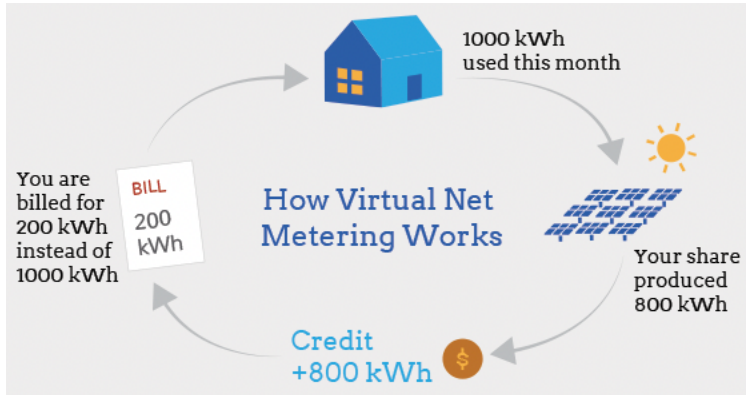
Source: Institute for Local Self-Reliance (Stumo-Langer 2016)

In the case of Minnesota, community solar is best described more contextually, based on what is required. It can be something like a large solar array that is delivering generated electricity to an electric utility while the utility is required to provide benefits in return on consumer utility bills (General Manager, CEF). The solar array is democratically owned and controlled subscribers who receive the benefits on their bill (General Manager, CEF). Environmental justice and energy justice advocates claim that community solar is one of the most important ways to make renewable energy accessible for low-income households (Sax 2022). Community solar can be built on vacant land, on the rooftop of a community center or an abandoned parking lot, allowing renters and multi-housing residents who do not have roof space of their own to share in the benefits of solar energy (Sax 2022).

Community solar systems can make a profit through a program called virtual net metering (VNM). VNM allows a community solar facility to sell energy back to the grid and in return distribute the financial credits back to the members or subscribers of the shared solar system (Richardson 2019). VNM can be applied to community solar that is shared by on-site members or off-site members. Members of the shared solar system receive bill credits based on their shares of the community solar and how much energy is produced (Richardson 2019; Feldman et al. 2015). Community solar is not just about bill credits. Other incentives such as upfront

subsidies, community education and capacity building programs, and efforts to increase access to low-income and under-resourced communities help to explain the rapid uptake of solar in recent years (Heng et al. 2020; O’Shaughnessy 2022).

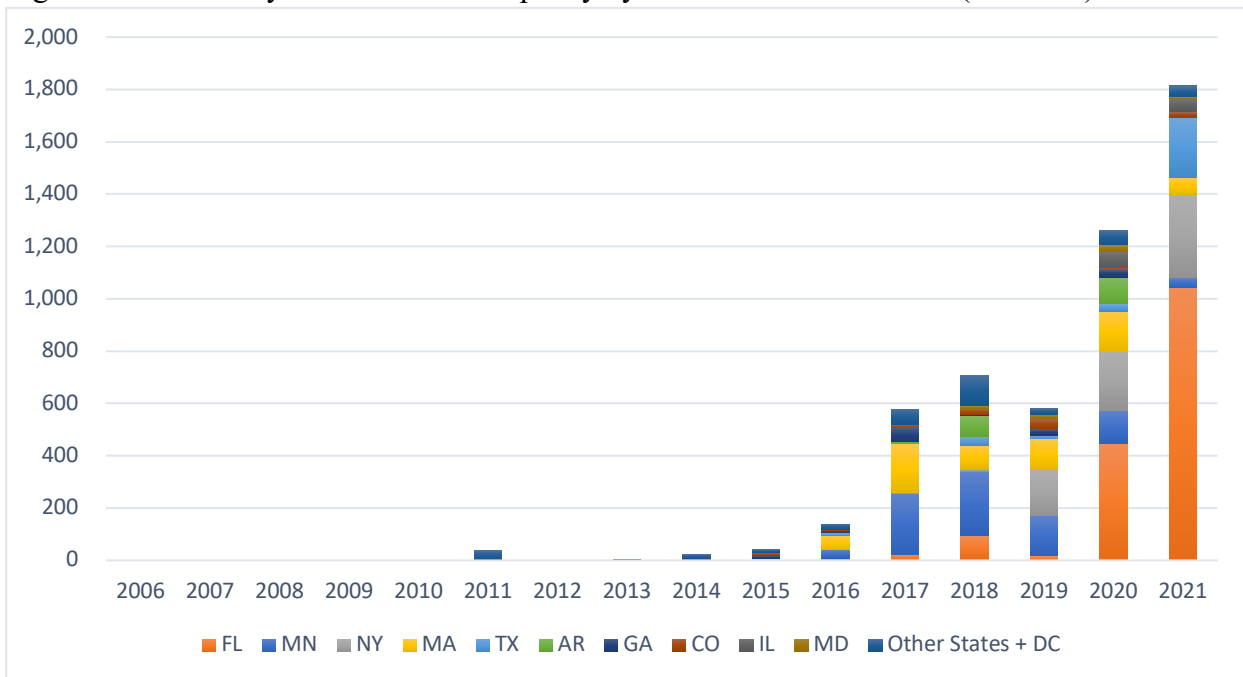
Figure 2. Virtual net metering (VNM)



Source: EnergySage (Richardson 2019)

3.1.3 Community solar trends

Figure 3. Community Solar Installed Capacity by Year of Interconnection (MW-AC)



Source: National Renewable Energy Laboratory (G. Chan, Heeter, and Xu 2021)

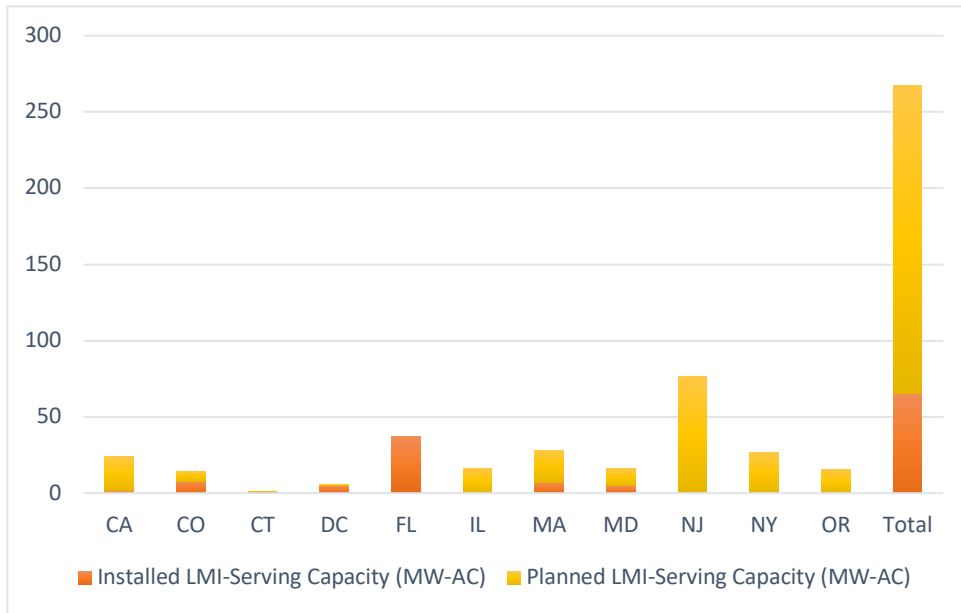
Diversifying the types of renewable energy projects, including community solar, is crucial for achieving state and national electricity decarbonization targets. As shown in figure 3, community solar began to gain traction in 2017. The Sharing the Sun Market Report shows that by the end of 2020, the number of community solar projects is estimated to have reached 1600, totaling over 3,253 MW-AC in 39 U.S. states and Washington D.C. (Chan, Heeter, and Xu 2021). The dramatic rise in the U.S. since 2017, is led by Florida, New York, and Minnesota. The recent surge in uptake in Florida can be explained by the addition of utility-owned, utility operated community scale solar projects by companies like Duke Energy (G. Chan, Heeter, and Xu 2021).

3.1.4. The advantages of community solar and its associated benefits

Community solar can generate many tangible benefits. Community solar offers choices for consumers who want to choose the source of the electricity they consume. Community solar can also bring subscriber bill savings. This is particularly popular with consumers who may not be homeowners, but still want to participate in a solar project (Coughlin et al. 2012; NREL 2022). And community ownership ensures that the benefits are more evenly distributed among the parties involved (Benander 2018; Sax 2022).

The U.S. Department of Energy's National Community Solar Partnership reports a measure of subscriber bill savings in terms of the net present value (NPV) of residential subscriptions (U.S. Department of Energy 2021). This summarizes the difference between payments made by subscribers over time and credits received through community solar (U.S. Department of Energy 2021). As of December 2020, the median project-level NPS is about +\$0.19 per watt, and approximately 76% of community solar projects yielded a positive NPV, suggesting that however small they may be, community solar projects bring net financial benefits to subscribers (U.S. Department of Energy 2021).

Figure 4. Installed and Planned LMI-Serving Capacity (MW-AC)



Source: National Renewable Energy Laboratory (NREL)

Yet, according to NREL, community solar capacity serving low-to-medium income communities is very small, considering the total community solar capacity installed nationwide (NREL 2022). The total reported by NREL of identified installed community solar capacity serving LMI communities is 65.4 MW-AC while identified planned community solar capacity serving LMI communities is 202.1 MW-AC in 2021 (NREL 2022). The total installed capacity of community solar was about 5,200 MW-AC nationwide in 2021. This suggests that community solar targeted for LMI communities is less than 4 percent (NREL 2022).

Various efforts are being made at the local and state levels to ensure that more community solar benefits are directed to low-income households who face serious energy burdens. For example, the Colorado Energy Office (CEO) is keen on expanding the use of and implementation of community solar as a way to lower the energy burden for low-income communities (Dobos and Artale 2017). CEO partnered with GRID alternatives; a non-profit organization focused on providing solar energy to low-income communities. CEO provided a \$1.2 million grant to administer eight pilot models throughout the state, working with the eight different utility partners at their respective locations (Dobos and Artale 2017). As of October 2017, 380

households benefitted with 15 to 50 percent electricity bill savings. Total community capacity reached 1,485 kW (Dobos and Artale 2017).

There are other benefits of community solar beyond making energy more affordable. For example, community solar also adds a bit of insurance in the face of unpredictable risks posed by accidents and natural disasters. Many residents in California were victims of the largest wildfires in history, caused by faulty transmissions lines in 2019 (Weinrub 2021). These kinds of unforeseen disasters not only killed numerous people, but also forced people out of power for an extended number of days (Weinrub 2021). Single utility dominated power distribution can be particularly vulnerable to climate induced disasters, like wildfires and hurricanes (particularly in the Southeast). This is why community solar can be a viable alternative. Conceptually, when multiple households are interconnected, or are connected to a common energy storage facility, then households who need power (due to grid failure) can get excess power from households who do not need all of what their rooftop solar is generating. This model can be expanded to a decentralized solar system with micro-grids or grid subsystems that can co-exist with the primary grid system (CEO and Co-founder, People Power Solar Cooperative).

Among the different kinds of community solar projects available, the focus of this research is on community owned solar projects. While there is a recent uptick in community solar of all kinds (figure 3), primarily led by utilities and renewable energy developers, there is no specific data on recent trends in solar projects fully owned and operated by communities. This is partly because the share of solar capacity that fall under the community-owned category is still quite small, and relatedly, there are several structural and financial challenges that make community ownership unattractive in some locations. The intermediaries covered in this research help communities overcome these barriers, performing roles beyond those played by traditional “neutrals.” The details of the challenges immediately faced by communities seeking to own solar facilities, and the new roles played by intermediaries that can help them overcome those challenges are discussed in subsequent sections.

3.2. The rise of community-based organizations

To support grass-roots development of renewable energy, intermediaries of various kinds need to help communities overcome regulatory hurdles and prepare successful applications for new projects (Howells 2006; Hodson, Marvin, and Bulkeley 2013b; Warbroek et al. 2018). These intermediaries are sometimes referred to as community-based organizations (CBOs). They not only disseminate information to address community residents' unfamiliarity with the technology, but play a variety of other networking roles (Noll, Dawes, and Rai 2014; Ramanan et al. 2021). Grassroots outreach can be a game-changer for new wind or solar developments. CBOs, as intermediaries, can provide assistance in moments of crisis, and take proactive steps to help communities reap financial benefits. Intervention in some situations can best be described as "entry into a situation for the purposes of self-interested manipulation" (Young 1967). Self-interest for CBOs in the context of energy transitions or energy justice might be to assist communities consider unfamiliar technologies and help them reduce their financial burdens.

CBOs are defined slightly differently by scholars and professionals, but there are clear attributes that both point to: working towards community interests and expanding community membership (Grimley et al. 2022). CBOs can connect communities while taking a purely a supportive role (Kivimaa et al. 2019; Kanda et al. 2020). The community-based intermediary's willingness and inclination to enhance equitable access to affordable and clean energy also tracks the long-time nature of mediating institutions. One of the key roles of mediating institutions is to help preserve communal identity despite top-down legal, regulatory and market pressures. Mediating institutions provide across-the-board support for stakeholders who need help participating directly in decision-making (Fort and Noone 1999). CBOs have historically included environmental justice and energy equity organizations, churches and other religious groups, local social/political action organizations, housing organizations, community development corporations, community-based wind and solar businesses, and others (Ramanan et al. 2021; Scavo et al. 2016). The DuPont Park Seventh Day Adventist Church in the District of Columbia is an example of a religious CBO that sought to play an intermediary role -- partnering with the DC Department of Energy and Environment, Goundswell, a community-scale solar developer, and SunCatch Energy LLC, a solar consulting firm (Ramanan et al. 2021). The church was approached by the project developer to establish community solar through the District's Solar for All program (Ramanan et al. 2021). The church as a CBO and mediating institution was able to

connect community residents who needed help with their electricity bills, and together installed a total of 168.2 kW of solar power which delivers electricity to 47 families in the community at zero cost (Ramanan et al. 2021). As illustrated by this example, project developers/installers or wind/solar consultants can act as intermediaries, networking with state and local governments as well as renewable energy end-users (Mignon and Broughel 2020).

Similarly, Lacey-Barnacle & Bird (2018) show that CBOs can play a vital role in advancing energy justice missions in particular. They show that CBOs as mediating institutions bridge local low-carbon energy initiatives and deprived communities – raising awareness of funding opportunities, helping localize the economic benefits of low-carbon transitions, and enhancing distributional, procedural, and recognition justice (Lacey-Barnacle and Bird 2018). They identify four different types of actors: (1) non-profit; (2) local government; (3) local energy group; and (4) energy companies (Lacey-Barnacle and Bird 2018). The Bristol Community Strategy for Energy is an example of a CBO seeking to address the broad goals of local ownership of energy assets, spreading the belief that “money (should) stays in the community” (Lacey-Barnacle and Bird 2018). They worked with a local city council to develop a model for decision-making that included a wider range of actors than usual (Lacey-Barnacle and Bird 2018). Their involvement ensured that funding reached communities that would normally be excluded. Their underlying mission and aspiration are to deliver energy justice outcomes (Lacey-Barnacle and Bird 2018). CBOs in this form combine a push for social and energy justice with the aim of providing equal access to cleaner and cheaper energy for community members.

CBOs increasingly play a crucial role in raising awareness of the need for clean energy transitions. In particular, CBOs have been particularly active in making clean energy programs an opportunity to own and develop community solar energy accessible to communities of color, communities that do not have adequate financial resources, including community members who do not own homes, and communities that are often excluded from governments support of different kinds (Aylett 2013; Wright and Reames 2020; Reames and Wright 2021). Reames and Wright (2021) found that CBOs tend to prioritize the economic and equity components of community sustainability, often driving collaborative partnerships with different parts and levels of the county/regional government to support vulnerable communities. In addition, existing

studies provide evidence that CBOs promote energy justice by putting the community in the driver's seat, allowing them to make decisions about solar development rather than expecting the CBOs to do everything for the community (Paulos 2017; Leon et al. 2019). CBOs seek to empower communities by ensuring that solar development is done “by” rather than “to” community members (Leon et al. 2019).

CBOs face many challenges that threaten their effectiveness. Wright and Reames (2020) found that shortage of government funding and collaboration, lack of human resources, and the absence of revenue generating options are the most common reasons why CBOs struggle.

3.3. Challenges of implementing community solar

3.3.1. Dominance of investor-owned utilities and corporations.

One of the systemic challenges to community solar production is that corporations dominate the solar industry. From the perspective of small intermediaries who are at the forefront of community solar development, American society is still a corporate-driven extractive economy, where big corporations build projects to extract as much profit as they can. Most efforts to keep up with increasing electricity demand still start with a commitment to fossil fuel production. This creates an additional stumbling block for small intermediary organizations who aim to build and own community centered solar energy projects. The President of a Co-op in Hawaii claims that indigenous communities in these contexts are not “fighting energy and science” but “fighting for equity”.

For example, an effort to build a community-owned solar was blocked by the dominant Investor-Owned Utility (IOU) in California. A community in California attempted to build a small community solar project (66 kW generation capacity) with the assistance from the Shake Energy Collaborative, but their application to build under the Community Solar Green Tariff program was rejected twice by Pacific Gas and Electric (PG&E) for undisclosed reasons (Sax 2022). Intermediary organizations including environmental and energy justice organizations are advocating for policies that serve renters and low-income households. Yet, major utilities in

California are arguing that consumers are not paying their fair share of the costs required to maintain the grid because their net savings from solar energy is so great (Sax 2022). Moreover, they claim that they already have policies in place to provide community benefits like the Community Solar Green Tariff Program that allows low-income households to receive a 20 percent discount on their energy bills. However, energy justice advocates claim that although on the outset, the nearby residents of utility scale solar energy developed and owned by IOUs are receiving bill savings, the accumulated benefits over time continue to remain in the hands of the IOUs (they still end up taking the larger share of the pie). The three major utilities in California are continuing to limit community ownership of small-scale community solar, rejecting community solar gardens in the range of 50-150 kW (Sax 2022; Initiative for Energy Justice n.d.). Intermediaries are trying to counter these trends. The lack of opportunity for ownership and control of energy continues to push communities towards poverty and instability (Johnson and Lewis 2017). This is often reinforced by the lack of access to quality information or the ability to tap resources provided by the state. The ownership element is often overlooked when people talk about transitioning away from fossil fuels to combat climate change. Traditionally, energy, mostly in the form of electricity, has been controlled by corporate or state actors. The dynamics of the electricity market have traditionally run top-down, communities and their members are allowed to be subscribers not owners (reaping a share of the long-term benefits derived from energy production).

Those who strongly favor renewable sources want the freedom to choose from which sources their energy comes. But that is not enough. The idea of “energy democracy” has been raised during the past decade or so (Johnson and Lewis 2017; Obias and Yoko-Young 2020; Feldpausch-Parker et al. 2021). The idea is that everyone, including communities of all kinds should be granted an opportunity to participate in the energy market, as business owners and entrepreneurs. Rather than electricity being commodified and dominated by the state or a small group of so-called powerful players, anyone who is willing can build their own clean energy facility. Solar is a popular outlet for this line of thinking because of its relative ease of installation and maintenance.

3.3.2. Huge upfront costs and capital required

Communities who want to build and own a solar project generally have two ways of financing it. They can come up with the capital to make an upfront investment. This allows them to start with almost no debt. But most communities do not have the upfront capital required to start a project. Thus, most communities have to find a way to either borrow money or seek an investor partner. This is often very difficult, particularly without the assistance of experts. Many low-to-mid income (LMI) communities face financial challenges including poor credit resources and lack of capital for making upfront investments in the solar market (C. Chan, Ernst, and Newcomb 2016; Cook and Bird 2018; Cook et al. 2019). This applies to both residential (LMI households that are homeowners) and community solar (Primarily renters). Other resource constraints are associated with residential status. While single-family housing owners have the option to choose residential solar or onsite community solar, renters and multi-family housing tenants usually have to resort to offsite solar (Cook and Bird 2018). So, even if a community of members is able to come up with the upfront capital required to build a community solar facility, the siting and design of the project might be constrained by these other obstacles.

Table 1. Obstacles to solar power access in LMI communities

Factors	Key ingredients
Lack of Access to Capital	<ul style="list-style-type: none"> • LMI communities have less disposable income, which makes higher upfront cost or community solar subscription prohibitive • LMI customers often have low credit scores, which makes access to credit difficult
Insufficient Tax Burden	<ul style="list-style-type: none"> • LMI customers may not be eligible for state or federal tax incentives if they don't fall within a qualifying tax bracket • Tax breaks represent the largest public incentives driving solar deployment, they have not been comprehensive in extending affordability to LMI communities.
Renter vs. Homeowner Status	<ul style="list-style-type: none"> • LMI communities usually have low homeownership rates. They are most likely to live in multifamily and affordable housing units, which restrict their controls over decisions pertaining to rooftop solar and utilities.

	<ul style="list-style-type: none"> • Even in those cases where LMI customers own home, their roofs are not in good conditions, and rooftop solar may not be a viable option.
Distorted Price Signals	<ul style="list-style-type: none"> • In some areas LMI customers are already receiving reduced electricity rates due to energy subsidies program • Solar PV even after subsidy may be higher than what they are already paying.
Unfamiliarity with Solar Products	<ul style="list-style-type: none"> • LMI communities may not be familiar with the benefits of engaging in solar programs.

