# Community Energy Planning: Best Practices and Lessons Learned in NREL's Work with Communities

**National Renewable Energy Laboratory**
Liz Ross and Megan Day

## Summary of Findings

The clean energy transition is accelerating due to local, state, and national actions combined with external market forces. Regardless of where goals are set and decisions are made, clean energy deployment occurs on the ground in communities. As a result, communities increasingly need technical expertise and assistance with planning for and managing the energy transition. Building on decades of work with state, local, and tribal jurisdictions, the National Renewable Energy Laboratory (NREL) increasingly provides community-driven modeling, analysis, and technical assistance to enable more data-driven and equitable community energy planning. To inform and enhance NREL's capabilities in community energy planning and provide a resource for others working in this space, the Joint Institute for Strategic Energy Analysis (JISEA) Sustainable Communities Catalyzer supported this best-practices document based on interviews with seasoned NREL practitioners and a literature review on equitable community energy planning. Findings include five best practices for community energy planning that NREL practitioners and others can apply to strengthen their impact:

1. Do your homework in preparation for community interactions.
2. Be humble, authentic, and honest in your interactions with community members.
3. Respect community agency in every step of the process.
4. Meet the community where they are.
5. Democratize participation.

JISEA
Joint Institute for Strategic Energy Analysis

# Introduction

## The Need for Well-Executed Community Energy Planning

Through energy goal setting, policy enactment, and often siting authority, local jurisdictions are critical decision-makers in the clean energy transition. Evidence of the growing role of local jurisdictions in energy planning and decision-making abounds:

- More than 180 communities in the United States have committed to transition to 100% clean energy by 2050 or sooner (Sierra Club 2022).
- There are 332 U.S. members and 2,500 international members of ICLEI – Local Governments for Sustainability (ICLEI – Local Governments for Sustainability 2021).
- Around the globe, 11,752 cities, representing more than one billion people, are committed to the Global Covenant of Mayors for Climate & Energy (GCoM 2022).

At the same time, some local communities are pushing back on the changes in land use and the development required to transition to clean energy (Sovacool et al. 2022). Further, the energy transition is complex and will require technical, policy, and other expertise. NREL will be called to provide this expertise for energy planning assistance to many different types of communities.

NREL has demonstrated experience in community energy planning, having provided more than 2,000 communities, utilities, and businesses with technical assistance since 2010. As clean energy investments ramp up, demand for NREL's expertise in supporting communities in clean energy transitions is growing. This best practices document is intended to support NREL practitioners' capabilities in community energy planning and equitable planning processes in a streamlined, consistent fashion across the lab. The document is also intended to be a resource for communities and practitioners external to NREL engaging in community energy planning. The best practices identified here are based on interviews with NREL practitioners who have extensive experience working with communities. Interviewees, who gave input during fall and winter 2021, discussed their experiences and lessons learned working with communities. Interviews were supplemented with a literature review, which largely supported NREL practitioner recommendations. Additional resources and references are included at the end of this document.

# Defining NREL's Role

One challenge that practitioners face pertains to terminology—what terminology best describes NREL's work with communities? Several terms are involved in this discussion, which are defined as follows.

- **Technical assistance** refers to NREL modeling, analysis, and capacity-building that helps stakeholders learn how to achieve their goals. Technical assistance can be applied broadly—for instance, to communities, which can include municipalities or tribes, in addition to businesses and investor-owned utilities. Figure 1 demonstrates NREL's approach to technical assistance.
- **Community engagement**, in this context, is the process of collaborating with stakeholders and community members to identify and evaluate clean energy solutions. Effective community engagement requires deep training and an understanding of facilitation methods and community groups and their histories. Community engagement presents an opportunity for NREL to work with diverse local facilitators, who represent community members and have a strong understanding of local community dynamics. Local facilitators can also be more effective at engaging the community during and after NREL's involvement, especially when working with large, complex communities.
- **Community energy planning** is a type of technical assistance in which NREL practitioners work with communities to identify their energy-related needs and goals and outline potential solutions using NREL data and analytic capabilities. Community energy planning is the focus of the best practices outlined in this document.