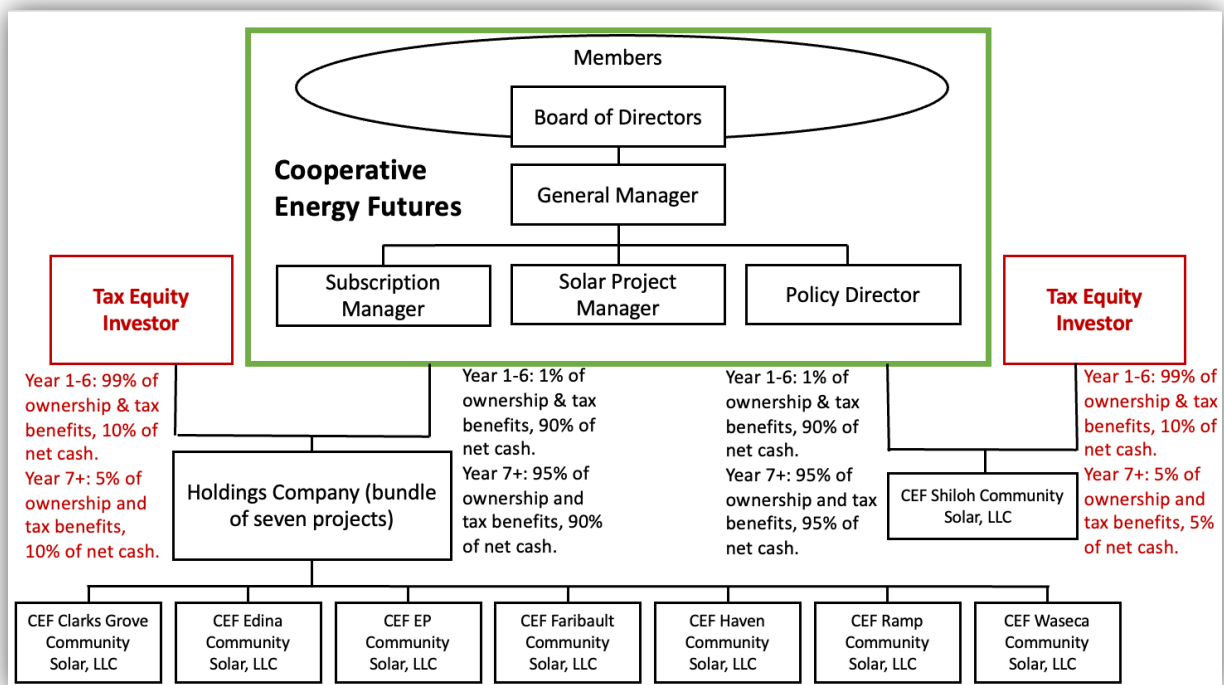
Source: NREL (Cook and Bird 2018)

As one of the leaders of a cooperatively owned intermediary organization points out, “... access is limited, access to capital, access to the bankers, access to utilities (i.e., interconnection), and access to the state policies... structurally all kinds of access are against small communities, small developer, where groups do not have deep pockets.” Communities including low-income homeowners and renters who often live in multi-family housing or apartment complexes do not have the ability to cope with huge upfront costs required to build a community solar system and need expert assistance to help them leverage other ways to strategically finance solar projects. Cooperative Energy Futures (CEF) is a great example of an intermediary organization guiding community members on how they can pursue alternative financing – the equity partner flip model. It is important to underscore that this model is only possible in states that have legislative programs in place that allows VNM and community shared ownership up to a level where a project is financially viable. Community solar can be organized under different rules, actors, and boundaries. Several examples exist. Hess and Lee (2020) claim that shared community solar seems to be more advanced in the state of New York, and community solar choice seems to be more advanced in California. The key determinants of the differences in the trajectory of development in their view are the regulatory rules for retail energy competition (that are partly dictated by powerful utility companies), the varied roles of civil society, and the level of intervention of elected officials (Hess and Lee 2020).

Cooperative Energy Futures (CEF) is organized as shown in the green box below. Members of the Co-op are the controlling body as they elect the board of directors. CEF as a cooperative

entity is a joint owner of the project companies alongside a tax equity investor. Seven solar projects as a bundle are owned by a holding company which is owned jointly by the tax equity investor and CEF. One of the more common ownership models of cooperatively owned community solar projects is the partner flip model as explained in the CEF case study. In years one through six, the tax equity investor is a 99 percent owner. During this period, they get 99 percent of the tax benefits. This is ultimately what CEF, as an intermediary, was able to negotiate on behalf of the members. Then, from year 7, the ownership structure flips and the tax equity investor becomes a minority owner. In this example, they get 5 percent ownership and 10 percent of net cash. So, the idea is that CEF works with the tax equity investor, strategically enabling community members to build and become shared owners of a solar project over time.

Figure 5. CEF organizational structure

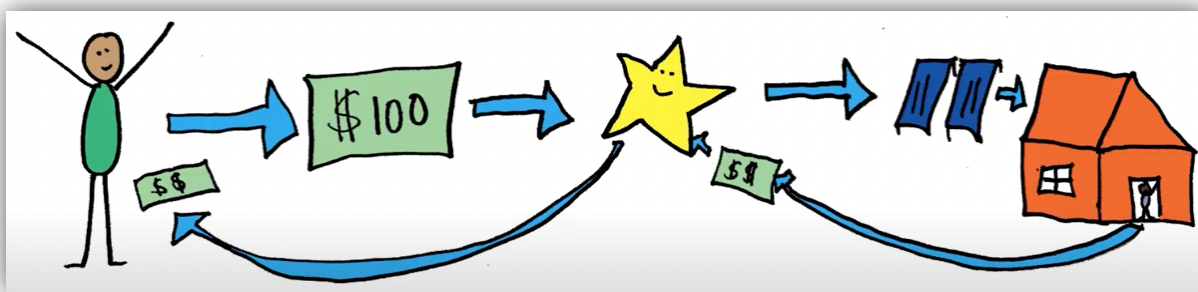


Source: Cooperative Energy Futures (CEF)

In a similar, yet different way, the People Power Solar Cooperative helps community members who want to participate in community shared ownership but do not have the resources to install their own solar panels. Due regulatory conditions, it is more challenging for California residents

to build and own a shared community solar garden. In fact, the largest electric utility in California has rejected various attempts by communities as previously discussed (Sax 2022). People Power Solar Cooperative found a way to help members of the community who are unable to find physical space to install solar panels (or do not have the capital) but want to become a share owner of a community solar facility. In this model (see figure 6 below), individuals can buy a share of the cooperative by making an investment of \$100 or up to \$1000. The cooperative uses the accumulated investment to build a solar project on the rooftop of a local church or community center. While the off-taker, in this case, the local church or community center, uses the solar energy generated and buys this energy from the cooperative at a rate that is lower than what the local electric utility would otherwise charge. The share owners of the cooperative receive interest on their shares in return, and the bill savings go to the off taker.

Figure 6. People Power Solar Cooperative community solar model



Source: People Power Solar Cooperative

3.3.3. Community solar enabling conditions vary by geographic location.

Many communities find it hard to cope with different rules and conditions when it comes to developing community-owned solar in different states. This is particularly true for intermediary organizations that work in multiple locations across the U.S. This applies equally to communities that want to develop small-scale community solar, but cannot take what other communities have done in other states and apply it in their own context because of differences in the policy and program environment. For example, Minnesota is known to be pro-community solar, leading the nation in developing community solar gardens. The state's community solar program reached

about 841 MW in generation capacity as of August 2022 (McCoy and Farrell 2022). Minnesota has no caps on community solar development (in terms of generation capacity), which makes community solar garden more profitable (McCoy and Farrell 2022). In contrast, community solar projects in Colorado have to be between 10 kW and 2MW, and the projects must be located near the communities being serviced and must have at least 10 subscribers (McCoy and Farrell 2022). The two key factors that determine the chances of success of community solar are VNM and interconnection rules. Only 20 U.S. states have passed legislation that supports community shared solar gardens.

There are also different restrictions on who can participate in the community solar opportunity, in certain states by geographic location or utility distribution territory. For example, Massachusetts launched two community solar programs in 2009 – the Neighborhood Net Metering and Community Shared Solar/Virtual Net Metering – and the difference between the two is that the former requires that subscribers are located in the same neighborhood as the solar facility, and the latter requires that the subscribers are located in the same utility distribution territory of the solar facility (Interstate Renewable Energy Council 2019b). Unlike Minnesota, most other states including Massachusetts and Colorado have a limit on aggregate community solar capacity (Interstate Renewable Energy Council 2019b). Since energy is regulated locally or at the state level, communities and intermediaries that help support communities might struggle with the inconsistencies in policies and programs and this could significantly impede the transition to renewable energy (Susskind et al. 2022; Hirsh Bar Gai et al. 2021; Burns and Kang 2012). This is also partly exacerbated by the absence of a federal level standard that could help clarify the direction towards supporting community solar (Heng et al. 2020; New York State Energy Research and Development Authority 2021; Roemer and Haggerty 2021).

3.3.4. The challenges of working with local electric utilities

Communities often find it difficult to work with local electric utilities, interconnection issues in particular. North Carolina for example is being described as a “regulated monopoly” where the utility pretty much dominates the retail electricity generation and transmission in the state (Energy Policy Advocate, North Carolina Justice Center). The staff and leaders of non-profit

organizations that support low-income households in particular to lower their energy costs explain that the IOU in the state has the market power. They are the ones oppose legislations that were designed to help residents who want to go solar with the help of external solar developers (Energy Policy Advocate, North Carolina Justice Center).¹ So, the IOUs have been active in trying to keep solar accessibility out of the market, not just community solar but even residential rooftops (C. Huang 2022). The utilities would sometimes charge rates, despite the bill credits from net-metering, at a price that ended up being higher than what residents would buy off the grid at the regular residential retail rate (Co-director, North Carolina Justice Center). In addition, the utilities have the ability to make net metering unattractive in different ways. For example, in North Carolina, when residents have over generated electricity beyond what they could use and got a credit on their bill, there was a limit on how long they could keep the credit active. If they do not use the credit by the end of a certain month for example, the credit would expire. In these ways, utilities can limit the ability of the community members trying to use the benefits to their advantage, and making it less incentivizing to go solar.

The role of intermediaries becomes even more important for community members who are trapped in this space of wanting to own and build solar but are hesitant to begin primarily because of their lack of experience in working with utilities. Intermediary organizations come with precedents, and because of their accumulated experience, some utilities are known to prefer to work with community owned solar than a large-scale developer (Cofounder and former CEO, Co-op Power). One of the founding members of Co-op Power claims that it is not harder to do community solar than solar in general. Cooperatively owned and operated community solar managers as intermediaries are getting better at communicating the value they bring to the table when negotiating with utilities. Utilities are gradually finding out that community solar intermediaries are working with and hiring competent solar installers and contractors thereby adept at bringing the expertise needed. Some utilities also understand that the economic impact will be greater for the communities when they work with these intermediary organizations. This is important because some utilities are quite committed to their ratepayers. So, utilities can be a

¹ The data from the North Carolina Justice Center come from a focus group observation co-organized by the Clean Energy States Alliance (CESA), and funded by the US Department of Energy, Solar Energy Technologies Office [EE-0009360: Effective Knowledge Dissemination for LMI Solar].

problem when they generally do not want solar therefore cutting out the possibility of adding more community solar in the mix. But from the standpoint of cooperatively managed intermediaries, they are getting better at partnering with utilities and building confidence in the work they do.

In light of all of these challenges, intermediary organizations can help in several ways. One is to build community support. Ensuring ownership of community shared solar is one way that intermediaries can help build community support. This is why community ownership matters. Secondly, they can provide the technical, procedural, and administrative assistance required to carry out the tasks. This will help alleviate the pressure on communities who are reluctant to proceed because they have no experience working directly with utilities. Thirdly, intermediary organizations generally have the experience and know-how of how to come up with innovative financing mechanisms for communities who face severe resource limitations. Fourthly, to better cope with complexities around legislative policies and programs, intermediary organizations are actively voicing their concerns to make an impact on policy change that is favorable for community participation and community ownership of solar. Lastly, to help internalize the hiring and human resource utilization, intermediary organizations are growingly trying to develop training and education programs for the community members. The latter chapters and sections will further explain these intermediary roles referencing empirical evidence and case study examples.

4. Research Design

4.1. Overview

In November 2021, I had the privilege of participating in the Strategic Convening on Energy Democracy that gathered more than fifty participants from twenty-five organizations working to advance a broad vision of energy democracy across the U.S. In four-online sessions that took place across two days, the convening introduced me to a new world of community-driven clean energy development, filled with dedicated, knowledgeable, and experienced, individuals striving to advance energy democracy. Participating organizations ranged from non-profit energy and environmental justice groups to religious organizations. They were all helping to support communities, fighting for energy justice, social equity, and increased access to affordable clean energy options in face of the changing climate. Some of these organizations were national in scale while most were local or regional.

While the majority of the convening was devoted to mapping how each participating organization could best contribute to the nationwide energy democracy movement, and how they could best collaborate on planning the first national campaign on energy democracy, my focus was on getting to know as many participants as I could – building ties and beginning to build partnerships. The convening opened a window of opportunity for private conversations with leaders of the energy democracy movement. We discussed why achieving energy democracy is critical in the current period – especially in light of what happened in Puerto Rico after Hurricane Maria in 2017 that took the lives of nearly three hundred people due to the lack of electricity – limiting access to medical equipment, food, water, and basic shelter for a number of months, according to the Puerto Rican government (Weinrub 2021).

Comité Diálogo Ambiental, one of the participants of the convening led the discussion and called for the transformation of the Puerto Rican Electric Power Authority (PREPA) – transitioning from fossil fuels to the implementation of rooftop solar, storage, and energy efficiency programs (Energy Democracy Project 2021). Further, the campaign for energy democracy issued a statement urging the U.S. government to use FEMA recovery funds to help develop community-

based energy (Energy Democracy Project 2021). These organizations collectively voiced the need for a decentralized model of community-led, community-controlled energy production that would increase resilience in the face of external shocks such as energy shortages due to natural disasters or unexpected rate hikes.

Side conversations with some of the participating organizations directed my attention to community ownership of solar – which seemed to be a critical element of community-led, community-driven clean energy development. One of the participants, and former CEO and Founder of Co-op Power, Lynn Benander, emphasized the importance of community ownership, explaining what community ownership means to community members -- what it means to own the things they depend on (Benander 2018). Although the movement had just started, I came to realize that these organizations were already serving as intermediaries for communities that might think that owning something is not really an option for them. Many organizations like Co-op Power, an active participant in the convening, were helping community members understand how they can become owners. They were educating as many people as they could about how energy can be a source of economic opportunity to fight against poverty and injustice.

What I heard reminded me of some of the key successes (and attributes) of intermediaries in the public dispute resolution field. But questions emerged – predominantly about the advocacy roles these new intermediary organizations played as compared to the mediation services offered by traditional mediating institutions. This led to my core hypothesis: i.e., that intermediaries functioning in the context of community-owned solar have to operate differently from intermediaries that intervene in crises in traditional public dispute resolution settings.

4.2. Research Questions

It turns out, community ownership is more important than I imagined. For certain communities, particularly those with fewer resources, it may not be easy to think about owning something. Indeed, it may take a huge transformation in their thinking if they want to confront the societal challenges associated with community ownership of solar projects. Thus, this research aims to address four core questions:

What is special about intermediaries that focus on community ownership of solar compared to conventional intermediaries operating in the field of public dispute resolution? I aim to identify and compare the distinct roles these new intermediaries play in helping to advance community ownership of solar. There is a chance that these intermediaries might also carry out some of the same facilitative roles that traditional intermediaries play in the public dispute resolution context. The analysis will however focus on unpacking the new tasks and responsibilities these intermediaries take on to guarantee successful construction and operation of community-owned solar projects.

How do these intermediaries work with communities that ask for help? My objective is to illustrate how these intermediaries interact with potential communities or community clients – whether they intervene and help multiple actors collaborate in particular ways. I attempt to map these interactions, identifying who the actors are, how information and knowledge flows, and model the nature of the relationships that emerge.

What roles and functions do these intermediaries offer? Relatedly, how do community members perceive these roles and functions offered by the intermediaries? As identified by some of the organizations participating in the energy democracy movement, there are clear roles these intermediaries are willing to assume, including providing knowledge about the technologies involved and the procedures required to lawfully own shared solar facilities. I was also eager to discover whether the way the intermediaries see themselves matches the perceptions that communities of different kind see them.

What are the kinds of mediating institutions involved in the context of expanding community ownership of solar? While in the traditional public dispute resolution context, professional firms, federal agencies, state offices, and local government departments provide intermediary services at the local level, it is unclear which entities make up the group of intermediaries helping to advance community ownership of solar. My research aims to categorize these intermediaries (into clusters) to better explain the dynamics involved.

4.3. Data collection

To adequately investigate the above research questions, I inventoried existing scholarly works including professional reports published by leading organizations and think tanks in the context

of community-owned solar energy development as a first step. Based on my initial review of existing materials, several common challenges faced by communities attempting to develop their own solar projects were noted for further investigation. Additional intermediary organizations were identified. This exploratory research led to in-depth interviews with leaders of organizations in each category of intermediaries.

Interview requests were made to about 40 intermediary organizations in 18 U.S. states. Ultimately, leaders and staff of 28 intermediary organizations agreed to participate. The interviews were conducted either virtually using a video conferencing tool or by phone, depending on the preference of the interviewee. Not every interview was recorded. Among those that were, the files were professionally transcribed. Each interview took about 45-60 minutes to complete.

For certain intermediary organizations, the same individuals were interviewed multiple times. My objective was to capture the first-hand descriptions of intermediary interactions as completely as possible. Based on the interviews, nine categories or clusters of intermediary organizations were identified. The 28 intermediary organizations all belong in the following 9 clusters. A few belong in more than one cluster, depending on the scope of work, type of organization, and populations they serve.

Figure 7. Intermediary clusters



Table 2. Intermediary organizations interviewed

Intermediary Organization Name	Intermediary Cluster Types	City	State
*Ashland Solar Cooperative	Cooperative	Ashland	Oregon
Cape Light Compact	Municipal	South Yarmouth	Massachusetts
*Cleveland Owns	Cooperative	Cleveland	Ohio
*Co-op Power	Cooperative	Northampton	Massachusetts
*Colorado Energy Office	State	Denver	Colorado
Comite Dialogo Ambiental	Non-profit, EJ	Salinas	Puerto Rico
*Cooperative Energy Futures	Cooperative	Minneapolis	Minnesota
Energy Democracy Alliance	Non-profit, EJ	Syracuse	New York
*Ho‘āhu Energy Cooperative Molokai	Cooperative	Kaunakakai	Hawaii
*Indigenized Energy	Non-profit, Tribal	Pine Ridge	South Dakota
*Leech Lake Band of Ojibwe	Tribal	Cass Lake	Minnesota
Local Clean Energy Alliance	Non-profit, EJ	Oakland	California
*Minnesota Department of Commerce	State	Saint Paul	Minnesota

Mountain Association	Non-profit, EJ	Berea	Kentucky
*Native Sun/Solar Bear	Non-profit, Tribal	Minneapolis	Minnesota
*New York State Energy Research and Development Authority	State	Albany	New York
*People Power Solar Cooperative	Cooperative	Oakland	California
*People's Solar Energy Fund	Cooperative	Florence	Massachusetts
*Portland Clean Energy Funds	Municipal	Portland	Oregon
RE-AMP Network	Non-profit, EJ	Minneapolis	Minnesota
*Shake Energy Collaborative	Solar Developer	Fresno	California
Souladarity	Non-profit, EJ	Highland Park	Michigan
*Standing Rock Renewable Energy Power Authority	Tribal	Fort Yates	North Dakota
The Franklin Community Choice Power Supply Program	Municipal	Conway	Massachusetts
The Nathan Cummings Foundation	Non-profit, Foundation	New York	New York
*Verde	Non-profit, EJ	Portland	Oregon
*Vineyard Power	Cooperative	Vineyard Haven	Massachusetts
*Washington Electric Cooperative	Rural Electric Co-ops	East Montpelier	Vermont

*Intermediary organizations developed as case studies – these intermediaries either have a community-owned solar project in operation or at least in pre-development stage.

The majority of intermediary organizations interviewed were either member-owned cooperatives or non-profit EJ based organizations. Among the 28 intermediary organizations, 19 have direct experience in community ownership of solar projects. For the purposes of this study, intermediary organizations with an asterisk either have one or more community-owned solar projects operational, or at least in pre-development stage. The ones without, have strong interest in community-owned solar, but thus far have yet failed to pursue project ownership.

To measure community perceptions of the intermediary services provided by the organizations that serve these communities, surveys were administered in communities that agreed to participate. I asked community members to respond to several proxy questions about the benefits they offered. A total of nine questions were asked regarding the level of importance of intermediary roles and functions (as described by the intermediary organizations), which intermediary roles benefitted the communities the most (from the perspectives of the communities), and which future energy projects would benefit the communities the most.

Additional questions were included in the survey to gauge the composition of each community and the scope of intermediary interaction. The latter half of the survey asked demographic questions about each respondent’s household income, age, level of education, household size, gender, ethnicity, and primary geographic location. The survey was distributed in six different intermediary communities as shown below.

Table 3. Intermediary communities surveyed

Intermediary Organization	Intermediary Cluster Types	City	State
Cleveland Owns	Cooperative	Cleveland	Ohio
Cooperative Energy Futures	Cooperative	Northampton	Minnesota
Ho‘āhu Energy Cooperative Molokai	Cooperative	Kaunakakai	Hawaii
People Power Solar Cooperative	Cooperative	Oakland	California
Standing Rock Renewable Energy Power Authority	Tribal	Fort Yates	North Dakota
Vineyard Power	Cooperative	Vineyard Haven	Massachusetts

Five out of six intermediary organizations participating in the survey are member-owned cooperatives, and the remaining intermediary organization is a Tribal group serving the citizens of a Tribal community.

The survey response rates were relatively low. This is expected given the conditions under which the survey was administered (Holtom et al. 2022). For certain organizations, the survey was incorporated into their weekly or monthly member newsletter. For others, direct individualized emails were distributed to encourage participation. Generally, intermediary organizations that distributed personalized emails yielded higher response rates than those that sent out mass emails in the form of a newsletter. To encourage participation, a small financial incentive was included for those willing to complete the survey.²

² As compensation for participating in the survey, the first 200 respondents had the option of (a) receiving a \$20 gift certificate or (b) donating a \$20 gift certificate to an intermediary organization of their choice.