## Community Energy Planning

NREL's community energy planning commitments can be in the short term (as little as one week) or long term (spanning multiple years). Community energy planning can also involve either single entities, such as a government department or a municipal utility, or multiple stakeholders, such as various government departments

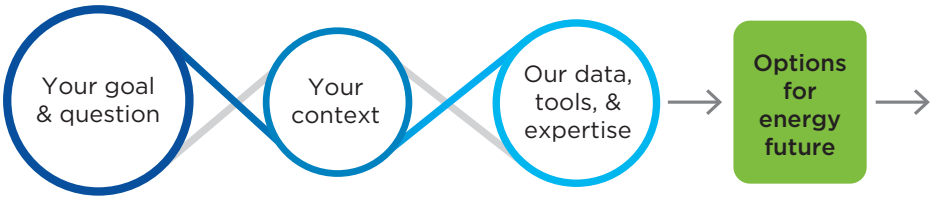


Figure 1. NREL's approach to state, local, and tribal technical assistance

and community groups. These best practices assume longer-duration, well-resourced community energy planning efforts; however, practitioners working on less-resourced efforts can also use this guide with modifications that depend on budget and time availability.

The community energy planning process begins with identifying and convening stakeholders and forming a leadership team (see Figure 2). Once a shared understanding of fundamental energy concepts is established, an energy vision and baseline, as well as specific energy goals, can be developed. Options for goal achievement are then discussed and evaluated, and finally, a plan is compiled and implementation begins. This process is flexible. For example, Steps 1 and 2 often happen concurrently; the individual requesting technical assistance on behalf of a community commonly becomes the point of contact and part of the leadership team. In addition, data collection (i.e., part of Step 5) should begin as early as possible to make the most of your time with the community.

When working with communities, NREL employees are bound by law to refrain from making recommendations. Recommending or advocating for specific actions or policies can be interpreted as lobbying, and federal law, as well as many state statutes, prevents the use of public funds for lobbying (see 31 U.S.C. 1352 and P. L. 101-121; National Conference of State Legislatures 2021; U.S. Department of Health and Human Services 2019). NREL's credibility partially lies in its third-party, neutral role, which is to provide data, modeling, and analysis to inform data-driven decision-making and help communities prioritize investments, policies, and programs. NREL provides decision-support but not decisions.


Figure 2. Community energy planning cycle (sourced, with modifications, from DOE [2010])

## Just and Equitable Community Energy Planning

Just and equitable community energy planning has several empirically supported benefits. Not only does diverse stakeholder involvement in decision-making typically lead to better outcomes (Beierle 2002), but community members are more likely to trust findings that were generated collaboratively, incorporate cogenerated knowledge into decision-making, and accept energy siting when they perceive that the process was just (Bidwell 2016; Chief, Meadow, and Whyte 2016; Gross 2007; Liebe, Bartczak, and Meyerhoff 2017).

Several concepts are frequently used in energy justice literature and are important for just energy planning:

- **Procedural justice** is equitable stakeholder involvement with an inclusive range of community groups and representatives in the decision-making process that leverages stakeholder expertise and fills in the gaps in stakeholder knowledge so that the stakeholders can meaningfully participate (Jenkins et al. 2016; Sovacool et al. 2019).
- **Distributive justice** deals with the equitable sharing of the burdens and benefits of the energy system and the fair treatment of those impacted by energy development (Jenkins et al. 2016; Sovacool et al. 2019; Romero-Lankao and Nobler 2021).
- **Recognition justice** dictates that historical inequities be addressed in planning solutions and that vulnerable individuals should not be made more vulnerable in those solutions (Jenkins et al. 2016; Sovacool et al. 2019; Romero-Lankao and Nobler 2021).

- **Cosmopolitan justice** asserts that justice concerns should be human-centered and go beyond national boundaries, and that the full life cycle of technologies should be considered (Sovacool et al. 2016; Sovacool et al. 2019; Romero-Lankao and Nobler 2021).
- **Restorative justice** is the culmination of the above principles in practice, wherein all stakeholders jointly develop solutions to redress injustices caused by the energy system and prevent future injustices (Heffron and McCauley 2017; Romero-Lankao and Nobler 2021).

Although the justice principles outlined above impact the outcomes of planning processes, the role that community members play in these processes is highly variable. Spectrums or ladders of engagement with communities, such as those described by Arnstein (1969), the International Association for Public Participation (2018), and González (2020), describe the extent to which citizens have power in the decision-making process. On the lowest rungs of Arnstein's ladder of citizen participation are *manipulation*, where participants are used merely as "public relations vehicles," and *informing*, where participants are briefed to some extent, but the input of those participants is not likely to be considered. The highest rung on Arnstein's ladder is *citizen control*, in which citizens are given "full managerial power." Similarly, the lowest level of public participation, according to González (2020), is *marginalization*, and the highest level is *community ownership* (see Figure 3).

NREL's work with communities should prioritize procedural justice by engaging at higher levels of these ladders or spectrums. However, because NREL does not specialize in community engagement and the community determines the goals and priorities of the technical assistance process, NREL practitioners supporting community energy planning may not make the final decision on who participates in energy planning meetings. Nevertheless, recognizing this spectrum of engagement can support planning for more inclusive community and stakeholder involvement.