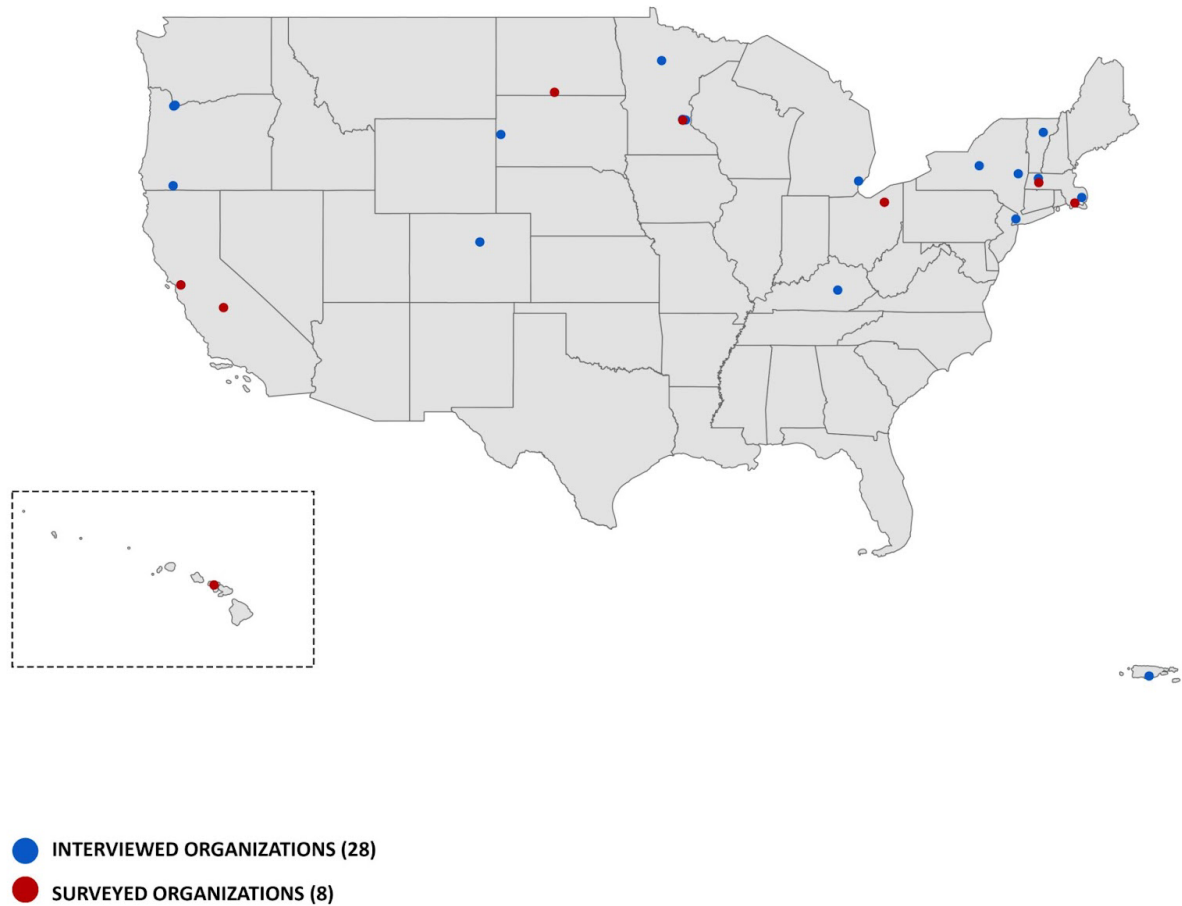
Table 4. Survey response rates

Intermediary Organization	Total number of individuals surveyed	Total number of survey responses	Response rate
Cleveland Owns	50	14	28.00%
Cooperative Energy Futures	1100	79	7.18%
Ho‘āhu Energy Cooperative Molokai	150	31	20.67%
People Power Solar Cooperative	165	22	13.33%
Standing Rock Renewable Energy Power Authority	450	93	20.67%
Vineyard Power	1332	86	6.46%
Total	3247	325	10.01%

The intermediary organizations interviewed and the intermediary communities that participated in the survey show an even geographic distribution, dispersed across 15 different states. Minnesota is one of the leading states in developing community solar, thus it is included in the sample. Other states like Massachusetts and Hawaii are currently in the process of making community ownership of clean energy projects easier to accomplish. Two additional communities were included in the survey administration plan but failed to yield meaningful numbers of responses, and therefore were not included in the subsequent analysis.³

³ Co-op Power (Massachusetts), and Verde (Oregon) were dropped from survey analysis.

Figure 8. Case study locations



4.4. Data analysis

4.4.1 Interview analysis

Some of the interviews that were recorded were professionally transcribed and edited for accuracy. Then, the interview notes and interview transcriptions were open coded to identify references to the common themes in response to the core research questions: intermediary challenges, intermediary key roles and functions, what community ownership means, and what the longer-term aspirations are. Then, second order coding was done to identify common patterns across the interviews. This led to conceptualizing the key intermediary roles and functions as

claimed by the intermediary organizations. These roles and functions were then organized relevant to the sequential process of developing community solar projects. These concepts were triangulated with the challenges communities face when attempting to develop community-owned solar projects – how the functions they provide help communities overcome these challenges. The findings from interview pattern analysis were also triangulated with online resources (or intermediary organization documents) to supplement any missing information and to check for accuracy. This information combined with interview findings were used to construct 19 case studies of intermediary organizations that help to facilitate building community-owned solar projects. The case studies were designed to provide the basic history and key milestones of each intermediary organization studied and to explain how the intermediary roles and functions manifest in the case studies using specific examples from the interview findings.

Once, the key intermediary roles and functions were identified, the intermediary roles and functions have been mapped in the form of a matrix to analyze and record quantitative patterns of predominance across all 19 case studies. To add additional robustness to the data, the interview findings were used to construct a survey questionnaire. Based on the interview findings, the survey questions were designed to capture community members' perceptions of how intermediaries helped them achieve their most important goals. These findings were then further analyzed by comparing them with the predominant outcomes identified with the interview data.

4.4.2 Survey analysis

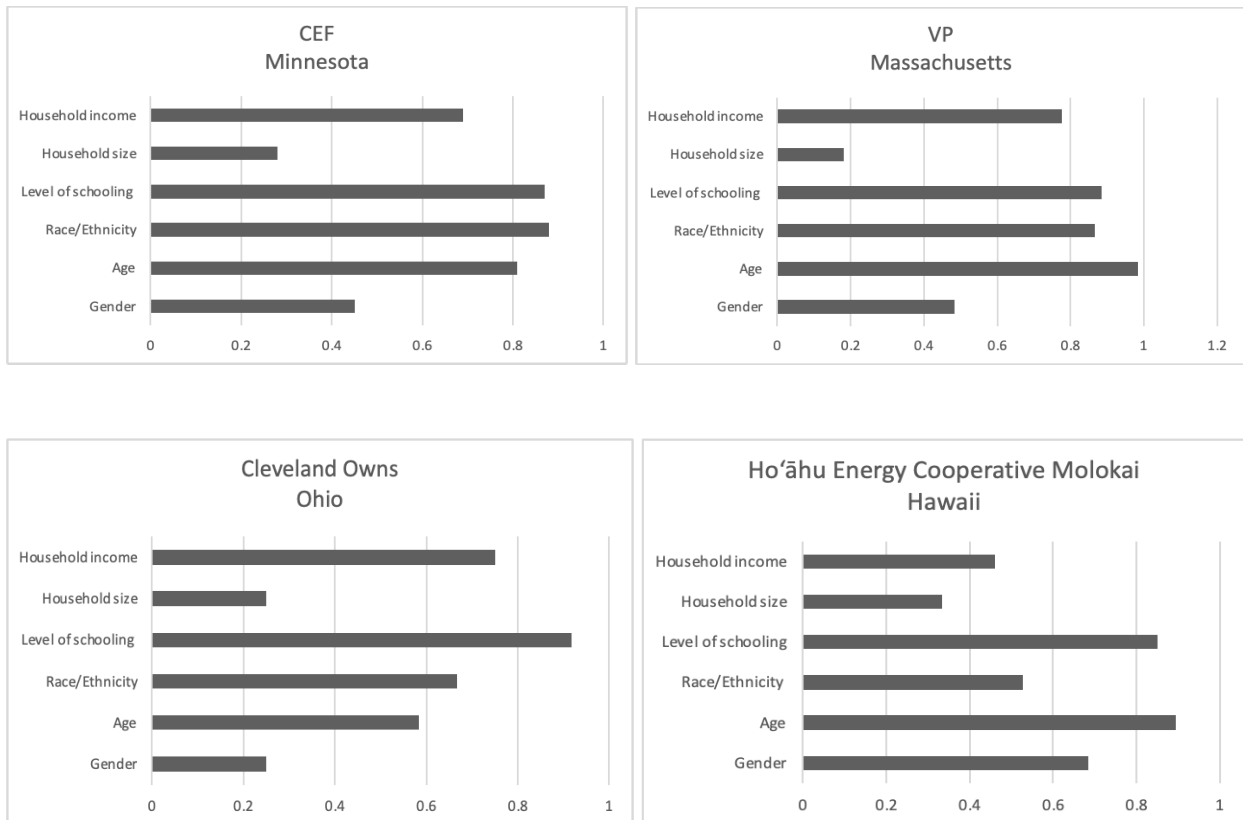
The survey data were cleaned by excluding incomplete survey responses. Each question was further analyzed by identifying predominance across top ranked answer choices across all six survey results (across the intermediary communities studied). The predominance from the survey responses was then further analyzed to identify patterns across the roles and functionalities community members found most beneficial to them. The findings were presented in bar graphs to illustrate the predominance and patterns across different intermediary communities.

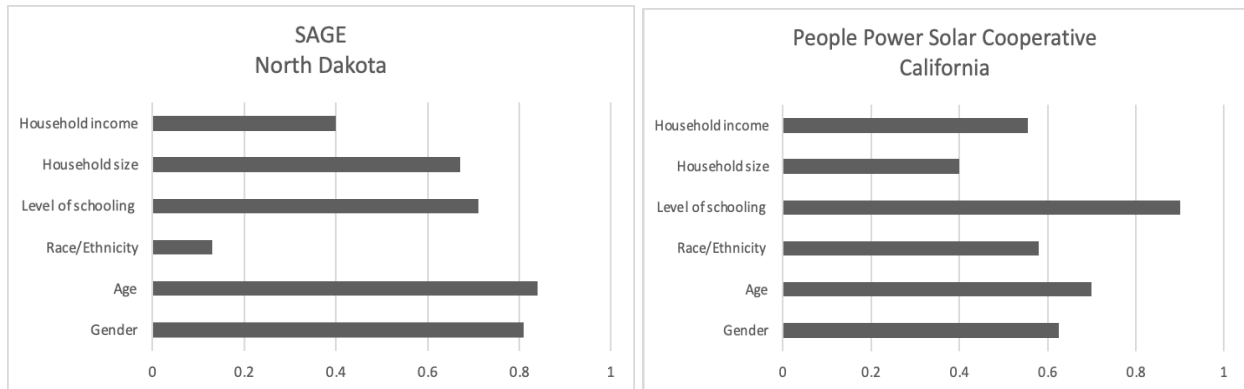
Then demographic data were further analyzed to capture the characteristics of the sample compared to the state average or state median. I cleaned the demographic data and transformed them into binary variables (values 0 and 1). I employed this step with three objectives in mind. First, this enabled a direct comparison between sample characteristics and the demographic characteristics of each state. Because I use state level data as the basis for coding the variables, I can make useful observations on the characteristics of the sample with respect to state characteristics. For example, I use each state's median household income for 2022 to code the household income data from each sample. If a particular state's median household income is \$70,000, and if a response to the household income question is \$60,000 - \$69,999, then I code this particular answer choice as a zero (0), below the median. If the state's median household income falls in between the income category (see survey questionnaire in Appendix B for detailed answer choices), then I treat the category as equal to or above the state's median household income, thus coded as 1. This procedure is replicated across all intermediary organizations to ensure coherence in the coding process. Secondly, this process standardizes the output of data across all demographics, allowing for meaningful interpretations across variables as well as across intermediary organizations. The absolute average values calculated for each variable cannot be compared one to one due to differences in the margin of error across the coding processes for each variable. Yet, the standardized binary data provide useful observations in the skewedness of the data with respect to the state median. For example, staying with the household income data, if the average value of the coded income data is 0.77, this tells us that the household income data for this particular sample is skewed more towards the right, meaning the proportion of households with higher income categories tend to be higher than that of households in lower income categories. Lastly, the binary variables allow flexibility to perform additional statistical analysis such as running logistic regressions to predict the relationship between demographics and answer choice predominance. For this research though, this was not possible especially because of the inability to gather additional state specific data accounting for state fixed effects for each intermediary organization.

I have collected and coded six demographics factors: gender, age, race/ethnicity, level of schooling, household size, and household income (see figure 9 below). Similar to household income data, if the answer choice is equal to or above the state median household size or state

median age, then a 1 is recorded. Below the state median yields a 0. For level of schooling, if the response belongs in a category equal to or above bachelor’s degree, then is coded as a 1, below a bachelor’s degree yields a 0. Coding the race/ethnicity variable hinged on which race/ethnicity is dominant in the state. Of the six different states represented in my survey sample, in five states, the most dominant race/ethnicity is “white”. In my sample responses, I have coded “white” as 1 and all others as 0. In Hawaii, the “Asian” heritage is the most dominant race/ethnicity. Despite this, I decided to still code “white” as 1 to ensure coherence in the coded data across all intermediary organizations. In the case of Standing Rock Sioux Tribe (SRST/SAGE), since the intermediary is a Tribal authority for a Tribal Nation, the majority of race/ethnicity in the sample is represented by American Indian or Alaska Native (85% in the sample). Gender is the simplest of all demographics data where “female” was coded as a 1 and “male” as a 0. For the purposes of coding the data, all other gender answer choices have been omitted from the data analysis and because there was only one or two observations, this had almost no effect on the results of the coded data.

Figure 9. Demographic characteristics of survey sample across six intermediary communities





(From top left clockwise: Cooperative Energy Futures, MN; Vineyard Power, MA; Ho‘āhu Energy Cooperative Molokai, HI; People Power Solar Cooperative, CA; The Standing Rock Renewable Energy Power Authority (SAGE), ND; Cleveland Owns, OH)

Compared to the state demographic characteristics, the sample studied are found to be higher in household income, that have higher level of education, and relatively small household size. Gender happens to be evenly distributed across the samples.

As a final step, correlation analysis was performed to evaluate the differences across key demographic data: household income and gender. Statistically significant correlation coefficients are reported in tables 6, 7, and 8 across intermediary organizations studied, comparing respondents that chose specific answer choices based on household income and gender differences.

4.5 Limitations

There are obvious limitations in my efforts to collect sufficient data to make sure the data are robust and accurate. While I tried to interview the same individuals multiple times to ensure the accuracy of the information collected, I could have improved the robustness by expanding the pool of the intermediary organizations studied. Member owned cooperatives and energy justice/environmental justice non-profit organizations were dominant in my sample of interviewed organizations. I could get a more representative picture of how these intermediaries operate if I could interview more intermediary organizations that belong in the other

intermediary clusters. This could also help build a more discrete layer of cluster categorization, beyond the nine clusters identified so far.

For the survey, there were some inherent limitations in the efforts to collect responses. Firstly, because the survey was administered via email or online newsletter, there is a chance that many active members of the communities might not have had access to the materials provided. The staff of some of the intermediaries pointed out that there are many active members who are retired and this is the reason why the sample demonstrates a higher age group characteristic (compared to the state average) across all intermediary communities studied in this research. This suggests that many active members who would have liked to participate might not have received the invitation to participate online. Secondly, there are certain survey questionnaire design related challenges or limitations. While the ranking questions provide a clear baseline making a direct comparison across answer choices possible, there are obvious limitations. For example, there are inherent differences in how everyone defines what is ranked first, second, and third. Some people might be more careful in selecting their first choice and randomly selecting the rest, while others might be careful in selecting all five answer choices. Relatedly, this is connected to the fatigue issue. Survey respondents might have taken the first two or three answer choices seriously and the latter choices not so much. This is the reason why when analyzing high/low-income segments, the top one or two answer choices were included in the analysis, to minimize the margin of error.

Finally, I had to face the challenge of not being able to aggregate all survey responses across all six intermediary communities. If I combine the data collected from the six organizations together, or by intermediary cluster types (i.e., combining all community Co-op data together), then I need to account for the state fixed effects since the intermediary organizations are located in different states. Some of the responses predominantly chosen by survey respondents could be from state specific characteristics and constraints. It is very difficult to get such state specific data, particularly for many variables, which may or may not have a causal role in shaping the respondents' opinion. As such, I have to rely on simple correlational analysis to make demographics related empirical claims pertaining to each intermediary community's context.

5. Empirical Findings

5.1. *Intermediary Roles*

To help overcome the challenges to adding to America's renewable energy supply, ranging from resistance from utilities to lack of financial capital, met by community members who wish to build and own solar energy, innovative intermediaries can in a variety of different ways. The specific roles these intermediaries can play are included in the list below. From the initial stage of community members asking for some kind of help, intermediaries can perform different roles at different stages of the development of community-owned solar project -- helping community members problem solve and overcome barriers.

Key roles that can help overcome the challenges and build societal support for community solar energy ownership and community empowerment:

- Facilitate an assessment of the energy status-quo
- Build local community support for renewable energy
- Inform project design, governance, and financing
- Provide technical, administrative, procedural assistance
- Advocate for governmental support
- Support local capacity-building
- Build partnerships, alliances, and networks
- Empower local communities and contribute to social equity
- Build movements for decommodified, decentralized, democratized energy

5.1.1. *Facilitate an assessment of the energy status-quo*

Similar to an intermediary tasked to help resolve any other kind of public dispute, intermediaries that support community-owned solar energy development often facilitate joint-fact finding, helping all parties fully understand the situation they are faced with. This includes helping community groups assess and understand the support they have and the opposition they face.

For example, communities in California have approached People Power for facilitation assistance. Because of their frustration with investor-owned utilities (IOUs), some community members want to go completely off-grid and become self-sufficient. People Power plays a crucial intermediary role, which is to channel the anger and frustration aimed at IOUs, and provide all the information community members need to fully understand their options and how they might want to navigate the situation they face (Co-founder and CEO, People Power). While some community members imagine building their own micro-grids, People Power can help them understand the downside of this idea and how to leverage their limited resources to get the most out of any investment they make (Co-founder and CEO, People Power).

People Power Solar Cooperative, based in California, was founded in 2018. It seeks to build a movement for “just energy transition and transform the face of energy ownership” (Co-founder and CEO, People Power). To the members of People Power, energy ownership means more than just electricity bill savings (Co-founder and CEO, People Power). Their focus is on changing the public’s fundamental relationship with energy – moving away from an extractive to a regenerative energy economy (Co-founder and CEO, People Power). Members of People Power now own and operate three revenue generating solar projects that yield dividends over the lifespan of each project (People Power Solar Cooperative n.d.). Based on the “Commons Model,” members buy a share of the cooperative for a fee up to \$1,000 of their choosing, the Co-op uses the money to build a solar project. While the off-taker buys solar energy from the Co-op and takes the bill savings, members earn interest on their shares (People Power Solar Cooperative, n.d.). People Power Solar Co-op is an active member of the People’s Solar Energy Fund (PSEF) and one of the pioneers of the energy democracy movement, dedicated to sharing tools, strategy, and governance know-how (including the People Power Bylaws) to get people in other communities across the U.S. to understand how to benefit from collective ownership of energy and as a result be empowered (Co-founder and CEO, People Power).

Another reason why facilitating the process of assessing the status-quo is important is because every community needs to be dealt on an individual basis. The community solar environment in every state can be different, as explained above. These differences create barriers for community

solar developers who can't make adjustments. It is very difficult for a community to simply take what another community in another place has done in the past and apply it directly.

Intermediaries can provide valuable assistance by assessing community-specific conditions and devising a project design and financing strategy that fits the regulatory circumstances (General Manager, CEF).

5.1.2. Build local community support for renewable energy

One of the ways in which Cooperative Energy Futures (CEF) helped to build local community support and encourage community members to participate and get additional buy-ins is by providing a clear path for ownership. A founding member, and general manager of CEF argues that there is an important distinction between “ownership as a financial investment” and “ownership in use.” People often recognize ownership from a financial investment perspective, i.e., paying to own something with the hope that eventually it will yield some financial reward. An immediate example of this might be buying real estate. Another form of ownership is ownership in use. This is more relevant for community members who may not have the financial capital up front. In other words, if the Co-op makes a profit based on the proportion of energy produced, then each member owner's gain is assessed on a month-to-month basis, and in this case, there is no required upfront cost. This is an important concept that seems to be key in getting community buy-in because this means it does not depend at all on each community member's ability to put down an upfront investment.

This also has a lot to do with the legislative environment the community is in. This kind of “pay as you go” ownership opportunity is possible in states like Minnesota where energy users can benefit directly from the energy produced through virtual net metering (VNM). But this may not be possible in other states, so they have to default to more of an investment model similar to the one offered by People Power Solar Cooperative in California.

CEF is a member-owned energy services cooperative in Minnesota, with over 1100 community members, that aims to help build clean energy projects contributing to a wider transition to clean energy, reducing energy costs, and building community wealth (Cooperative Energy Futures,

2019). The cooperative is democratically structured, as the members elect and run for the Board, and co-own the business, sharing Co-op profits (Cooperative Energy Futures 2019). CEF was founded in 2009, and has become one of the leaders in designing, building, and owning community solar gardens (CSGs), recognized as a third-party clean energy program in Minnesota in 2015 (Cooperative Energy Futures 2019). The launch of the program in 2015 enabled third party project developers like CEF to connect a viable solar project to the grid, and required the electric utility to provide bill credits to the subscribers (Cooperative Energy Futures, 2019). The subscribers then make subscription payments at a rate that allows net savings each month (Cooperative Energy Futures 2019). CEF has helped 8 projects go online thus far, with two additional sets of projects expected to be completed in 2022, each of 10MW or more (Cooperative Energy Futures, 2019).

Interestingly, intermediaries like Co-op Power are placed in a situation where they have to facilitate what are known as value-based or identity-based disputes when people do not want solar in their neighborhood. To certain people this had nothing to do with owning their own solar project. Intermediaries often support communities by encouraging other community members to join the movement, become a co-shareholder, and help contribute to combating climate change. There are situations when people did not want solar and did not like the idea of changing the identity of their town in any way. When the development did proceed, Co-op Power had no trouble holding community meetings and proceeding with the next steps. Interviewees indicate that this might be because communities are so used to seeing random developers swooping in and building something, it is almost like an allergic reaction when they hear that something might change (President and CEO, Co-op Power). Inevitably Co-op ends up doing some facilitation by reiterating the that what they are trying to do is for the community's benefit, owned by the community and that the benefits will stay within the community (President and CEO, Co-op Power).

Since 2009, Co-op Power has become a regional hub of Community Energy Co-ops (CEC) in the Northeast. Each CEC owns and runs its own community energy projects and sets its own local agenda (Co-op Power, n.d.). The primary objective of Co-op Power is to welcome members and help them launch their own community-owned clean energy projects, assisting them with

organization and membership development as well as business development and capitalization (Co-op Power, n.d.). Any group of 20 Co-op Power members in the Northeast is eligible to form a CEC (Co-op Power, n.d.). One member from each CEC serves on the Co-op Power board. Co-op Power is owned by over 600 members in New England and New York (Co-op Power, n.d.). Co-op Power is an iconic intermediary that provide all kinds of technical and community mobilization assistance, with access to teams of engineers, financial experts, and community planners who can help CECs design, capitalize, and launch community-owned businesses (Co-op Power, n.d.).

A Community Co-op developer in Hawaii explains that particularly for small community projects, buy-in from the community is key. And the key to achieving buy-in from the community are: community engagement (convening), capacity building (training), and ensuring equity (social justice) (President, Ho‘āhu Energy Cooperative Molokai). It took 6 months of constant public outreach for Ho‘āhu Energy Cooperative Molokai and Shake Energy to build trust and get community buy-in.

5.1.3. Inform project design, governance, and financing

Co-op Power, for example, provides a very detailed set of guidelines spelling out how they can best assist a community that might be willing to develop a community owned solar project. The guidelines are offered to any interested community. They take the form of a decision tree indicating how much time would have to be put in by community leaders, how much financial capital will have to be raised and what the possible outcomes might be given various levels of community investment. The Co-op Power staff has clearly laid out what Co-op Power can bring at each level of investment. This includes skills and expertise needed at various stages in the development process. Absent Co-op Power’s assistance, these would have to be outsourced, requiring huge time and resource commitments. The key asset Co-op Power brings is its ability to customize its process of community assistance based on what is needed. With its accumulated experience and existing relationships (with the local utilities, contractors, and policymakers), Co-op has the flexibility to offer many packages of services likely to yield positive outcomes. This

indeed is an example of an innovative project design mechanism, only possible with the assistance of an intermediary like Co-op Power.

One of the priority roles People's Solar Energy Fund (PSEF) aims to play is helping with project finance, exploring different financing mechanisms. Interestingly, intermediaries have to be equally cognizant about multiple sources of funds, the money cannot come from an industry that is viewed as unethical or whose values runs counter to the values of the communities solar developers serve. This makes the intermediary role in coming up with a tax equity investor particularly challenging because the fund-raising intermediary might not have the same set of values as the solar developing intermediary that works with the community on the ground (People's Solar Energy Fund, n.d.). For example, an intermediary might be approached by a potential investor who happens to raise capital from venture capitalists who want to invest in LMI communities; however, the solar developing intermediary on the ground might not be favorable to that idea (People's Solar Energy Fund, n.d.).

PSEF is a cooperative of community-based solar developers who joined forces to share knowledge, project financing, and mutual technical assistance to ensure success and reduce costs (People's Solar Energy Fund, n.d.). It is an alliance, partnership-based organization that serves as an intermediary for other organizations that serve as intermediaries for communities who wish to build and own community solar projects. Its portfolio size is more than 50MW. Each individual solar project ranges from 10kW and 2 MW (People's Solar Energy Fund, n.d.). Member organizations of PSEF include cooperatives that work with communities like CEF and People Power Solar Co-op, non-profit, energy justice organizations like Local Clean Energy Alliance and Climate Justice Alliance (People's Solar Energy Fund, n.d.). The core mission of PSEF is to help projects gain increased access to financing opportunities and provide support benefiting communities with limited resources (People's Solar Energy Fund, n.d.). PSEF is also dedicated to movement building towards a "just transition" – towards "energy sovereignty and restorative justice" as communities build community solar, they can own.

One of the key features of what PSEF provides as an intermediary is its ability to aggregate community solar projects in LMI communities to secure financing at scale -- towards a path of

community ownership (People’s Solar Energy Fund, n.d.). For example, the Sunset Park Solar is one of the best-known community solar case studies involving PSEF working with other member intermediaries to reduce financing costs by aggregating the project with other PSEF community solar projects (People’s Solar Energy Fund, n.d.).

CEF as an intermediary for such community groups plays a role in bundling several community solar projects and submitting the overall proposal to a financial institution for approval. This increases the chances of a project getting funded. One example is a package of projects CEF put together totaling around \$16 Million for about 6.5MW generation capacity. The bundling of projects can minimize the risk from the perspective of the financial institutions that provide the capital. In many instances, because each community solar project tends to be quite small, financial institutions do not find these projects to be attractive investments. They are concerned about their financial viability. To address these concerns, intermediaries like CEF can come up with innovative financial mechanisms to make small-scale community solar projects financially viable for potential investors. Gradually, they have built up trust with banks and lenders. Once they have successfully worked with community members to get one or more CSGs built, they are more likely to work with that intermediary again. CEF gradually built a reputation in the area. Community members who banded with CEF are more likely to launch successful community solar projects.

Another example of an innovative project design role an intermediary can play is coming up “back-up subscribers”. This alleviates the financial institution’s concern that a project might not be able to maintain a healthy balance sheet. Because of Minnesota solar garden rules, any specific off-taker can take up to 40 percent of any particular solar garden agreement with back-up subscribers (General Manager, CEF). If any member fails to fulfill its obligation, then the back-up can go up to 40 percent of the CSG (General Manager, CEF). According to the Founding Director of CEF, the back-up subscriber arrangement depends on project-by-project planning. In one instance, they found a local recycling company and the company became one of the back-up subscribers for one of the solar projects. This suggests that the intermediary organization in this case found an innovative “de-risking” strategy for the financier so that they would put in a tax equity investment and the lenders would provide the capital for the whole

package. He goes on to say that many investors will be interested in projects that are only 5 to 10 MW. They will want much more. Aggregating or de-risking projects requires understanding the legal and accounting complexity involved. Some intermediaries have this capability.

5.1.4. Provide technical, administrative, procedural assistance

One of the key functions intermediaries of all kinds can play is providing the necessary tools, skills, technical knowledge, and information to parties so they can be adequately equipped to achieve their desired outcomes. Sometimes community groups confuse providing technical knowledge with extensive training or capacity building. From the intermediary's standpoint, there is so much they can do with the staff that they have. This is an inherent challenge, balancing what intermediaries realistically can do with the expectations members have for technical help (Manager, PSEF). The technical assistance provided by PSEF is a synthesis of what has worked best in previous communities. It is not so much about providing advanced technical knowledge as it is about providing practical advice that has worked elsewhere.

Shake Energy Collaborative provides all kinds of assistance: convening, hosting member meetings, providing technical information about community solar, budgeting, offering information about maintaining a healthy balance sheet, and finding task contractors when necessary. The Founder and CEO of Shake Energy came to the community from the university, found people she can work with, and talked about energy in a non-polarizing way.

Shake Energy Collaborative is a community solar energy developer that seeks to work with communities that are heavily burdened by their current energy situation. As one of their first projects, they helped to form the Ho'āhu Energy Cooperative Molokai supporting community outreach, project design, siting, financing, and the process of community solar project development. Both Ho'āhu Energy Cooperative Molokai and Shake Energy Collaborative evolved together and inspired other communities in Hawaii. Shake Energy sometimes works with a large developer, but takes charge of the community design process and ensures that community design is done properly.

Through the NY-Sun program, the New York state authority operating as an intermediary provides technical and procedural assistance, including the help needed to form a solar company, understand zoning laws and comprehensive planning, and deal with all the nuts and bolts of making a project work in New York state. The siting team offers training programs, various forms of direct technical assistance dealing with fire codes, zoning templates and other checklists. In order to support community driven solar, and bolster community partnerships, the state is committed to knowledge transfer and providing direct funds for community solar development.

State level policies can and do have a significant impact on the financial viability of solar projects. The New York State Energy Research and Development Authority, known as NYSERDA, is governed by a 13-member board. It provides technical expertise, and support for New York residents seeking to benefit from clean energy and economic opportunities since 1975 (New York State Energy Research and Development Authority 2022). The state government is one of the most crucial players in community owned solar development (Senior Project Manager, NYSERDA). One of the reasons being, in most states, the state government sets the rate per kWh. This is particularly important because the revenue is what determines project financing, especially for LMI communities who most likely do not have the upfront capital in hand. Although technically not the same as other U.S. states, the solar industry in Washington D.C. is putting down cash for LMI communities helping them to go solar through the Solar for All program (The DC Department of Energy and Environment n.d.).

5.1.5. Advocate for governmental support

Intermediaries in different states are playing transformative roles in advocating for changes in state legislative policies and programs not only seeking more renewable energy, but more distributed energy. CEF along with other groups of independent stakeholders, like environmental and consumer advocacy groups, fought hard for an integrated resource plan for their electric utility. This meant that the utility would have to shut down coal, not build any new gas facilities, and generate more renewables, while focusing on community ownership and social equity (General Manager, CEF).

Ho‘āhu Energy Cooperative Molokai is connecting with their state’s congressional leadership and the Department of Energy with the help of intermediaries like PNNL to tap larger grants to develop renewables in the community of Molokai, Hawaii. This is another crucial role intermediaries strive to play -- aligning the national government’s interests with local needs, seeking politically alliances and overcome blocking political forces.

SAGE at SRST is leading the way in talking with state governments to take over billings from the utilities. In North and South Dakota where [??the reservation] is located, they do not have net metering policies. These two states demonstrate the entrenched power of fossil fuels. While the states are looking for ways to adjust, they are still holding onto the entrenched system of self-regulated supply, consumer base, and billing. So, SAGE as a tribal entity, supported by the Department of Interior, is trying find a common ground between state law and the rights of their tribal nation. SAGE is trying to take over billing from the existing utilities and the conversation is still on-going. There is a state regulation that caps community solar projects at 150 kWh. This is financially infeasible. The allowed rate is also very low at 2.3 cents a kWh. SAGE sees this as an opportunity to reset rates to make community solar economically feasible.

The Standing Rock Renewable Energy Power Authority, otherwise known as “SAGE” is owned and operated by the Standing Rock Sioux Tribe (SRST), and acts as a Public Power Authority (PPA). “SAGE” is an acronym for “Strategic Advancement Goals for the Environment”. SRST’s SAGE manages all energy production and services within the reservation. SAGE leads SRST’s involvement in clean energy development (including both wind and solar), facilitates collaborations with third party entities on behalf of tribal citizens, and holds SRST’s equity interest. SAGE is an iconic example of a tribal intermediary supporting tribal members in their ownership of renewable energy. SAGE is looking to establish themselves as a public power utility which would allow them to set their own rates and distribute their own power without having to worry about interconnection. Several wind and solar projects are at pre-development stage as the tribe aims to sell the energy commercially.

Indigenized Energy at Standing Rock Reservation led by Cody Two Bears spent a lot of time deliberating their concerns to the local, state, and federal governments. They are asking regulators to restrict monopoly energy providers who are simply taking the energy produced at a very low rate and selling it at a high rate. It took two years in 2017 to develop a community solar farm in North Dakota which is still a fossil fuel driven state. Starting a new tribal utility is a possibility, the only prerequisite is that it would cost a lot for the tribe to buy its own substation. Indigenized Energy Initiative is a Native-led non-profit organization focused on building the capacity of native communities to transform their energy system to, ones that are cleaner, affordable, and self-sufficient (Indigenized Energy Initiative n.d.).

Similarly, Cleveland Owns, a cooperative based in Cleveland Ohio has also joined forces with other environmental justice groups trying to push the IOU to transform its current practice. Cleveland Owns is a group of people trying to start solar projects committed to community ownership. Cleveland Owns is aiming to develop six solar projects working with a network of about 60 or so volunteers. They are particularly involved in the pre-development stage – identifying hosts, conducting initial site analyses, creating financial models, and potentially originating Power Purchase Agreements (PPAs). They are getting closer to the physical development cycle.

Vineyard Power (VP) in Massachusetts has been working hard to get the state to pass legislation to ensure that solar ownership will rest in the hands of the community in Martha's Vineyards. VP does not aim to pursue the "flip model". For many years, the Co-op has been trying to get a legislation passed that will allow communities to enter into long term financeable contracts with developers. This would provide the ability for the community to buy the electricity it produces on behalf of its residents. The community members will then be able to get direct bill savings and also increase their energy resiliency. It has been over 13 years since the birth of the organization. They are currently unable to sell electricity back to the members. Once the bill passes the ownership benefits will be realized by the residents in the forms of new jobs created and additional bill savings. The Co-op plan to advocate for lowering electric rates for the residents particularly for the low-income ratepayers in the community.

VP is a community-owned cooperative formed in 2009 based on the island of Martha's Vineyard in Massachusetts. It is a member-owned 501-c-12 non-profit with a growing membership of over 1,600. The Co-op's aim is to support and empower the local island community and its members to keep control of their own clean energy resources. VP as an intermediary continues to help produce electricity locally from renewable sources, while making sure the benefits go directly to community members. VP aims to make the island 100 percent renewable by installing several community solar energy projects as well as offshore wind energy.

5.1.6. Support local capacity building

In order to respond to the acute needs of the community, the Co-op is leading the efforts to implement workforce development that will be foundational for building off-grid systems for community members that have zero electricity connection. Ho'āhu Energy Cooperative Molokai has a solid workforce development program in place with the help of their intermediaries, able to perform intermediary roles themselves as a provider of capacity building for its community members. The Co-op certified 12 individuals as of June, 2022. Through the workforce development program, they can internalize the operations without having to outsource tasks throughout the life-cycle of the solar or other related facilities. They are on course to install 12 to 14 MW of solar before the end of 2022, with the partnership with Shake Energy Collaborative.

Ho'āhu Energy Cooperative Molokai serves the members of the Hawaiian island of Molokai, has a track record of building community support for energy independence, and has made significant progress in designing and building a 2.7MW community solar project. The longer-term vision for the Co-op is building a holistic infrastructure consisting of a 14 MW renewable energy system including energy storage by 2030 that would serve a population of 7,000 indigenous community members. The Co-op serves community members regardless of whether they are members of the Co-op. Community members can become members of the Co-op. The Co-op is dedicated to addressing social and energy inequities, limited capacity building opportunities, and repressed economic development opportunities.

The Portland Clean Energy Fund (PCEF) was passed by the Portland, Oregon voters in 2018 with the aim of providing sustainable funding to ensure that environmental and economic benefits from climate action efforts are available to under-resourced, marginalized communities. The foundation of the PCEF is the environmental justice community in and around Portland, advocating for the under-represented community members who were being left out of the benefits of improvements from energy efficiency, climate programs, and most importantly in the workforce (Manager, PCEF). The second round of PCEF grant awards were distributed in July 2022, awarding more than \$100 million to fund 65 projects in clean energy, green infrastructure, and workforce development (Portland Clean Energy Community Benefits Fund (PCEF) 2022). PCEF is particularly very keen on offering funds to develop training programs for new workers in clean energy technologies, and help existing contractors pivot towards clean energy contracting opportunities.

Indigenized Energy so far has trained over 30 “solar warriors” from nine different tribes (Indigenized Energy Initiative n.d.). They are employed by four solar projects built for and by the native communities on their reservations. Indigenized Energy has so far raised over \$1.6 Million (Indigenized Energy Initiative n.d.). They were able to provide free training services, including everything from recruitment to technical knowledge on building and maintaining solar projects. Capacity building programs in their view should not be focused on building awareness. In their view, building awareness programs are everywhere and that does not seem to be what is needed on the ground. What they provide is technical knowledge on how to build and maintain things. To them, high poverty communities need more training on technical matters.

5.1.7. Build partnerships, alliances, and networks

PSEF is a great case study of an intermediary playing a key role in enhancing an alliance, becoming the focal point of network building among community solar developing intermediaries. PSEF provides a membership-based platform that allow intermediaries aimed at working with communities to build and own community solar, share best practices thereby reducing common risks, and maximizing the chances of achieving success with community solar

development (People's Solar Energy Fund, n.d.). This includes processes related permitting, dealing with utilities, getting projects financed and securing community buy-in.

Indigenized Energy at Standing Rock is a dedicated intermediary to other tribes not just at Standing Rock but across the U.S. In some instances, the tribes might have the money to invest but they end up outsourcing all of the procedures required in the development. Indigenized Energy has been approached by different tribes for assistance. They are particularly an effective intermediary for other tribal communities because they can be trusted as one of their own people.

In addition, the work of Verde, a non-profit based in Portland, Oregon, demonstrates another example of an intermediary helping to build partnerships and collaborations. One project that is in the pipeline is a 1.5 MW community solar project (Program Manager, Verde). The goal is to have at least 100 subscribers. To make the project possible, Verde has partnered with the Port of Portland which will generate 40 percent of the subscription load (Program Manager, Verde). There will be a lease agreement with the Port of Portland which will be the anchor tenant. The remainder of the subscriptions will be provided by low income, indigenous, communities of color, most of whom are living in subsidized housing. Verde is the organizing intermediary between the anchor tenant and other subscribers in the community, making the project a possibility through the alliance. The Port of Portland is a public service organization operating under the Portland City Government. They are joining a network of community member households taking part in the joint ownership of a solar project, both as subscribers and as a lessor of the land (for the solar arrays that will be ground-mounted). The key in this dynamic is that unlike other cooperatives where the intermediary embodies members of the community as co-owners, Verde is a nonprofit intermediary that does not take part in the joint ownership. Once they implement the entire process from project ideation to operation, their goal is to leave the project in the hands of the community. They work to ensure that they have provided sufficient capacity building assistance for self-management and self-maintenance by the time they leave.

In Minnesota the state energy office is keen on not only providing energy assistance, but also putting together a Community Energy Collaborative. The objective of the Collaborative is to work with community-based organizations, leaders of cooperatives and nonprofit organizations

in the state to enhance the understanding of the communities and create a channel for a two-way communication between the communities and the state (led by the Department of Commerce in Minnesota). For example, the collaborative is a means to get input and feedback on specific legislative idea around energy and community assistance. If the state energy office is able to get a sizable federal grant, they can find out from communities who will be best served by the program. To make this communication and two-way feedback system as effective as possible, the state office depends on state employees with diverse cultural backgrounds and who speak the language of immigrant communities.

5.1.8. Empower local communities and contribute to social equity

People Power Solar Cooperative serves community members in California that are mostly renters or low-income homeowner frustrated with the energy system. There are common problems facing low-income community members trying to benefit from renewable energy. This includes a resource barrier particularly for renters and LMI households. They do not have rooftops of their own where they can install solar panels. People Power makes it possible for people to invest – pull resources together and in fact contribute to empowering people who face constraints of this sort. This includes engaging with property owners or community centers which have rooftop space that can be used on behalf of community members.

When it comes to empowering communities and their members, People Power claims that it is not just about realizing bill savings or contributing to climate change by having access to clean energy. The key to empowerment is a “switch” in people’s thinking about ownership. All people, including LMI community members, must recognize working with People Power is a wealth-building opportunity. Wealth from owning something is no longer restricted to wealthy people. An opportunity to build wealth from owning a share of a solar facility can change the power dynamics in the community. Relatedly, on this note, a co-founder and CEO of People Power stated that “we disconnect the ownership of land [with] ownership of power”.

Ho‘āhu Energy Cooperative Molokai is an intermediary that is seeking to ensure energy justice in Molokai in indigenous communities in Hawaii. The Co-op claims that if nothing is done,

renewable energy will create an even wider equity gap. The Co-op raised the question, “Why are we getting left behind?” They offer a strong message to those who show up at their meetings – solar energy is not rocket science. They can do it by themselves. The social justice aspect is what drives them – they want to have the backs of the most vulnerable. “[Empowerment is fundamentally about] inviting people to step into social transformation and into different types of relationships around the basic decisions in their lives” (General Manager, CEF). The emphasis is on opening doors to a different relationship to an essential service.

The NY-Sun program provides financial incentives for both residential and non-residential solar, non-residential ranging from 750kW to 7.5MW (New York State Energy Research and Development Authority 2021). The NY-Sun program marks a significant shift in a single program targeting the so-called disadvantaged. On the one hand, the program is providing funds to help people start their own solar project, including intermediaries who want to help prepare people to work in the solar industry – like cooperatives. On the other hand, funds are available to help LMI communities directly participate in project co-design. In line with a move towards equity by the EPA, they want to pay community groups and environmental justice groups for their time for participating in the co-design process. They are not expecting them to volunteer for free.

We're... putting them in the driver's seat and serving them. We're saying, what do you need to see? What do we need to do to help you accomplish your goals? And then we're providing the technical expertise. And, you know, okay, these are how the nuts and bolts of similar projects work in starting a solar company. This is what you need to do. How can we help you get there? So, it's really moving toward, like, an enormous partnership up with communities to get it to exactly what you're saying, a community led, community owned, community driven solar (Senior Program Manager, NYSERDA).