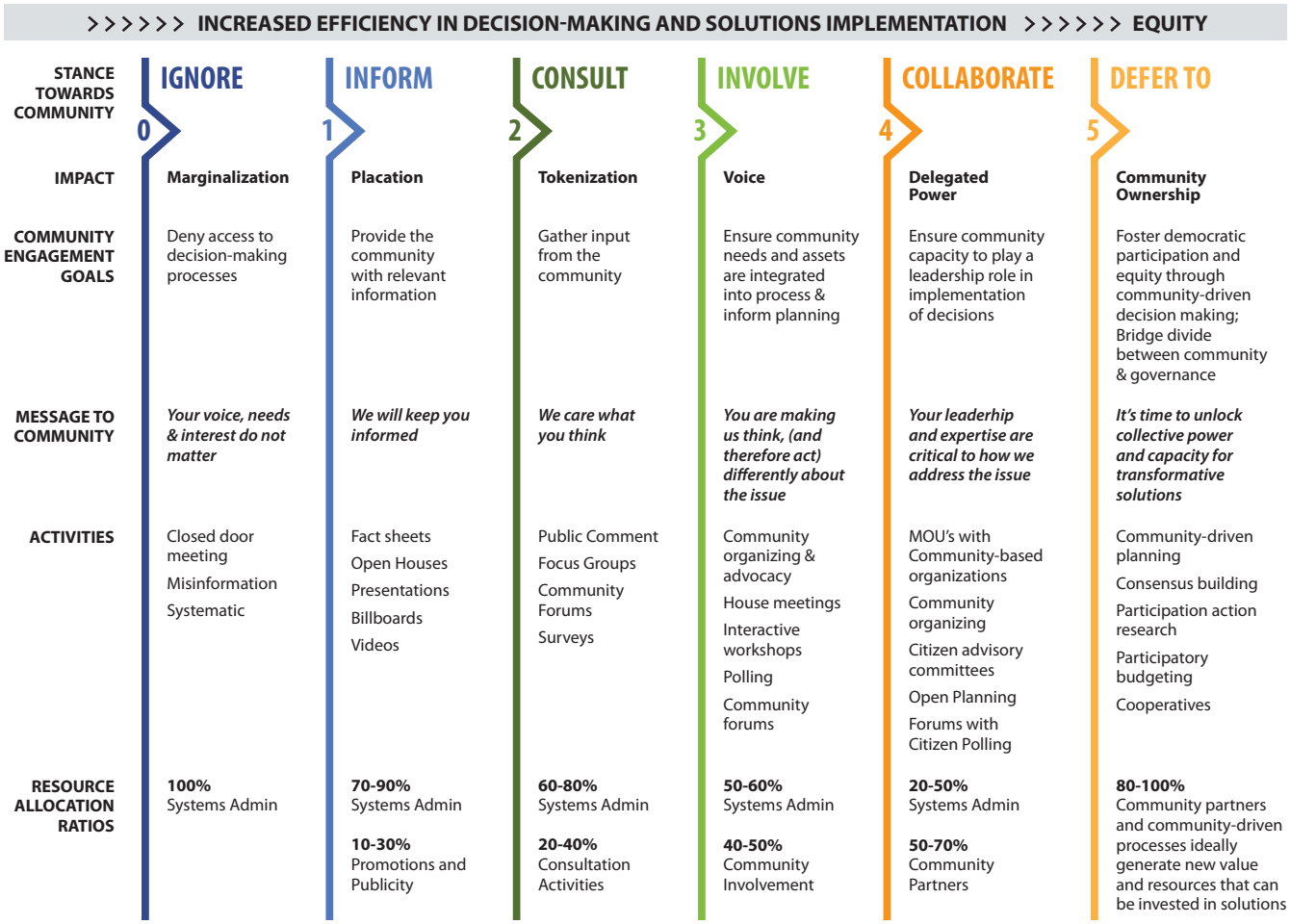


Figure 3. Spectrum of Community Engagement to Ownership (adapted with permission from Rosa González at Facilitating Power 2020)

NREL's Cold Climate Housing Research Center energy experts and community specialists work directly with community members and tribes to identify needs and craft solutions in Alaska. Photo by Mollie Rettig, NREL 67686

## Best Practices in Community Energy Planning

Interviews with seasoned NREL practitioners, as well as a literature review on equitable community energy planning, informed the following community energy planning best practices.

### 1. Do Your Homework

Understanding as much of the community context as you can before engaging directly with a community enables you to ask questions, recognize the differences and unique needs across stakeholders, and, ultimately, build trust and generate context-sensitive options for a community. Spend time becoming familiar with the community's history, culture, people, structure, and energy resources and context before meetings begin. Understanding the community's energy needs and landscape and recognizing the work that has already been done by community members is also an important first step. Doing your homework also includes making calls and having discussions with contacts in the community to ask questions and learn more about the community's context and interest in technical assistance.

**1.1 Understand Culture and Terminology.** In your research, look for important cultural differences that might arise—between you and the community as well as between different community groups. For instance, the words you use matter. As an example, the term "tribe" is acceptable in some Native American communities and Alaska Native villages but unacceptable in others.

Other cultural differences may also arise. In some cultures, for example, avoiding eye contact is a sign of politeness rather than evasion. Some communities might also prefer to bring in spiritual, elected, or other community leaders to speak at the beginning of meetings. Spend time researching which phrases and customs are appropriate, and if you are unable to find answers to cultural questions ahead of time, one interviewee said to "ask the community."

Becoming familiar with a community's culture is especially important in those communities that have experienced significant historical trauma. If you find previous instances of community

members' exclusion from decision-making processes, this exclusion should be verbally acknowledged and not ignored (Chief, Meadow, and Whyte 2016; Fisher and Ball 2003; Groundwork USA 2018; Stubben 2001). If you discover in your research that the community has had challenges in the past, you can ask if they are still relevant today, if it feels appropriate.

> "Ask them, '*How would you like me to refer to your community?*'
>
> And, '*Do you have any cultural preferences for this meeting?*'"

**1.2 Map Stakeholders.** To support community agency (discussed in later sections), interviewees recommended getting a sense of what type of expertise the community has and what they are already doing well. For

> "If they have lots of PV installs, help support them in those efforts."

instance, one interviewee said that staffing is very important because the plan follow-through will be impacted by staffing. Is there an entity that can execute the plan? Also, determine the extent to which the community has control over enacting solutions, and identify relevant regulations that could impact plan feasibility. What is within a community's authority to implement? Where do they need to partner?

During this process consider whose voices should be represented in meetings and whose voices might be missing (Advocacy & Communication Solutions [ACS] 2020; Groundwork USA 2018). Stakeholders should include voices that have historically been marginalized in these conversations. Partnering with community-based organizations, or CBOs, ideally through arrangements providing compensation, can establish a conduit for input and engagement for different community sectors, particularly marginalized or underserved stakeholders. Community members should be involved from the beginning; instead of using the stakeholders to get approval once solutions have been outlined, solutions should be codeveloped with community input and, preferably, community leadership (Innes and Booher 2004).

**1.3 Assess the Community Structure.** Numerous structural factors can influence the energy strategies that a community can pursue, including utility type, existing community plans, and the relationship between state and local governments. For instance, a community's utility type can impact the strategies through which they can achieve their goals. The larger the utility, the more challenging executing the energy plans could be. Most utilities

> "Small utilities also face challenges. It's miles per customer, not customers per mile. That distinction matters."

in the United States are publicly owned (i.e., municipal-, state-, or federal-owned utilities), member-owned (i.e., cooperatives [co-ops]), or investor-owned (IOUs). Although member-owned co-ops are more numerous than IOUs, IOUs serve the most customers because they tend to be much larger and are often found in big cities (EIA 2019, 2021). Co-ops serve fewer customers and are frequently found in rural or tribal areas.

Existing plans also provide information that is valuable to the community's energy planning process, including data the community has already compiled. Therefore, ask the community which plans they have in place. Existing local plans may include:

- **Comprehensive or general plan –** Guides a community's land-use planning and infrastructure development, often through goals, objectives, and mapping, and may be relevant to energy planning efforts (Ewing and Knapp 2009).
- **Climate action plan –** Catalogues local sources of greenhouse gas emissions; outlines the community's greenhouse gas reduction goals and often the processes needed to achieve those goals (Ewing and Knapp 2009).
- **Sustainability plan –** Similar to a climate action plan but broader in scope; addresses environmental, economic, and social goals. Some communities find sustainability plans more politically feasible than climate action plans (Ewing and Knapp 2009).
- **Racial equity plan –** Outlines a community's goals and processes for ending racial disparities and may include descriptions of environmental justice, workforce, health, housing, transportation, economics, and development goals and objectives for the community (Curren et al. 2016).

These documents can be quite long, so a deep dive is likely not necessary or feasible. The plans often, however, have executive or chapter summaries that you can use. The community will need to ensure that the energy plan aligns with other existing plans.

## 2. Be Humble, Authentic, and Honest

Being humble, authentic, and honest in your interactions with community members helps to build trust, which is an important component of equitable community energy planning.

**2.1 Listen More Than You Speak**. Interviewees felt strongly that individuals working with communities should be humble and come to the table as learners. Research supports the critical need to do more listening than talking, especially early on (ACS 2020; Chief, Meadow, and Whyte 2016; Groundwork USA 2018). Acknowledge there is a lot you do not know and be open about the questions you have. This openness creates an environment that allows everyone involved to be vulnerable and honest about where they are and what they need.

> "Try, '*I'm confused about what you're asking; could you help me?*'
>
> Or perhaps, '*I don't know the answer to that question, but I'll find someone who does.*'"

To aid in this process, ask questions and allow community members to "surface related issues that are important to them" (ACS 2020). One interviewee noted the importance of refraining from interrupting a stakeholder when they are speaking and letting speakers fully finish their thoughts. Take detailed notes throughout the process to keep track of what you talked about, to remember any ideas you or community members have, and to document what did and did not work for the future.