One of their central goals as a state energy research and development authority is to empower communities, effectuate a meaningful transfer of power.

5.1.9. Build movements for decommodified, decentralized, democratized energy

Intermediaries individually and/or as part of a coalition can contribute to changing the societal context in which the transformative work they do, otherwise known as “field building,” can emerge (General Manager, CEF). While their role is to be an implementer and support projects on the ground, they are also up against massive systemic barriers against community owned, decentralized, democratized energy systems (General Manager, CEF). If they are not constantly questioning existing societal barriers and joining forces to create a new larger societal context for the work they seek to do, then they will continue to remain as a small niche operation with relatively few resources (General Manager, CEF). Without the work of gradually supporting a wider movement, my interviewees believe that policymakers and elected officials will not take the actions required to make a larger distributed solar energy market leading to expansion of community ownership and management.

Similarly, People Power Solar Cooperative seeks to lead a movement towards a decentralized, decommodified, and democratized energy system that is currently dominated by IOUs and corporations. People Power is keen on supporting communities who can and want to own solar projects, by helping them overcome the technical, financial, and procedural barriers, and advancing the movement toward energy democracy (People Power Solar Cooperative, n.d.).

Table 5. Representation of intermediary roles across intermediaries studied.

	<i>Become a Facilitator for communities*</i>	<i>Build local community support for RE</i>	<i>Inform project design & financing</i>	<i>Provide technical, procedural assistance</i>	<i>Advocate for governmental support</i>	<i>Support local capacity building</i>	<i>Build partnerships/alliances/networks</i>	<i>Empower local communities (contribute to social equity)</i>	<i>Build movements for energy democracy</i>
Cooperative	Ho'āhu Energy Cooperative Molokai	✓	✓	✓	✓	✓	✓	✓	✓
	People Power Solar Cooperative	✓	✓	✓	✓	✓	✓	✓	✓
	Cleveland Owns	✓	✓	✓	✓	✓	✓	✓	✓
	Cooperative Energy Futures (CEF)	✓	✓	✓	✓	✓	✓	✓	✓
	Co-op Power	✓	✓	✓	✓	✓	✓	✓	✓
	Vineyard Power	✓	✓	✓	✓	✓	✓	✓	✓
	Ashland Solar Cooperative	✓	✓	✓	✓	✓	✓	✓	✓
	People Solar Energy Fund (PSEF)			✓	✓	✓	✓	✓	✓
State government	NYSERDA	✓	✓	✓	✓	N/A	✓	✓	✓
	Minnesota Department of Commerce	✓	✓	✓	✓	N/A	✓	✓	✓
	Colorado Energy Office	✓	✓	✓	✓	N/A	✓		

Municipal	Portland Clean Energy Fund (PCEF)		✓	✓		✓	✓	✓	✓	
Tribal	SRST/SAGE	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Native Sun		✓	✓	✓	✓	✓	✓	✓	✓
	Indigenized Energy	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Leech Lake Band of Ojibwe	✓	✓	✓	✓	✓	✓	✓	✓	
Solar Developer	Shake Energy Collaborative	✓	✓	✓	✓	✓	✓	✓	✓	✓
Non-profit Organizations	Verde	✓	✓	✓	✓	✓	✓	✓	✓	
	Bonneville Environmental Foundation			✓	✓	✓	✓		✓	
Count Total		15	17	19	18	16	18	17	16	9
Representation		79%	90%	100%	95%	100%	95%	90%	84%	47%

✓ Priority Intermediary Roles**

✓ Routine Intermediary Roles

*Intermediaries facilitate the understanding of the status-quo, assessing where they are, what is possible, what can be done. They may fulfill the literal meaning of facilitation, managing the conversation among the members to work with the differences and coming up with a jointly agreed roadmap for the communities involved.

**Priority intermediary role determinations in this table are solely based on the interview data. The fact that a particular intermediary role is not identified as priority does not preclude the possibility that it might be a priority role for any intermediary represented.

Of the 28 intermediary organizations interviewed, 19 of were directly involved in developing community-owned solar projects. 9 intermediary organizations were either not involved in developing community-owned solar projects and only indirectly involved as a potential grant funder or energy justice organization.

Not surprisingly, intermediary roles such as – informing project design & financing, providing technical, administrative, procedural assistance, helping to deliberate a change in local, state, and federal governments, and supporting local capacity development – are the most prominent intermediary roles identified from the interviews I completed with 19 intermediary organizations. This reinforces the more traditional intermediary roles identified in other fields. Intermediaries are called upon for help by community members who require technical, financial, and procedural assistance. It is a common trend across all intermediaries who are focused on developing community-owned solar to fight for changes in local and state level policies to ensure the financial viability of shared community solar projects and achieve a gradual transfer of power from IOUs to the communities.

In general, the majority of Co-ops in the study are more actively involved on the ground playing a facilitative role for communities to understand the status-quo and help come up with feasible options. When community-owned solar requires additional community support such as projects needing additional shareholders or subscribers, these Cooperatively owned intermediaries help to build community support by communicating the benefits of ownership and ensuring intermediary accountability to the community.

Tribal or tribal affiliated intermediaries are very much focused on community empowerment and enhancing social equity. They all believe that Tribal Nations and Indigenous intermediaries ought to be fighting for community empowerment and equitable access to renewable energy options. There is a growing possibility that Native nations could buy and own their own utility systems which mean they can control what to buy, how much they will charge and credit shareholders and subscribers as they think appropriate. This would have a transformative impact not just in indigenous communities, but all other communities, including under-represented, and under-resourced communities across the U.S.

The concept of movement building advocating for a decentralized, distributed, and democratized energy system is beginning to gain traction among the Co-op communities. While the focus seems to be figuring out a way to help communities begin to develop community owned solar projects, the longer-term mission seems to be envisioning a transformed future of distributed energy systems filled with micro-grids and energy storage systems.

5.2. Intermediary Interaction Models

My interview data reveal various ways in which intermediaries interact with communities and community members they serve. The intermediary roles summarized in table 5 reveal priority and routine roles, or functions intermediary organizations play for their respective clients. The following five intermediary interaction models help to characterize the different ways in which intermediary interactions can be understood. They also help to underscore different ways in which intermediaries contribute to the betterment of local communities or other intermediaries in certain contexts.

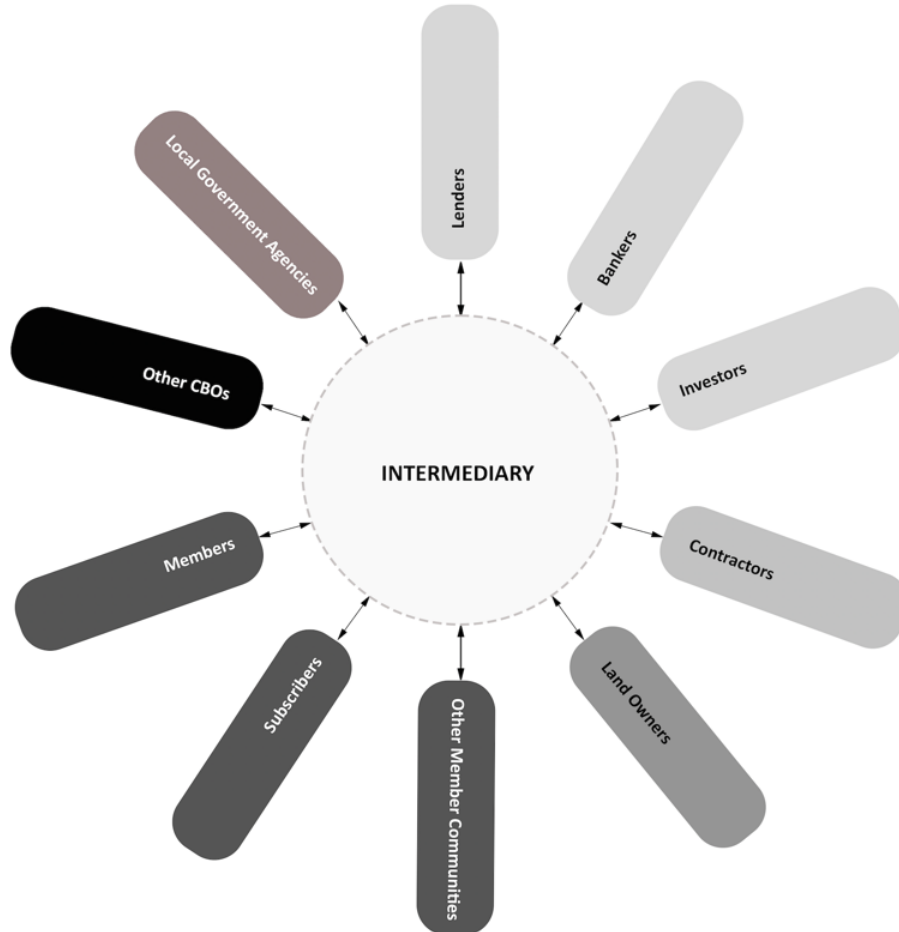
Figure 10. The Network Model of Intermediary Interaction.



In the first intermediary interaction model is the “network model”. In this context, the intermediary encourages exchanges among members of the same community as well as engagement among members of different communities. My interviews pointed out that many intermediaries want to do even more of this – playing an active role in solidifying collaboration and communication among members within and across communities. This intermediary role is particularly valuable because it allows community members to build capacity by learning from each other. Both within a single community and across different communities, intermediaries of this kind help widen their impact without relying heavily on community outreach.

The way in which People Power Solar Cooperative works with communities is a great example of communities coming together, members of one community communicating with members of another community, continuing to bring people into the conversation about energy justice and learning together. People Power does not do any community outreach. Part of the reason might be because communities bring People Power into their community to help get a conversation started on community solar. Co-founder and CEO of People Power Solar Cooperative explained that communities just take them around to places and begin to build relationships. People Power was founded with 44 “anchor owners” who are leaders in their community. They talk to their friends and community members about what might happen.

Figure 11. The Convener Model of Intermediary Interaction.

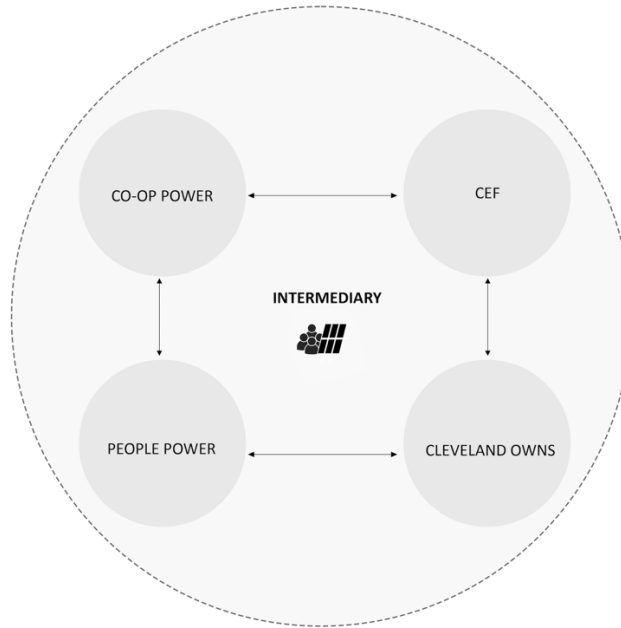


The second intermediary interaction model is the “convener model” It assumes an intermediary is responsible for – inviting other actors and groups who have distinct skills and knowledge – into the process of developing a community owned solar project. Actors that are most commonly involved are solar engineers, installers, contractors, tax equity investors, lenders, subscribers, other CBOs that work with the communities, and other community workers.

While all intermediaries studied as part of my research are indeed playing a convening role, one very clear illustration is CEF. From identifying host sites to managing operations and maintaining solar arrays, CEF convenes and works with a host of actors that each offer a very specific set of skills or expertise (Cooperative Energy Futures, 2019). This includes solar contractors, financial investors, utilities, and member subscribers (Cooperative Energy Futures,

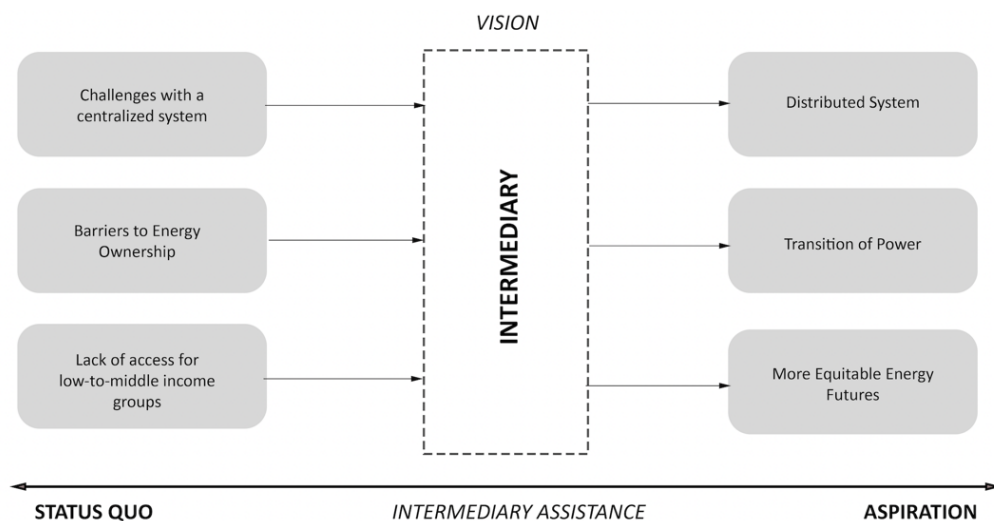
2019). The number and timing of interactions with each of the stakeholders can vary depending on the process of building and managing the solar facility.

Figure 12. The Organizational Development Model of Intermediary Interaction.



The third intermediary interaction model features alliance building among intermediaries that work with their own respective communities. An iconic case of this form of interaction model is PSEF. PSEF is a cooperative of intermediaries that works with communities on the ground (President and CEO, PSEF). If CEF and Co-op Power are intermediaries that provides services that involve facilitating community organizing and developing projects for their members, PSEF is kind of a federation of all the solar energy co-ops that are doing what they do. So, in essence, PSEF supports intermediaries like CEF or others that belong in other clusters that work directly with communities. PSEF provides peer-to-peer or intermediary-to-intermediary technical assistance, training, financing, community mobilization, and public policy advocacy for community ownership (President and CEO, PSEF).

Figure 13. The Political Action Model of Intermediary Interaction.

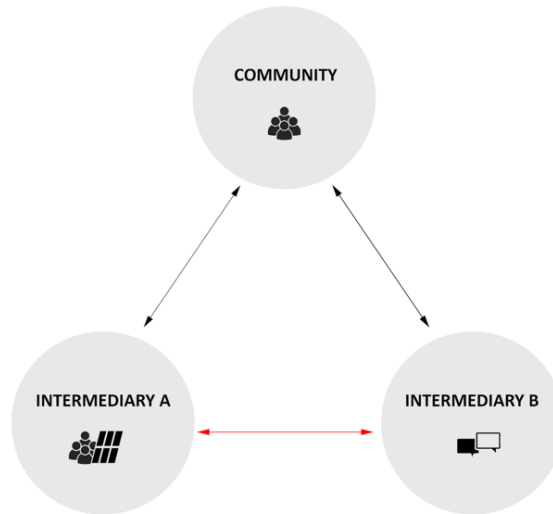


The fourth intermediary interaction model follows an intermediary role that aims to bridge the gap between now and the future, what communities are faced with now and where they want to be (their aspirations). From the standpoint of communities – they are in many ways faced with the unknown – not knowing the opportunities for community ownership, not knowing about the possibility of a more distributed energy system, not knowing about the resources available to them thanks to intermediaries working in this space – and intermediaries of various kinds make the gap narrower, providing more opportunities for communities with a chance to reach closer to their aspirations of a more equitable, empowered energy future. Intermediaries as such, through interactions with communities, help to clarify the once “unknown futures” and help to illuminate new opportunities for communities to get more directly involved in the community solar business. These interactions can gradually help to build a larger social movement towards a more equitable energy futures with a level playing fields to build and own solar energy projects.

The core mission of People Power Solar Cooperative is to facilitate and bridge the status-quo with the larger movement building opportunity. It is helping members understand it is not just about bill savings or a financial opportunity to build wealth, but more about the deeper underlying purpose of changing the relationship with the current energy system dominated by IOUs, from extractive ownership to shared ownership of control and power. So, in essence, an intermediary like People Power seeks to provide the tools and governance mechanisms that help

communities to build the foundation to come together and take the first step towards a different ownership structure – one that empowers people, one that changes the relationship with the current energy system towards a more equitable distribution of wealth building opportunities and power.

Figure 14. The Intermediary-to-Intermediary Partnership model of intermediary interaction.



The last intermediary interaction model identifiable in the community owned solar space is the so called the intermediary-to-intermediary partnership model: an intermediary (intermediary B) serving as an intermediary for another intermediary (intermediary A) when working with a local community group. An example of this kind of interaction is the work of Ho‘āhu Energy Cooperative Molokai and Shake Energy Collaborative. In the diagram, Shake Energy (intermediary B) empowers Ho‘āhu Energy Cooperative (intermediary A) and the Co-op (intermediary A) empowers the Molokai community (community). Shake Energy mainly assists the Co-op but works in collaboration with the Co-op to help the Molokai community. The interviewees claimed that Shake Energy Collaborative helped to make everything fall into place once the decision to form a cooperative was made. Shake Energy Collaborative helped to make decisions about the governance of the Co-op, staffing, financial planning. Ho‘āhu Energy Cooperative Molokai with the help of Shake Energy was able to keep the members of the community up to speed on the detailed numbers, including foreseeable cost savings, because the equity is owned and managed by the community. The President of Ho‘āhu Energy Cooperative

Molokai describes the Founder and CEO of Shake Energy Collaborative as an “energy navigator”. The Co-op was able to inspire and empower the community members because Shake Energy can be very specific about what they ought to be doing, identifying specific contractors to work with, reviewing timelines, working with local utilities and looking for additional funding. The key distinction Ho‘āhu Energy Cooperative Molokai makes about Shake Energy Collaborative is that they work with the community in a non-extractive way unlike other solar developers who might be able to provide comparable assistance for the Co-op.

This model has shown success in Hawaii. In addition to Shake Energy Collaborative, Pacific Northwest National Laboratory (PNNL) has been instrumental in bringing the expertise, technical knowledge, and capacity building opportunities for the community members that work with Ho‘āhu Energy Cooperative Molokai. PNNL as an intermediary supports the Co-op, advocating for larger grants that will support the indigenous community on the island on a holistic basis. The Co-op works in collaboration with PNNL, and PNNL as an intermediary works with the relevant government agencies, along with the Department of Energy to garner additional support for indigenous communities.

Interestingly, Shake Energy is widening the applicability of this model of intermediary interaction to other communities in the Hawaiian Islands. Ho‘āhu Energy Cooperative Molokai is in fact beginning to operate as an intermediary for other intermediaries on the island, potentially becoming a popular reference point for other communities who might want to create a Co-op like Ho‘āhu Energy Cooperative Molokai. Other communities like Kahuku and Waianae are keen on making the transition like Molokai did. This is encouraging evidence to see intermediary organizations can in fact have pervasive influence beyond their home community, as illustrated by this model. Ho‘āhu Energy Cooperative Molokai is a classic example of an intermediary playing a crucial role for their community members as well as other distant communities. They are assisted by other intermediaries like Shake Energy Collaborative yet assisting other communities as intermediaries. The key element is the level of trust and the fact that they can be an effective precedent.

5.3. Survey Results

To understand the perspectives from the community's standpoint, on some of the most prominent intermediary roles identified from the interviews, also summarized in Table 5, a short survey was administered in six communities that worked with and are currently working with their respective intermediaries. The details of the survey administration, target groups, response rates, descriptive statistics, and sample characteristics are described in detail in the research design chapter.

Some of the most interesting and notable high-level findings are summarized as follows:

1. Intermediaries that claim they want to and are showing interactions with communities following the Network building model illustrated in figure 10 above tend to show higher level of connectedness (more frequent communication around community solar) within the community and between communities.
2. The most important reasons why community members work with intermediaries on advancing community-owned solar are build sustainable energy projects in my neighborhood, contribute to lowering carbon emissions and fight climate change, and making clean energy projects more accessible for members of my community who are usually left out, under-resourced, and under-represented.
3. Interestingly, community members were generally less concerned about bill savings. Among the six communities studied, the sample populations from four communities had higher income than the respective state average income. This is probably the reason why. In one Tribal community, the income was below the state average, hence explaining higher predominance in financial bill savings compared to the other communities.
4. In terms of how the intermediaries helped to benefit the communities from the perspective from the community members, the most predominant choices were: helped to build sustainable energy projects, shared community solar specific knowledge, and helped to bring people together, build networks and alliances.
5. The more communities have more experience in building and operating community-owned solar projects, more highly ranked is the answer choice "my intermediary helped

me the most by sharing community solar knowledge”. This is certainly true of intermediaries that built multiple community-owned solar projects to date.

6. The perspectives of community members on future community solar projects centered on enhanced community ownership and community independence. This can be seen by the highly ranked options such as community microgrids and community resilience hubs. Home energy upgrades and improved infrastructure and electrified systems were also preferred options from the perspectives of the community members.
7. Observing the association between household income data and survey responses, there are some confirmatory findings. Generally, community members who belonged in the higher income categories found building sustainable energy projects as their top choice reason why they decided to join the work of the intermediary. In one of the communities, among the people who selected shared community solar related knowledge as their top choice with regards to the most important intermediary role, a greater share of higher income households was represented. This is probably because community members that have higher income have more flexibility with putting down capital to become a part shareholder or join as a pay-as-you-go subscriber.
8. Across the different communities, members who fall under higher income groups tend to value community micro-grids, resilience hubs, and changing our relationship with energy systems more highly than members belong in the lower income groups.
9. Statistically significant correlation analyses results support these findings. In general, higher income groups chose building clean energy projects as their most important choice. Male are generally more supportive of progressive ideas such as community microgrids and community resilience hubs. Low-income groups are generally more concerned about improving their home energy efficiencies than other transformative options listed for future energy systems.