**2.2 Be Authentic**. Strive to be authentic in your interactions with the community. One interviewee emphasized that you should embrace who you are and advised that it's not about trying to blend in; instead, be respectful of the community's culture and seek opportunities to learn about what life is like for them. Recognize that you are an outsider, and ask yourself, "How would I interpret and react to someone new coming in?" This approach will help you build cultural sensitivity. If you make a mistake, be sure to acknowledge it and apologize, and then move on and do not dwell on the error. Additionally, seek diversity on your project teams to better match and represent the community you are working with. One interviewee said this representation could pertain to any characteristic—for instance, urban or rural backgrounds, race or ethnicity, language, income, or education.

NREL provides technical assistance and analysis support to the Clean Cities Coalition, including the nine-county Centralina Clean Fuels Coalition in North Carolina to work with community leaders and other stakeholders to save energy and promote advanced vehicle technologies. Photo courtesy of Centralina Clean Fuels Coalition

**2.3 Maintain Honesty and Integrity**. Being open and transparent about the technical assistance process is crucial for building trust. Inform the community about what to expect from the process and what NREL can and cannot do. This openness and honesty was emphasized by interviewees and in Groundwork USA (2018). Do not overpromise as you define NREL's role in helping the community achieve their goals—which means not committing to anything until you are certain you can deliver on it. Instead, build a realistic picture of what you can do by providing an explanation of the scope and scale of the process and of NREL's capabilities. Mismatched expectations weaken participants' trust, so be up front about how the stakeholders' input will likely influence the decision-making process (Brown and Chin 2013). Additionally, remember the anti-lobbying statute, and provide options, not recommendations.

> "If you're not sure you can offer assistance, don't make it seem certain; as soon as you say, 'I think we can help you out,' you're overpromising if you aren't sure, and trust can be damaged."

Trust also needs to be built between the stakeholders and the data. Be committed to scientific integrity and to NREL's review processes. Help community members better understand their questions and the potential analytic pathways and explain what the data will and will not help them solve. Communicate about data privacy by discussing and agreeing on how the community's information will be used and who the information will be shared with. Lastly, plan for sharing the data, results, and products with the community, and communicate this information proactively and consistently (ACS 2020; Chief, Meadow, and Whyte 2016).

## 3. Respect and Support Community Agency

The community's needs and goals should be centered and prioritized through co-developing solutions, building community agency, and addressing power differentials.

> "We should constantly keep in mind whether the process and what we're saying adds to or takes away from community agency."

**3.1 Codevelop**. Interviewees asserted that the community should lead the way during the process and that community agency should be prioritized. Ayala, Drehobl, and Dewey (2021) similarly stated that a community-centered approach should be used when investigating solutions, and according to Chief, Meadow, and Whyte (2016), when working with tribes, we should ask ourselves, "How can this research ultimately support the sovereignty, cultural revitalization, and well-being of tribal members, communities, and nations?"

> "What do community members want to get out of the process, and what's the best approach to get there?"

Community members should be involved in every step of the process (Nasca, Changfoot, and Hill 2019). The entire process—not just the solutions—should be codeveloped, including the technical assistance process itself. Get input on the technical assistance approach early on to help "frame the work as a partnership, which might help to build trust and make activities more engaging," relevant, and helpful (Conroy and Mastri 2021).

This continuous involvement also means letting the community define goals and not assuming what the community wants to gain from the process (ACS 2020). What are the community's needs, from their perspective? Figure 4 outlines example questions that communities might have about energy planning efforts.