5.3.1. Community Connectedness

Survey Question: How often have you spoken about community solar with?

- Members in my community
- Members of other communities that work with my intermediary
- Intermediary staff
- Community based organizations that work with my intermediary

Figure 15. Community connectedness



The results presented above corroborate the empirical findings identified from the interviews. Among interviewed intermediaries, People Power Solar Cooperative and Ho‘āhu Energy Cooperative Molokai expressed the importance of building community member alliance within a single community and across other communities. Ho‘āhu Energy Cooperative Molokai holds periodic member convenings and has a strong capacity building program in place, providing grounds for why there seems to be more active communication among members within and across communities. People Power relies on how each anchor owner connects with other community members and invites People Power to provide additional assistance, explaining the higher occasional communication with the People Power staff and among members in the community. Cleveland Owns is at a pre-development stage so the membership is represented by a smaller group of members. Early developmental stage and relative new project status might help to explain the higher proportion of active communication than other communities represented. There seems to be no clear pattern across the four answer choices.

The *pre-existence* of a sense of community and connectedness might be as important as the carefully planned *process* of forming a community as described in the previous sections where the concepts “community” and “community solar” are defined and discussed. Although it is very difficult to measure the degree of community connectedness in a specific community, one of the survey questions was designed to gauge the community characteristics – how often and with whom the community members communicate most frequently communicate with regards to community solar. The data from this survey question do not necessarily determine the degree of community connectedness or community foundation. However, the survey results from this question help to form interesting narrative comparatively across intermediary communities. The results also do not suggest any causal implications of how the role of the specific intermediary helped to expedite the process of forming a community from the pre-existence stage. The delta (the intermediary effect) is very hard to measure, not only because it is hard to identify what the starting and end points might be, but also the fact that it generally would take a long time for intermediaries to help form a sense of community among the community members.

5.3.2. Community Perceptions on Intermediary Roles

Survey Question: *Why did you work with this intermediary? (1 is most important and 5 is least important)*

Rank 1 Rank 2 Rank 3 Rank 4 Rank 5

Figure 16. Community perceptions on intermediary roles



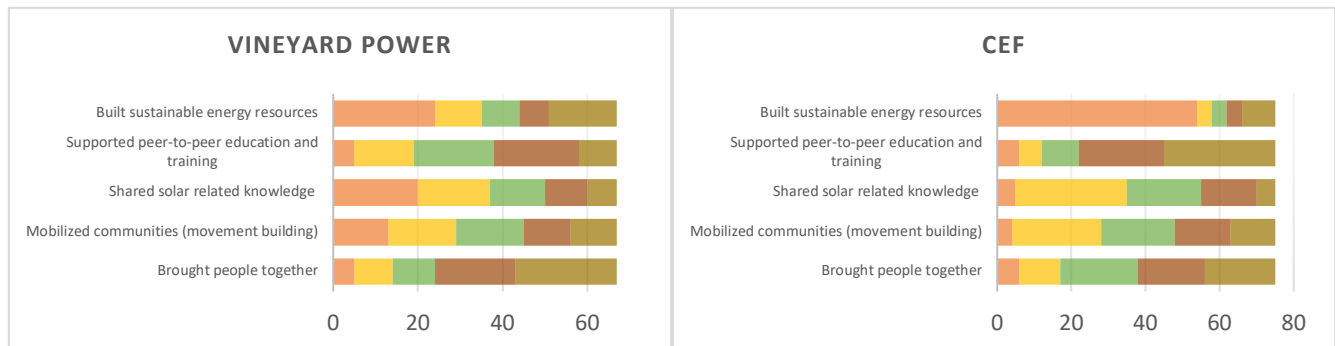
Compared to the most widely referenced roles that intermediaries play; survey results highlight a more solar specific role: the act of building sustainable energy facilities. The top two highest ranked answer choices for the question “what is the most important reason for working with this intermediary?” are (1) build sustainable energy projects and (2) lower carbon emission and fight climate change. This signifies the importance of tangible outcomes from the perspectives of community members, and they find that these intermediaries are expected to bring pragmatic, in the moment outcomes. This confirms one of the hypotheses that sometimes people seek help from intermediaries because they do not know how to begin

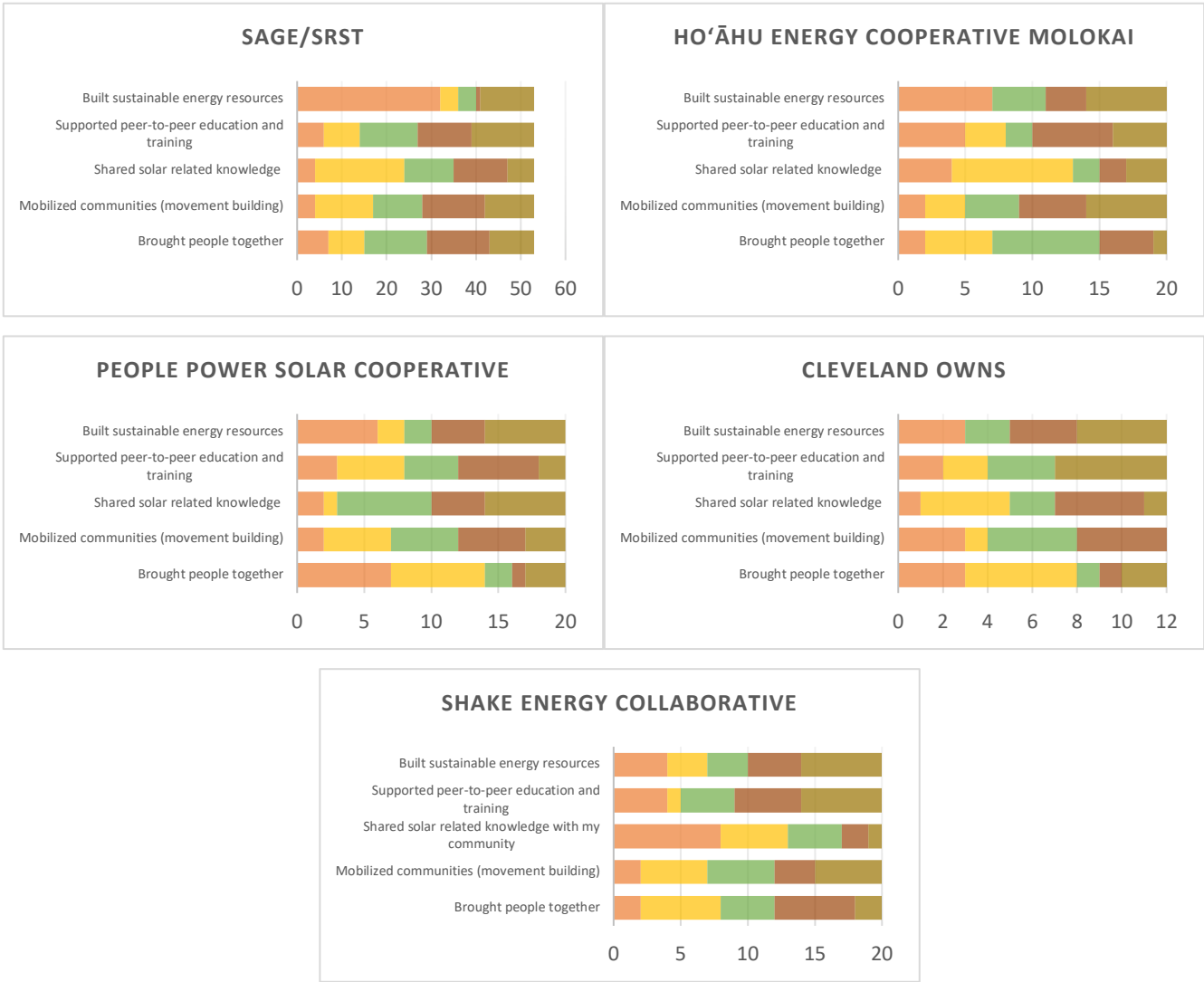
building a solar project, they can indeed own and operate. Community members who have the desire to yield immediate outcomes are more likely to work with intermediaries and approach them for help. Community members are also very keen on addressing the climate problem. Interestingly, on the flipside, from the perspective of the intermediaries (relying primarily on interview data), they claimed that one of the most important functions they play is the build movements and empower the community through community-owned solar projects. While this seemed to make intuitive and moral sense, it is somewhat surprising to find that movement building is ranked quite low compared to build sustainable energy or fight climate change. This might be because movement building is not more specifically defined such that movement building is connected more directly to empowering local communities and contributing to social equity, and supporting distributed, decentralized energy systems in the future. Yet, what seems very revealing is that respondents in communities that work with People Power Solar Cooperative and Cleveland Owns ranked making solar more accessible for the low-income groups very highly. These two intermediaries are more actively involved in empowering communities that are usually under-represented or under-resourced. Their core mission is to expand access to clean energy options for low-income communities.

Survey Question: How has your intermediary benefited your local community? (1 is most important and 5 is least important)

Rank 1 Rank 2 Rank 3 Rank 4 Rank 5

Figure 17. Community benefits from intermediary assistance





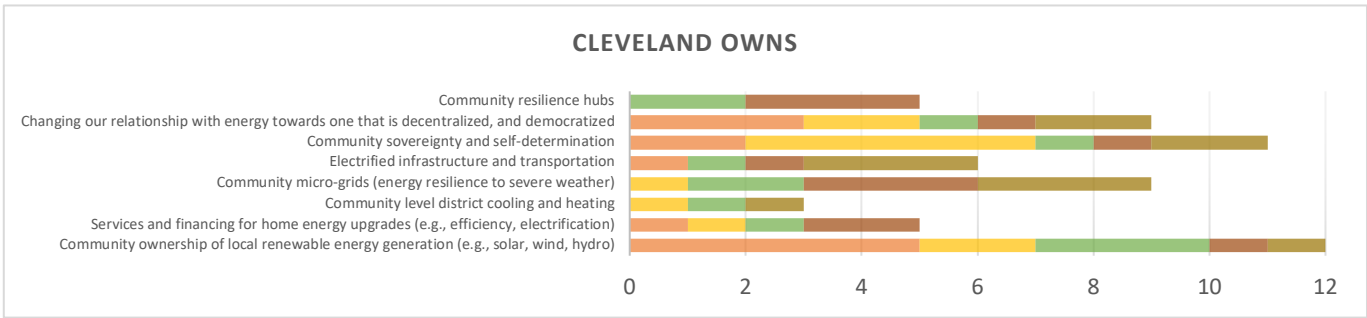
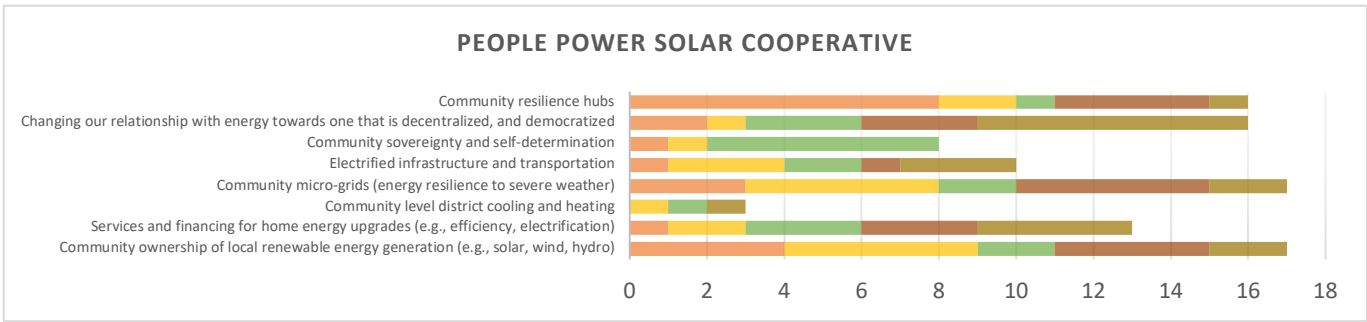
For Vineyard Power, CEF, SAGE/SRST, and Ho‘āhu Energy Cooperative Molokai, community members responded that, in their view, their respective intermediaries benefitted them the most by building sustainable energy resources in their local communities and sharing solar related knowledge. This generally confirms what these intermediaries claimed their priorities might be, to inform project design and financing projects as well as to provide technical and procedural assistance. For People Power Solar Cooperative and Cleveland Owns, the top answer choice is the two intermediaries benefitted their local community the most by bringing people together. This again is consistent with the priority roles these two intermediaries claimed they provide which are become a facilitator for communities and build local community support. While almost all intermediaries studied chose supporting capacity building including training programs as one of the key priorities, the respondents of the survey did not rank education and training as one of the top choices.

Survey Question: What types of future community energy projects most benefit my local community? (1 is most important and 5 is least important)

Rank 1 Rank 2 Rank 3 Rank 4 Rank 5

Figure 18. Community benefits from future energy projects





Across all six communities, community ownership of local renewable energy generation was ranked with the most predominance. This is consistent with the other two questions asked as part of the survey, where the respondents put a lot of value on building sustainable energy and making community solar accessible for the low-income groups. There are several interesting observations that can be raised comparatively across intermediary types and predominant answer choices. First, it is worth noting that the responses from a tribal community and an indigenous community in Hawaii vary across some of the higher-ranking answer choices. The community members that work with Ho‘āhu Energy Cooperative Molokai chose changing our relationship with energy to one that is decentralized, democratized as the next highly ranked answer choice after community ownership of renewable energy, followed by community micro-grids. This makes a lot of intuitive sense because one of the biggest motivators for indigenous community members to join and work with the Co-op is to achieve independence in energy generation, storage, and use. Ho‘āhu Energy Cooperative Molokai aims to help communities reach this goal by working very hard to connect with the state and federal government agencies to propose a holistic energy plan, once adopted will be sustainable and cost saving for all parties. Interestingly, for SAGE/SRST, one of the highest ranked answer choices is services and financing for home energy upgrades. This could mean that the tribal community members feel they need additional resources to do a major upgrade on the existing infrastructure before they can pursue community micro-grids. Yet, community sovereignty and self-determination are highly ranked which is a key issue for Native Nations. Similarly, partly showing the frustrations of the respondents on the way California is trying to limit the benefits of community-owned

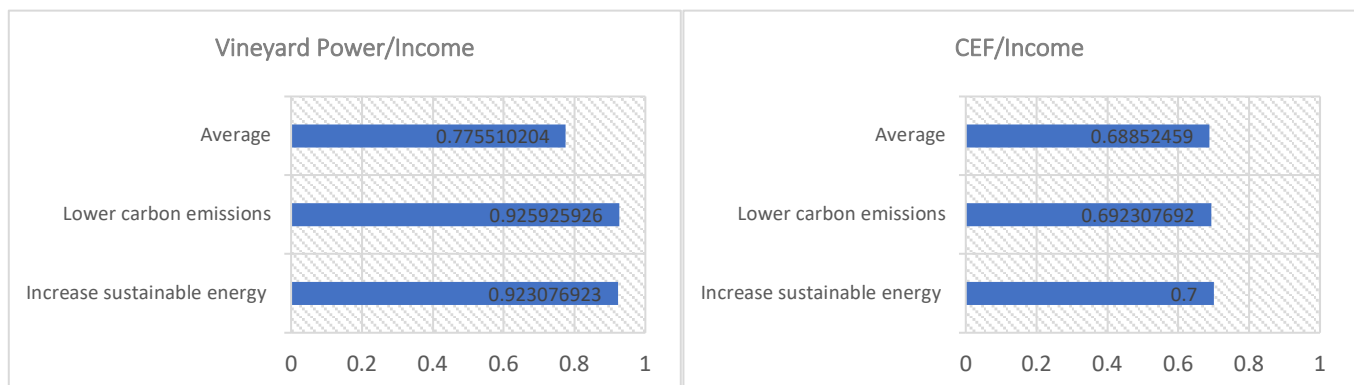
solar, respondents that work with People Power Solar Cooperative are very supportive of both community micro-grids and community resilience hubs as their top two future energy projects. This is also true of Vineyard Power. Vineyard Power has been struggling for many years to get a new legislation to pass because they are unable to sell back the electricity generated from shared solar and offshore wind. Respondents might have felt that a micro-grid on the island would solve all the problems.

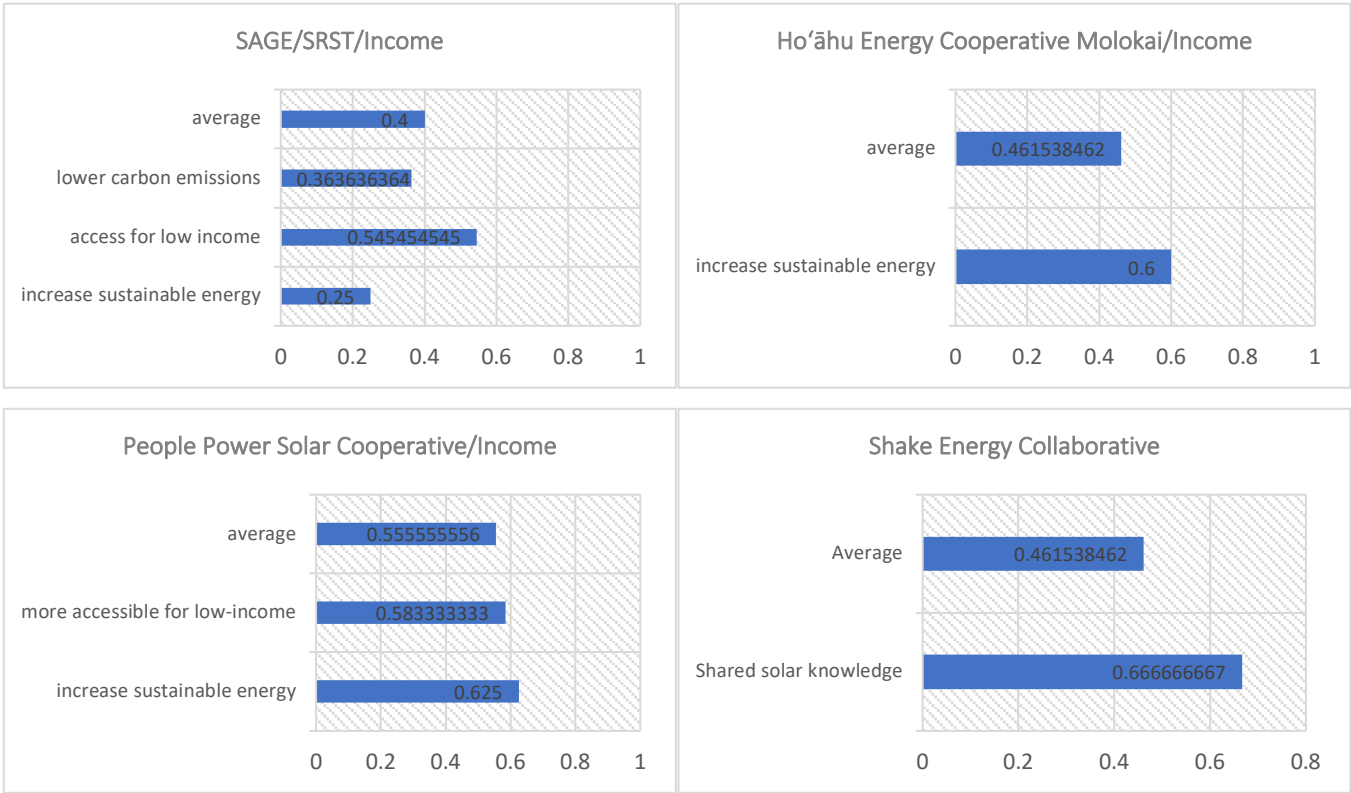
In summary, despite some limitation in survey administration, community members generally demonstrated parallel reactions to what the intermediaries claimed they prioritize when working with communities to help them develop community-owned solar. Most communities found helping to build solar projects to be one of the most important roles – which corroborates intermediaries’ claims on their central involvement in the project design, financing, providing technical and procedural assistance for expanding community owned solar. Two communities in particular, those that work with People Power Solar Cooperative and Cleveland Owns revealed very similar patterns as both intermediaries are primarily driven by their commitment to help communities that are often left out. Community members in these two communities (in California and Ohio), chose making solar more accessible for the low-income and brought people together as one of their top two answer choices when asked why they decided to work with the intermediary and how the intermediary benefitted their community. While there were some variations within the intermediary clusters, generally communities envisioned a decentralized energy system in the future, supporting community microgrids and community resilience hubs.

5.3.3. Additional Survey Results Analysis

Survey Question: Why did you work with this intermediary? (1 is most important and 5 is least important)

Figure 19. Community perceptions on intermediary roles and functions based on household income differences

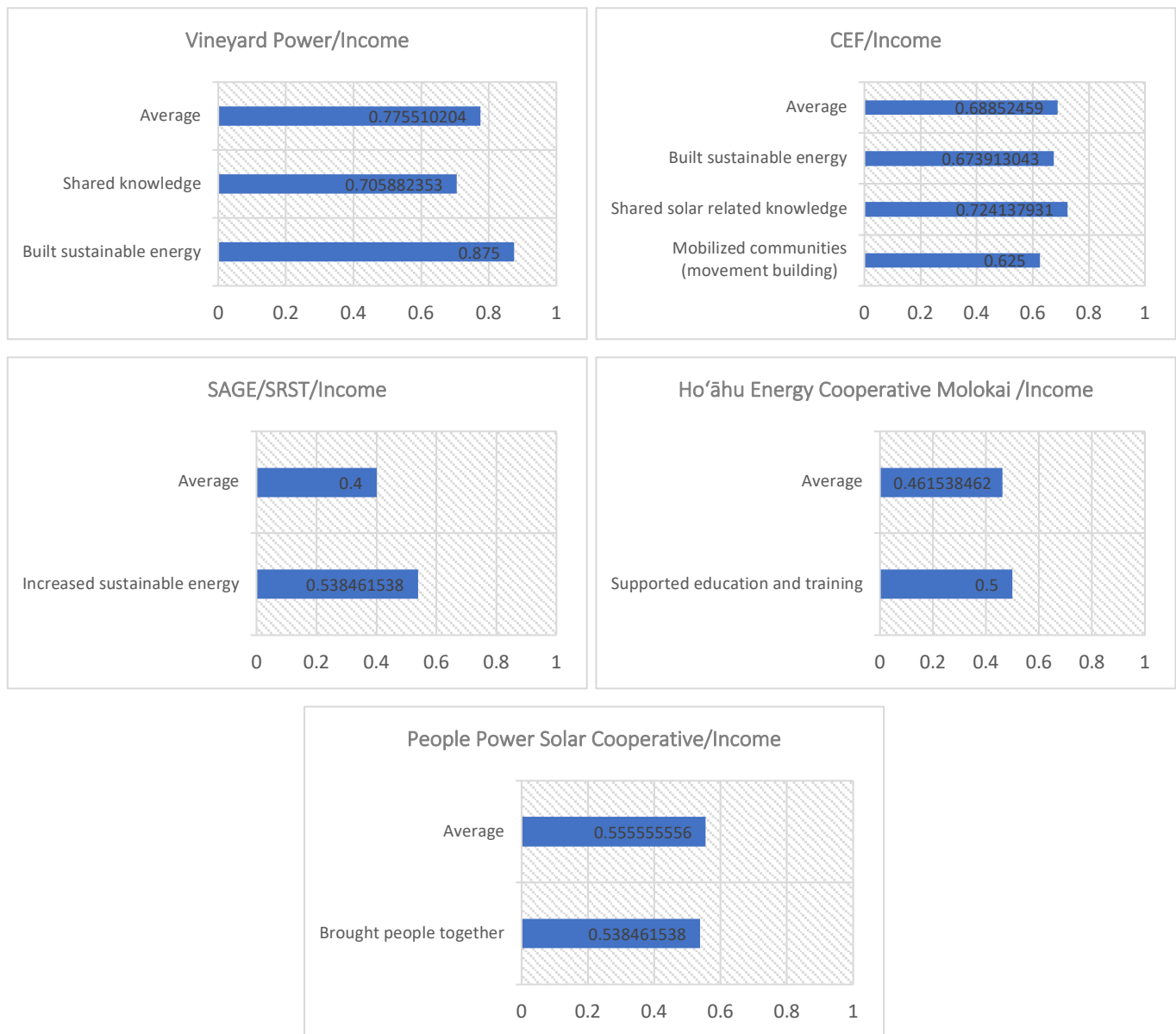




The figures above show how the income characteristics varied across top ranked answer choices when the respondents were asked to respond to the question why they decided to work with the respective intermediaries studied. Excluding the tribal citizens at Standing Rock Sioux Tribe, most other data show that compared to the sample averages, greater proportion of respondents that selected lower carbon emissions and increase sustainable energy, belong in the higher income group. In the case of Vineyard Power, the survey respondent sample is very much skewed towards higher income and even taking this into account, the skewness is greater among the respondent groups that chose increase sustainable energy and lower carbon emissions are their top ranked answer choices to the question why they decided to work with this intermediary. This shows that generally people with higher income tend to be motivated to build more sustainable energy and contribute to combating climate change and energy transitions. Interestingly, while the income in the sample is generally lower than the state average, the SRST community members that chose making solar more accessible to low-income tend to have a greater proportion of those that belong in the higher income group. Cleveland Owns data was excluded due to a very small sample size making it difficult to compare data that belong in the higher income group and lower income group. There was almost no variation across income groups in the top two answer choice categories in the communities that work with CEF, in Minnesota.

Survey Question: How has your intermediary benefited your local community?

Figure 20. Community benefits based on household income differences

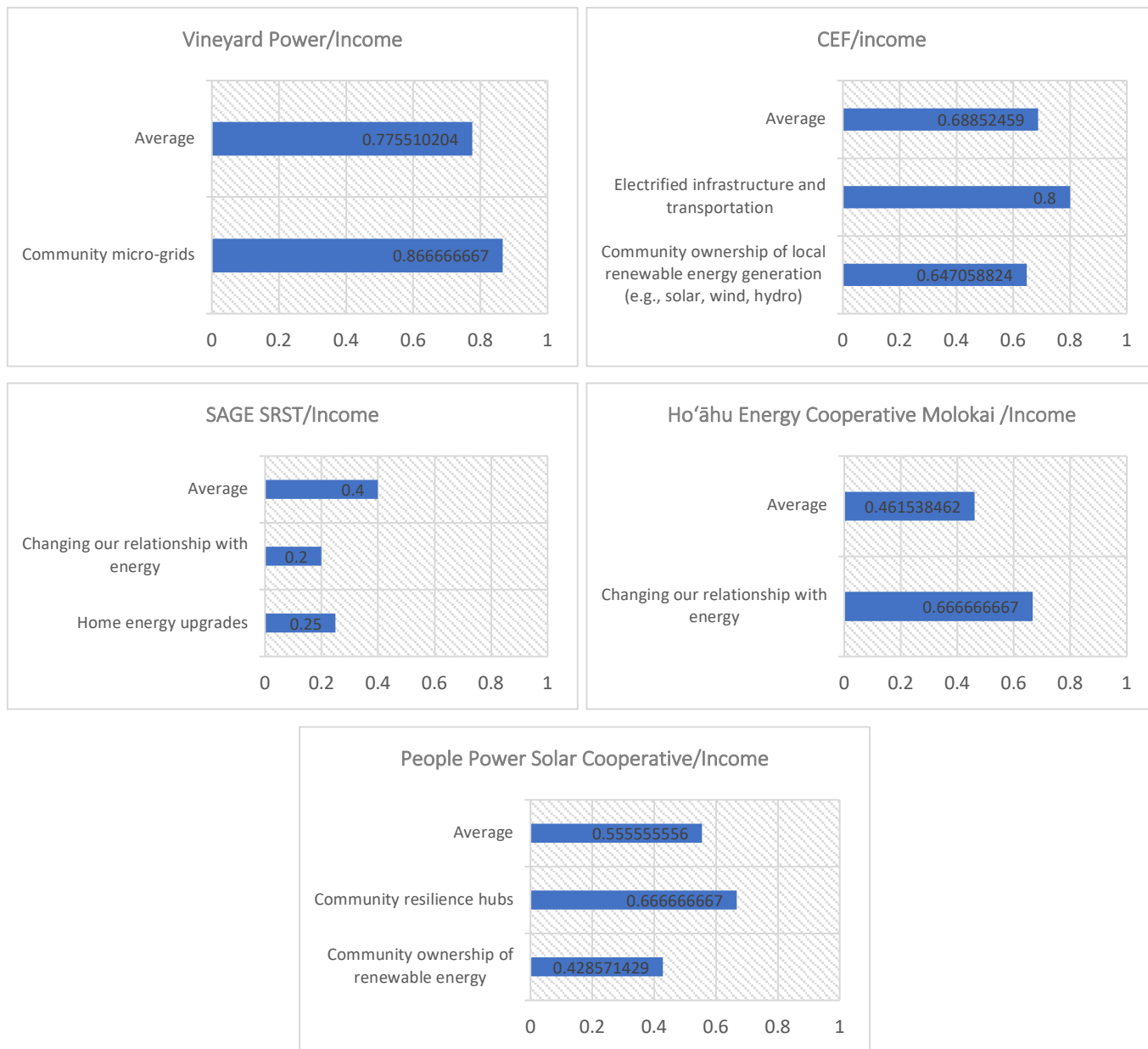


The figures above demonstrate whether the income characteristics varied across top ranked answer choices when the respondents were asked to respond to the question how the intermediaries, they interacted with benefitted them. Consistent with respondent characteristics in the previous survey question, respondents in community groups that work with Vineyard Power and SAGE/SRST that chose built sustainable energy as their top choice tend to have a higher income than the sample average. There does not seem to be a consistent pattern among respondents that chose shared solar knowledge as their top choice in communities that worked with Vineyard Power and CEF respectively. In Vineyard Power,

community members that chose shared solar knowledge as their top answer choice tend to have a slightly lower income characteristic than the sample average, while in CEF, there was no significant difference in the income variability.

Survey Question: Survey Question: What types of future community energy projects most benefit my local community?

Figure 21. Community choice of future energy projects based on household income differences



The figure above demonstrates whether the income characteristics varied across top ranked answer choices when the respondents were asked to respond to the question which future energy projects would

most benefit my local community. Interestingly, apart from SRST, all other top ranked answer choices demonstrated community empowerment through energy independence such as community micro-grids, community resilience hubs, and electrified infrastructure, including transportation. In all four communities, respondents that chose these answer choices as their top ranked choices demonstrated a higher income characteristic when compared to the sample characteristics, respectively. In the case of SRST, while the sample generally belong in the lower income category when compared with the state characteristic, respondents who selected home energy upgrades were skewed towards a lower-than-average income level in the sample. This makes intuitive sense, since households in the tribal lands who might need help with home energy upgrades tend to have lower income than those who might have other future priorities.

5.3.4. Statistical Analysis of Household Income and Gender Differences

Correlation analysis was used to evaluate the differences across the answer choices, on which intermediary roles community members selected as most important, and across communities. Statistically significant correlation coefficients are reported in the following tables for “most important reasons for working with the intermediary organization”, “how intermediaries most benefitted my community”, and “which community projects most benefit my local community”, across different communities. The single asterisk signifies that the difference is statistically significant at the 90 percent confidence interval, while a double asterisk signifies that the difference is statistically significant at the 95 percent confidence interval.

Table 6. Predominant intermediary roles and household income/gender differences

	Cooperative Energy Futures		Vineyard Power		Ho‘āhu Energy Cooperative Molokai		Cleveland Owns	
	Gender	Household income	Gender	Household income	Gender	Household income	Gender	Household income
Financial savings								
Invest in great projects		0.614*		-0.578*				
Become a shared owner								
Build sustainable energy								-0.619*
Increase access for low-income								-0.604*
Lower carbon emissions				0.294*				

**Contribute
to local
businesses**

**Movement
building**

* P<0.05

Some of the interpretations are as follows: for communities members that work with Cleveland Owns in Ohio, female respondents are 62 percent more less likely to select build sustainable energy projects as their top ranked reason for working with Cleveland Owns compared to male respondents. Similarly, for community members that work with CEF in Minnesota, members that have higher household income are 61 percent more likely to select invest in great projects as their biggest reason why they chose to work with CEF. Interestingly, results from Ho‘āhu Energy Cooperative Molokai show that community member that have higher household income are less likely to choose increase access to clean energy sources for the low-income, when compared to the other options. This corroborates the findings from the previous section that among community members that chose build sustainable energy in my neighborhood and fight climate change as their top two motivations for working with their intermediaries, a greater share of higher income groups was represented.

Table 7. Community benefits and household income/gender differences

	Cooperative Energy Futures		SAGE/SRST		Cleveland Owns	
	Gender	Household income	Gender	Household income	Gender	Household income
Convened different stakeholders				-0.352*		
Mobilized communities						
Shared knowledge	0.274*					
Helped build capacity	-0.367**					
Build sustainable energy projects	0.377**			0.332*	0.651*	

* P<0.05, ** p<0.01

In the communities that work with Cleveland Owns, female respondents are 65 percent more likely to choose built sustainable energy projects as their most important benefits provided by Cleveland Owns. In other words, there is a pretty strong tendency of women choosing built sustainable energy projects as top ranked choice for how Cleveland Owns benefitted the communities. Interestingly, household income seems to be negatively associated with community members choosing convened different stakeholders as one of the top answer choices for how the intermediary (in this case SAGE) benefitted their communities. One possible explanation for this might be because members who have lower income are more likely to care about increase access to clean energy projects, rather than the process of bringing communities and people together.

Table 8. Most important future community energy projects and household income/gender differences

	Cooperative Energy Futures		Vineyard Power		SAGE/SRST		Ho‘āhu Energy Cooperative Molokai	
	Gender	Household income	Gender	Household income	Gender	Household income	Gender	Household income
Community ownership of renewable energy	0.314*					0.368*		
Home energy upgrades	-0.455**			-0.407*				
Community level district cooling and heating								
Community micro-grids					-0.477*		-0.9661*	
Electrified infrastructure and transportation								
Community sovereignty and self-determination								
Changing our relationship with energy (decentralized, democratized)					-0.430*			
Community resilience hubs								

* P<0.05, ** p<0.01

When it comes to choosing which future community projects are most important for community members that work with intermediaries, female members are less likely to support the adoption of community microgrids than male members of the Ho‘āhu Energy Cooperative Molokai. There is one statistically significant result for household income where there seems to be a moderate

negative association between household income and home energy upgrades in the Vineyard Power communities, which is consistent with the results presented in the previous section. Low-income groups have consistently reported higher priorities for home energy upgrades than higher income groups, particularly in communities that work with Vineyard Power in Massachusetts, and tribal communities at Standing Rock.

6. Implications

6.1. Intermediaries are generally successful in matching the needs of the communities

The key roles intermediary of all kinds set out to play generally respond to community members who decided to seek assistance. Most commonly performed roles by intermediaries revolve around getting sustainable energy projects built, advocating for governmental support, providing education and training, strengthening community networks, and empowering community members. My survey findings show that community members that worked with six different intermediaries learned about lowering carbon emissions, building sustainable energy supplies, and making solar more accessible for low-income households. More commonly discussed motivations for working with intermediaries, such as getting bill savings and investing in clean energy projects, were ranked as less important (relative to the ones associated with wider benefits, i.e., common goods). All of the roles listed above play a part in getting community solar projects built. The goal of empowering communities is usually linked to efforts that target low-income groups, making opportunities clearer for communities that are under-resourced and under-represented. Two communities in Minnesota and North Dakota ranked building sustainable energy as their top reason for working with an intermediary. Two communities in Massachusetts and Hawaii ranked increasing their solar-related knowledge as their top reason. Two communities in California and Ohio ranked bringing people together as their top choice. All of these responses corroborate the many roles intermediaries set out to fulfill. The comparison between the roles claimed by intermediaries and their contributions as seen through the eyes of residents are presented in the following table.

Table 9. Intermediary Contributions

Predominant intermediary roles claimed by intermediaries	How intermediaries most benefitted the communities in the eyes of community members
Inform project design and financing	→ Get sustainable energy projects built Shared solar-related technical knowledge
Provide technical, procedural assistance	
Support local capacity building (education and training)	→ Shared solar-related knowledge
Build partnerships and alliances	→ Brought people together

The findings show that generally, what the intermediary organizations set out to do (or what they provide the communities they work with) matched the perceptions of the communities. The communities that ranked “built sustainable energy in my neighborhood” and “shared solar related technical knowledge” the highest worked with intermediary organizations that focused on providing innovative solutions to project design and financing hurdles. For the intermediary organizations that were keen on delivering capacity building programs, the community members ranked shared solar related knowledge as their top choice. Similarly, intermediary organizations that claimed to mobilize communities by encouraging communication and collaboration within and across communities worked with community members who responded “brought people together” as their highest-ranking choice. These findings clearly indicate that the intermediaries are not only serving the true needs of the community members, but they are in many ways supportive of the roles and functionalities of the intermediaries helping to build more community-owned solar, and in the process, empower and equip communities.

6.2. Association with household income and gender differences

Top ranked answer choices regarding the reasons that communities seek the help of intermediaries were investigated further to understand whether the distribution of responses

varied according to household income and gender. Interestingly, among respondents that selected “build sustainable energy projects” as their top choice, there was a higher share of community members who belong in the higher income category across most of the communities included in the study, when compared to the average income of the sample. This might indicate that members in higher income categories tend to value building sustainable energy projects more highly than building a movement to achieve distributed, decentralized, and democratized energy systems for example.

In the Tribal community, a greater share of low-income households was represented in the group of respondents who selected “making home energy upgrades” as their top priority when asked which future community energy project would be most beneficial for my local community. This might indicate that community members who have lower income tend to value more immediate outcomes than longer term benefits such as ones related to electrifying the infrastructure or building community resilience hubs. These other future projects might seem too distant from the perspective of low-income homeowners and renters who need financial assistance.

Among those respondents who chose “making clean energy projects more accessible for low-income people” as their top choice, there was greater representation from the higher income groups in the sample. It is somewhat surprising, though, that a greater share of higher income groups advocated for increased access to solar energy for low-income groups when compared to the overall average household income of the full sample. My initial assumption was that people with lower income would be more predominantly represented in the group of respondents who chose increased access to clean energy projects for low-income households as their top priority objective. This suggests that more access to clean energy options for the low-income is generally a common goal for communities regardless of income status, also widely supported by members in the higher income categories.

Only for one or two intermediary organizations and their community members, were gender differences correlated with key intermediary roles that seemed to most benefit member communities. For example, for Ho‘āhu Energy Cooperative Molokai, male respondents tended to support community micro-grids more than female respondents did. In the case of communities in

Cleveland, there was a strong association between female respondents and support for the idea of building more sustainable energy projects in my neighborhood. Based on these two observations, we might be able to infer that the female respondents in these two samples prioritized building grid-connected projects than supporting the idea of going off grid.

6.3. Ownership means enhanced equity and justice

It has become clear that the concept of ownership carries a much bigger connotation than accumulation of wealth and capital. The intermediary organizations studied aim to achieve a gradual shift in ownership from large corporations to local communities. When it comes to community owned solar projects, the power to build, the power to make key decisions on the rates per kWh belong to the communities. Ownership does not just mean higher profitability for the community members compared to other forms of their participation when working with traditional IOUs for example. This concept of ownership appears to be foundational to community buy-in. Sometimes, of course, the concept of ownership is treated lightly. People might only think about buying something or committing their personal financial capital to acquire ownership of something. In the context of community shared solar, the concept is much more than that. In some ways, ownership reflects a commitment to equity and justice. One clear example is what happened in Kahuku, Hawaii, where a large-scale wind farm was built and became operational despite strong local opposition (Susskind et al. 2022). Two-hundred or so community members were put behind bars for protesting the project (Susskind et al. 2022). If the project had been owned by the community, or if community members were shareholders, then the situation would probably have been very different. The project could have taken the form of a “tax equity flip.”, for example, then the community would have been able to decide where to site the turbines; those two-hundred or so community opponents might have become “wind warriors” advocating for the benefits that could have come to the community (President, Ho‘āhu Energy Cooperative Molokai). To most community members, corporations take energy from their land and make millions of dollars in the process. This is why community and cooperative ownership is important. It offers a different narrative that can win additional community support. It can also be argued that community ownership of solar projects does not guarantee success and there are associated risks to ownership, like any other financial investments. This is the reason

why intermediary organizations help to come up with sustainable project designs and financeable mechanisms – as a way to minimize the risks and promote community ownership to enhance social equity and support community self-determination and community empowerment.

6.4. Why intermediaries?

The current regulatory, political, and business environment in many locations require “targeted” assistance from community solar-mission driven intermediaries with a broad agenda (i.e., including affordable housing, racial equity, or home energy efficiency improvements). There are other entities that can help a community develop a solar project, but their involvement does not mean the same thing if they are limited to intervening with regulators and finding investors. Community based intermediaries put the community’s needs at the center of their effort, and they focus their efforts within the boundaries of the community and its cultural priorities.

Communities require a holistic, expertise-oriented support to build community owned and independently operated solar projects. They need to find a way to make a project economically profitable and regenerative despite initial resource scarcity challenges (both in the form of financial capital and physical space for installing solar panels). Solar intermediaries function as a convener, alliance and network-builder, political action leader, and facilitator of local buy-in, and stay with the process from beginning to end (from pre-development to post-completion).

What makes any intermediary successful applies equally in the context of community solar development and ownership. This includes:

- Able to produce a neutral analysis of the problems at hand – seeking the best outcome for all parties involved;
- Committed to joint fact-finding and joint problem-solving among parties who disagree;
- Committed to agreement building, winning community support, and offering advocacy for the community in its dealing with other levels of government;
- Dedicated to capacity building of the parties involved;
- Attentive to longer term aspirations not just short-term success;

- Advocative of a wider social change towards a distributive, democratized energy system.

Equally relevant are structural (environmental) conditions that tend to make some intermediaries more suitable in some circumstances than in others:

- Conflict created by a non-level playing field;
- Conflict created by the unknown (uncertainty);
- Conflict created by an initial lack of financial and human resources.

As illustrated by one of the case studies, People Power Solar Cooperative actively engages with community members in joint problem-solving – helping them understand the status-quo. For example, People Power as an intermediary organization helps them understand why it might not be a good idea to go off grid now, and what might the energy system look like with new shared solar models. This kind of facilitation requires communicating all the relevant information to the community members, including potential risks associated with potential lack of solar-sourced electricity generation at certain times of the year. This further underscores the traditional role of intermediaries as sources of technical assistance and help in jointly coming up with more options. Intermediaries like People Power and Co-op Power only act when they are called upon, when members of the communities ask for help, so they need to be ready to handle multiple kinds of requests.

6.5. Intermediaries that empower

Intermediary success seems to be directly connected to a clear sense of purpose and specific functionality. As discussed in the previous chapters, intermediaries have been called upon to complete a specific mission (i.e., to try to help parties in conflict generate an agreement that benefits them all – one that is fairer, more efficient, more stable and wiser than the status quo) (Susskind 2006). In parallel, intermediaries helping to win community ownership of solar energy also have a specific purpose: to overcome challenges of various kinds. In most U.S. states, there are still many challenges imposed by regulators or those who have the power to lobby policymakers. Electric utilities make it hard for communities to implement financially profitable

shared solar projects by charging high interconnection fees or limiting net-metering options (in certain U.S. states). There are other challenges around keeping the benefits of new solar facilities within the communities themselves and not having to out-source much of the operation and management. This means more community members have to be trained to self-maintain the solar panels and become more knowledgeable about the technicalities. And most importantly, community members need to be empowered through adequate access to correct information, to realize that they are no longer powerless, and to know that in the long term they can build wealth through energy. This requires a big shift in mindset and underlying beliefs that is probably more deeply rooted than what the younger generation might think. This requires time and persistence.

Intermediaries help to overcome obstacles like countervailing state policies, lack of organizational capacity, and unclear pathways to community empowerment. The intermediaries studied as part of this research contribute in multiple ways to overcoming these challenges in their respective localities. There are obvious differences in the different locations. Intermediaries must figure out when and how to (1) help communities combat the status-quo; (2) build local support for community ownership of solar; (3) assist with project design, creation of governance mechanisms and financing; (4) provide technical and procedural support; (5) advocate in deliberations regarding legislative changes; (6) enhance alliances across communities and even with other intermediaries; (7) enhance community resilience and social equity; and (8) organize movements on behalf of the larger goals of decentralized, distributed energy systems in America.

Table 10. Intermediaries for Community-owned Solar Development

	<i>Conventional Intermediaries</i>	<i>Intermediaries for Community-owned Solar Development</i>
Procedural		
Empowerment through facilitating access to information and resources	✓	✓
Socio-Political		
Empowerment through self-determination, ownership, and social equity		✓
Socio-Economic		
Empowerment through capacity-building and wealth-building		✓

Intermediaries empower communities. Empowerment is a very important attribute of intermediaries that work with communities who are keen on owning and making decisions on community shared solar. Historically, in a more specific context of intermediary involvement, empowerment is viewed as very much a secondary or tertiary kind of concern. Many interviewees expressed the importance of this intermediary role in the context of making community solar possible. The results from the empirical analyses reveal that intermediaries empower not only through enhanced access to information and resources, but through ownership and a gradual shift in power from the IOUs and corporations to the communities (added control and self-determination) and through capacity-building and wealth-building opportunities (regenerative economy that thrives within the community). Intermediaries that operate in the community solar space seem to empower communities beyond providing facilitative assistance: the communities are empowered in the social, political, and economic dimensions. In the beginning stages, intermediaries work consistently to identify people (assessment), who can show up for meetings on a regular basis (commonly identified both in traditional intermediaries in public dispute mediation and intermediaries that strive to support community ownership of solar). And these intermediaries present ideas in a way that brings people along and convince them that this will transform their lives (identified only in new kinds of intermediaries in the community-owned solar space, see figure above). Always being truthful, not making things up or

convince them that this project will make them a fortune but being true about the real impacts. The effort to support community ownership and capacity building indeed contribute to community empowerment. This is one of the primary missions of most intermediaries that function in the community-owned solar development space.

Finally, for intermediaries to be successful, a President of a Co-op in Hawaii argues that there has to be individuals in the community that have a track record of working towards a common good. Only then, intermediaries influence can be maximized in other communities as well. The question is how one supports these individuals who are normally working many hours per week on a voluntary basis. This is the reason why grants coming from the state or federal governments are crucial in helping various intermediaries succeed in what they are doing and achieve financial sustainability in the long term.

7. Conclusion

In this study I aimed to investigate the role of what I define as intermediaries, helping organizations that try to assist community groups who want to own and build community solar energy projects. There are various types of such intermediaries. In the past, intermediaries in the public sector have always put a high priority on remaining neutral – helping parties in conflict find agreement without taking sides. An example might be a local public agency – like a city department of public housing – that offers to mediate individual tenant/landlord disputes. The staff works for the city, but when they mediate, they try not to take sides. Similarly, private dispute resolution companies have for several decades, provided mediation services in the United States for a fee. Often, they have tried to settle lawsuits out of court. The key for such intermediaries is to assist without taking sides, to facilitate in a non-partisan way. Such intermediaries need to know about the technical matters being debated, but they are not technical advisors.

Today, some intermediaries in the public arena take on networking and organizational development roles. This is particularly true when they are helping to facilitate community-level energy transitions. In these instances, community-based organizations (CBOs) have emerged that provide a variety of services that go well beyond what mediators in the past have provided. It has become clear from the findings from this research, that CBOs working in the community renewable energy sector provide technical advice, facilitation assistance, financial management help, organizational networking and even movement-building help. These new intermediaries are not neutral, and not just devoted to a fair process (see table 9). Rather, they are trying to achieve a specific outcome: increased reliance on distributed or decentralized energy systems. This would redistribute political and economic power away from IOUs and corporations back to local residents once they are equipped to own, operate, and maintain their own solar facilities. This speaks directly to the last key role intermediaries that seek to advance community-owned solar often fulfill – movement building. Intermediaries of various kinds – community owned co-ops, non-profit energy justice organizations, and solar developers – appear to be coming together to build a national or regional campaigns promoting distributed or decentralized energy systems. Movement building or supporting a system wide social change was not considered as one of the

primary objectives of the traditional intermediaries in the public sector, as described in Chapter 2.

Table 11. Summary of contributions to the theory of intermediaries in the public sector

	Traditional Public Dispute Mediation	Advancing Community Solar for Public Interest
Neutrality	High priority	Not considered
Agreement getting (facilitation and mediation)	High priority	High priority
Agreement implementation	High priority	High priority
Mediating institution examples	State offices, local public agencies, private dispute resolution companies	State offices, cooperatives, environmental justice/energy justice organizations
Community empowerment	Low priority	High priority
Community capacity building	Low priority	High priority
Movement building for social change	Not considered	High priority

The concept of neutrality in light of supporting social change has become an ongoing topic of debate. Some argue that interventions in public dispute resolution cannot be successful if the neutrality of the intervener is compromised (Burgess, Burgess, and Kaufman 2022). Others claim that one-off intervention for the sake of settling the conflict is not enough, and conflict interveners ought to address the underlying societal problems for social change (Mayer and Font-Guzmán 2022). In this study, I find that neutrality is not a priority considered by the mediating institutions that are focused on advancing the public interest in community solar. Instead, they are concerned about the underlying problems for social change, ones that, in their view continue to hamper the ability of the public (i.e., communities on the ground) to claim equitable rights to own, share, and become trained and skillful. In the traditional sense, while certain mediators helped stakeholders who require additional support to adequately participate in the process of joint fact-finding and joint problem-solving (Susskind and Ozawa 1983; Forester and Stitzel 1989), their assistance did not extend to supporting certain values or public interest for social change. In my view, the concept of neutrality (or making sure the process of consensus building is fair) and advocating for policy change reflecting public interest is not mutually exclusive. To

be more accurate, I think the assessment of whether neutrality has been breached (and compromised the legitimacy of intermediary involvement) ought to be evaluated on a case-by-case basis. In other words, what I can confirm from this study is that the scope of the work of mediating institutions has continued to expand -- in the context of energy inequity and lack of opportunity for the under-resourced and under-represented. The difference however is that neutrality is not a necessary component and non-neutrality does not delegitimize the involvement of the mediating institution in the context of advancing community-owned solar.

A similar analogy could be made from China's transformation in the last forty-five years or so from the time when Deng Xiaoping adopted a strategy of making economic liberalization while keeping China's fundamental political structure and ideology unchanged. This has led many to describe China as a state-led market economy or authoritarian capitalism (Coase and Wang 2013). In the modern days, Chinese people increasingly express their concerns on the internet and continue to enjoy economic prosperity through state-controlled capitalism, yet China remains to be ruled by a single political party (Coase and Wang 2013). Not abandoning the origin or the core political ideology, China in the 1980s took an innovative approach in some sense, becoming more capitalistic and entrepreneurial yet not fully abandoning the roots or its core values (Y. Huang 2008). Similarly, in the context of community-owned solar development, the mediating institutions can facilitate the process of joint fact-finding, implement the project in the best interest of all stakeholders, and yet, support the movement-building efforts that seem to be consistent with the wider public interest.

Joint fact-finding (as part of agreement getting) is a crucial element in enhancing the understanding among disputants (Susskind 2006). This was the case when People Power Solar Cooperative and Co-op Power played facilitative roles as intermediaries in their respective locations. When community members jumped straight into exploring how to go off-grid, worker members of the Co-op (or leaders of the Co-op) suggested that going off-grid might not be the best short-term solution. People Power helped to alleviate the anger toward the big power companies and assessed all the options based on the available facts, explaining why staying connected to the grid might be the wiser option (at least for the near term). Co-op Power played a similar role when they were faced with staunch (value-based) resistance to installing community

solar in parts of Western Massachusetts. As Susskind (2006) explained, “values involve strongly held personal beliefs, moral, and ethical principles, basic legal rights, and more generally, idealized views of the world”. When value-based disputes are about what one believes is right, it is very hard to find agreement. Co-op Power did not attempt to sugar-coat anything. They showed what happened in previous situations and how those projects positively impacted the communities – including financial savings and how the element of ownership enhanced the overall morale of the communities – helped to build a movement toward fighting climate change, and overcoming the lack of access to under-represented, under-resourced communities. The key to intermediary interaction in my view is offering a form of facilitation (sometimes without even knowing that they are facilitating joint problem-solving) that aims to enhance factual (technical) understanding on all sides.

As part of the Consensus Building Process (Susskind, McKearnen, and Thomas-Lamar 1999), an intermediary (1) convenes the relevant parties involved, often through a systematic stakeholder assessment; (2) generates commitments to participate, which means, in the context of community solar development, that communities are bought into the plan, community members become shareholders as well as potential subscribers when the facility is up and running. In the governance structure of a Co-op, this is when the community project leader is appointed, members of the community formally join the Co-op and participate in the democratic process, such as voting the Board members. The next is (3) deliberation, which involves continuous communication between the intermediary and the community members, coming up with possible options. This includes brainstorming various financing mechanisms possible, incentives from the government, electric utility relationships, additional community buy-in, and contractors to hire. Then, at the project level, the community and intermediary begin the (4) decision-making process. The last step is (5) Implementation, carrying out the jointly discussed, explored, and decided course of action. The actual Consensus Building Process emphasizes that parties include “nearly self-enforcing agreements”. This requires building into the agreement consequences of uncertainty, working with contingencies, and anticipating future risks. This certainly is in the purview of intermediaries that help to guide communities throughout the entire process (from pre-development to post-completion maintenance).

One of the key contributions of intermediaries working on community solar energy is community empowerment. Peter Berger and Richard Neuhaus (1977) in their discussion of mediating structures in public policy, introduce the idea of “small structures” such as the neighborhood, family, church, and voluntary association serving in the middle space between the welfare state and the individual. They explain that people in modern society feel powerless when their lives appear to be controlled by institutions they do not know or whose values they do not share. This is why in their view, mediating institutions are “principal expressions of the real values and the real needs of people in our society” because people that form these structures or who are part of them know best what individual needs truly are (Berger and Neuhaus 1977). They also claim that poor people, through these mediating institutions, can do what once only affluent people could do. While their proposition centers primarily around the dichotomy between the welfare state (the government) and the individual, or public versus private, the central idea of community empowerment is quite relevant to a context in which intermediaries are trying to advance community ownership of solar energy. It is certainly true that many community members, particularly those that have huge energy burdens feel powerless. These individuals or households usually have no alternative. They often have no way to choose clean energy over fossil fuels, even though that’s what they want to do. Through access to new information and resources as well as various capacity-building programs, community members can become empowered to control their own energy future. Helping communities break out of the usual lock-in of privileged governance of energy resources is one of the key missions set out by the intermediaries I studied. Empirical results prove this to be the case. Many community-owned solar projects were built, owned, and self-maintained by communities I studied in Minnesota and Massachusetts. A community-owned solar facility is in the development stage in Hawaii led by Ho‘āhu Energy Cooperative Molokai in collaboration with Shake Energy Collaborative. Similar small-scale community solar projects are getting close to full operation in Ohio. Tribal nations are leading indigenous communities in building several solar and wind projects across the nation. More people on the ground, thanks to the leadership and dedication of mediating institutions and individuals have been able to participate in solar energy-related training and certification programs. Without relying on outside assistance, many communities that currently own solar projects have professionals in-house who can monitor and perform maintenance throughout the entire life-cycle.

The future work points in several directions. One is conceptualizing the theory of intermediaries in the context of other public interest technologies. The expanded applications will further illuminate other ways to understand how one could distinguish how neutrality could be interpreted for example. Secondly, I wish to conduct additional empirical studies to measure what we mean by community empowerment. Community empowerment could be measured qualitatively by conducting additional fieldwork including surveys and focus groups. Community empowerment could be further explored in ways to measure it quantitatively as well. This could take the form of proxy measures such as community wealth accumulated over time or community representation in various leadership positions or the share of economic benefits that continued to remain in the communities (regenerative investments in education or health for example). These are ongoing questions that would be valuable to investigate in the future. Finally, as communities continue to envision a decentralized, distributed energy system, it would be immensely important to support the kinds of intermediaries that have been studied as part of this research. They need societal attention and backing in addition to various kinds of monetary support.

8. Appendix A

Interviews

1	Ashland Solar Cooperative	Board Member & Treasurer	December 7, 2021; April 6, 2022.
2	Cape Light Compact	Power Supply Planner	April 5 2022
3	Cleveland Owns	Executive Director	December 7, 2021; January 6, 2022; April 12, 2022
4	Co-op Power	Director	March 30, 2022
5	Colorado Energy Office	Director	December 1, 2021; April 6, 2022
6	Comite Dialogo Ambiental	Lawyer	December 24, 2021; February 18, 2022
7	Cooperative Energy Futures	General Manager	December 7, 2021; December 17, 2021; February 10, 2022; March 25, 2022
8	Energy Democracy Alliance	Steering Committee Member	December 9, 2021
9	Ho‘āhu Energy Cooperative Molokai	President	April 19, 2022; June 20, 2022
10	Indigenized Energy	Co-creator	December 9, 2021; December 20, 2021
11	Leech Lake Band of Ojibwe	Interim Environmental Director	February 8, 2022
12	Local Clean Energy Alliance	Steering Committee Member	December 10, 2021; December 17, 2021; December 28, 2021
13	Minnesota Department of Commerce	Weatherization Leveraging Specialist	December 15, 2021; January 31, 2022
14	Mountain Association	Residential Energy Coordinator	December 8, 2022
15	Native Sun/Solar Bear	Owner	December 23, 2021; February 14, 2022; February 23, 2022; March 3, 2022
16	New York State Energy Research and Development Authority	Senior Project Manager	April 15, 2022
17	People Power Solar Cooperative	Co-founder and CEO	November 17, 2021; November 24, 2021; March 4, 2022
18	People's Solar Energy Fund	Director	January 14, 2022; January 21, 2022; March 5, 2022
19	Portland Clean Energy Funds	Organizational Development & Policy Manager	March 18, 2022

20	RE-AMP Network	Strategic Director	December 20, 2021
21	Shake Energy Collaborative	Co-founder and CEO	March 21, 2022; April 16, 2022
22	Souladarity	Succession Supporter	December 22, 2021
23	Standing Rock Renewable Energy Power Authority	General Manager	November 1, 2021
24	The Franklin Community Choice Power Supply Program	Select Board Chair	March 25, 2022
25	The Nathan Cummings Foundation	Senior Program Associate	February 2, 2022; February 28, 2022
26	Verde	Energy, Climate, and Transportation Manager	February 17, 2022; April 4, 2022
27	Vineyard Power	President	March 31, 2022
28	Washington Electric Cooperative	State Representative	March 21, 2022

9. Appendix B

Survey Questions

New roles for intermediaries: the case of community-owned solar energy development

You have been asked to participate in a research study conducted by Mr. Jungwoo Chun from the Department of Urban Studies and Planning at the Massachusetts Institute of Technology (MIT). The purpose of this research is to understand how XXX has helped advance community-owned renewable energy in your community. The questions in the survey are meant to get at your initial reaction; they do not require any preparation on your part. The results of this study will be published in both academic journals and popular outlets.

Please read the information below before deciding whether to participate. All survey responses will be kept confidential. Answers will be collected and analyzed anonymously. Both XXX and Jungwoo Chun (MIT) will have access to the anonymized data. This survey is voluntary. You have the right not to answer any question, or to stop participating in the survey at any time, for any reason. It would help to have some demographic information from you. Demographics-related questions appear near the end, and they are optional.

By clicking the arrow button below, you are agreeing to participate, and the survey will begin. The insights you can offer are greatly valued – thank you for your participation.

Please contact Jungwoo Chun (jwchun@mit.edu) with any questions or concerns.

Q1: How are you involved in XXX? Select all that apply

- Volunteer
- Member
- Board member
- Customer
- Vendor
- Staff person
- Lender
- Investor
- Prospective member
- Partner organization member

Q2: Why did you join XXX? (Please select five options that are most important and assign them ranks in order of importance where 1 is the most important and 5 is the least important)

- _____ Financial savings
- _____ Invest in great projects
- _____ Become an owner of shared renewable energy resource (solar & wind)
- _____ Increase sustainable energy in our region
- _____ Contribute to making clean energy more accessible for low-income
- _____ Lower carbon emissions – fight climate change (decrease use of fossil fuels)
- _____ Contribute to local initiatives and businesses in my community
- _____ Movement building

Q3: How did you first find out about XXX?

- From another member
- From a community-based organization
- From an XXX staff member
- From my neighbors
- From web search or social media
- From the news media or local newspaper
- Other _____

Q4: How has XXX benefited your local community? (Please assign ranks in order of importance where 1 is the most important and 5 is the least important)

- _____ Brought people together
- _____ Mobilized communities (movement building)
- _____ Shared renewable energy related knowledge with my community
- _____ Supported education and career training
- _____ Built

Q5: What elements of the community solar or offshore wind project design are you most concerned about? (Please assign ranks in order of importance where 1 is the most important and 5 is the least important)

- _____ Location of the project
- _____ Land use and environmental impacts
- _____ Labor and workforce development
- _____ Financial benefit to the community
- _____ Ownership structure

Q6: How often have you spoken about community solar or offshore wind with:

XXX members?	<input type="radio"/> Frequently	<input type="radio"/> Occasionally	<input type="radio"/> Rarely	<input type="radio"/> Almost never	<input type="radio"/> Not at all
Others in the community?	<input type="radio"/> Frequently	<input type="radio"/> Occasionally	<input type="radio"/> Rarely	<input type="radio"/> Almost never	<input type="radio"/> Not at all
XXX Power staff?	<input type="radio"/> Frequently	<input type="radio"/> Occasionally	<input type="radio"/> Rarely	<input type="radio"/> Almost never	<input type="radio"/> Not at all
Community based organizations that work with XXX?	<input type="radio"/> Frequently	<input type="radio"/> Occasionally	<input type="radio"/> Rarely	<input type="radio"/> Almost never	<input type="radio"/> Not at all

Q7: What is your long-term goal in joining XXX? (Please select five options that are most important and assign them ranks in order of importance where 1 is the most important and 5 is the least important)

- _____ Financial savings
- _____ Invest in great projects
- _____ Become an owner of shared renewable energy resources
- _____ Increase sustainable energy in our region
- _____ Contribute to making clean energy more accessible for low-income
- _____ Lower carbon emissions – fight climate change (decrease use of fossil fuels)
- _____ Contribute to local initiatives and businesses in my community
- _____ Movement building

Q8: What types of future community energy projects most benefit me personally? (Please select five options that benefit you the most and assign them ranks where 1 is the most important of those options and 5 is the least important)

- _____ Community ownership of local renewable energy generation (e.g., solar, wind)
- _____ Services and financing for home energy upgrades (e.g., efficiency, electrification)
- _____ Community level district cooling and heating
- _____ Community micro-grids (energy resilience to severe weather)
- _____ Electrified infrastructure and transportation
- _____ Community sovereignty and self-determination
- _____ Changing our relationship with energy towards one that is decommodified, decentralized, and democratized
- _____ Community resilience hubs

Q9: What types of future community energy projects most benefit my local community? (Please select five options that benefit your local community the most and assign them ranks in order of importance where 1 is the most important and 5 is the least important)

- _____ Community ownership of local renewable energy generation (e.g., solar, wind)
- _____ Services and financing for home energy upgrades (e.g., efficiency, electrification)
- _____ Community level district cooling and heating
- _____ Community micro-grids (energy resilience to severe weather)
- _____ Electrified infrastructure and transportation
- _____ Community sovereignty and self-determination
- _____ Changing our relationship with energy towards one that is decommodified, decentralized, and democratized
- _____ Community resilience hubs

Instructions This research reflects deep concerns about energy justice (and equity). It would help to have some information about you (which will be kept anonymous). Demographics related questions appear next, and they are optional.

Q10 Gender

- Female
- Male
- Other
- Prefer not to answer

Q11 Age

- Under 18
- 18 - 24
- 25 - 34
- 35 - 44
- 45 - 54
- 55 - 64
- 65 - 74
- Over 75
- Prefer not to answer

Q12 Race/Ethnicity (select all that apply)

- White
- Black or African American
- American Indian or Alaska Native
- Hispanic or LatinX or Spanish
- Native Hawaiian or Pacific Islander
- Asian
- Self-identify _____
- Prefer not to answer

Q13 What is the highest grade or level of schooling that you have completed?

- Less than high school
- High school graduate
- Some college
- 2-year degree
- 4-year degree
- Professional degree
- Doctorate
- Prefer not to answer

Q14 Current household size

- 1
- 2
- 3
- 4
- 5
- 6
- Over 6
- Prefer not to answer

Q15 Household income

- Less than \$10,000
- \$10,000 - \$19,999
- \$20,000 - \$29,999
- \$30,000 - \$39,999
- \$40,000 - \$49,999
- \$50,000 - \$59,999
- \$60,000 - \$69,999
- \$70,000 - \$79,999
- \$80,000 - \$89,999
- \$90,000 - \$99,999
- \$100,000 - \$149,999
- More than \$150,000
- Prefer not to answer

Q16 Zip code of where you live for the majority of the year:

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