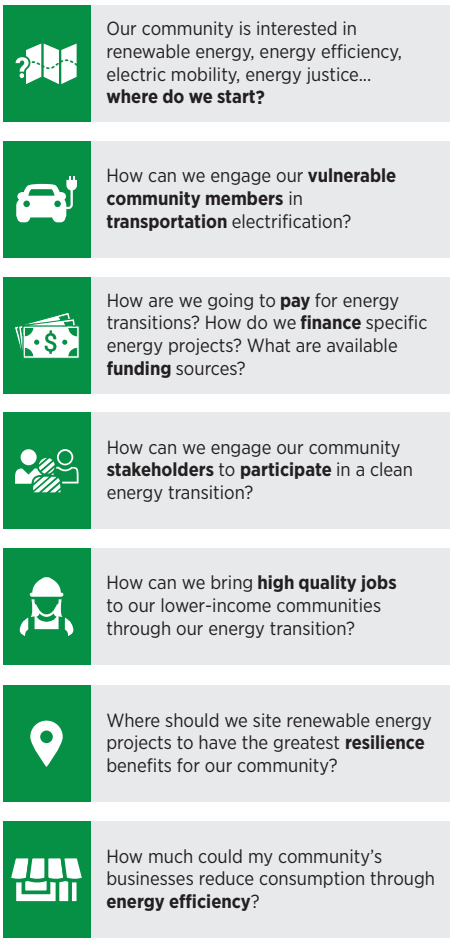


Figure 4. Questions that communities might have about energy planning.
Illustration by Nicole Leon, NREL

Respond to the community's specific goals and questions instead of any predetermined ideas of what you think the community needs. Focus on end goals and objectives—not specific solutions. One interviewee said that this approach allows for more creative thinking in finding optimal solutions that are codeveloped. Also, consider what preexisting assumptions you may be bringing to the planning process. Although the objective is to be neutral, we all have biases in how we think of others, how we think of and use the data we have access to, and how we consider solutions. Providing data to certain community stakeholders does not necessarily mean that those stakeholders will be on board with potential solutions or that other stakeholders will embrace the same solutions; therefore, centering the conversation around diverse community needs is important.

### Principles in Practice

Using a community-centered approach helps to balance power and promote community expertise. A neighborhood planning process in Ontario, for instance, began with a community-led tour of the neighborhood, which positioned community members as leaders with knowledge critical for the success of the project (Nasca, Changfoot, and Hill 2019).

**3.2 Build Agency**. Help the community become self-reliant and able to continue the work after the partnership ends (Ayala, Drehobl, and Dewey 2021). One option used at NREL is to walk community members through any tools that are used instead of simply presenting findings, which might help the community better prepare for future inquiries and for training other community members. Fisher and Ball (2003) say to "train and employ community members as project staff," and Innes and Booher (2004) say that "joint fact-finding"

yields more accurate and trustworthy results. In addition, one interviewee recommended that communities have someone in a dedicated position for plan execution, which will increase the likelihood that the community will follow through on the plan and outlined solutions. Conversely, you could help the community identify local organizations or entities responsible for plan implementation.

**3.3 Consider Power and Expertise**. Be aware of power differentials and the power you hold in a situation (Bryson et al. 2012; Nasca, Changfoot, and Hill 2019). NREL-led meetings carry certain technical complexity, which could exclude members of the community. Proclaiming those with technical expertise as the "experts" and community members as the "public" upholds power imbalances and threatens community agency. Those conducting technical assistance are experts on specific, technical topics, but community members are experts on their community and likely on a diverse set of other topics.

Leverage the power and knowledge that community members hold. Community-based organizations, which work on local issues and involve residents in problem and solution identification, might work on energy issues and be active in the area (National Community-Based Organization Network 2003). Those organizations are community experts as well—they have a strong understanding of the community and have likely built trust with the community. Several interviewees and the literature suggest working with a community member facilitator or point person (Stubben 2001, Fisher and Ball 2003). Meeting invites, for instance, should come from the point person. Having a point person who is also the project's champion might be most beneficial for the longevity of the project (Aloise-Young et al. 2021; Gattiker and Carter 2010; DOE 2010).

Working with community-based organizations and a locally-based facilitator helps in many ways, including by building trust, supporting community agency, and assisting the community with plan follow-through, in addition to positioning community members as leaders and bolstering community members' power in decision-making (Ayala, Drehobl, and Dewey 2021). Furthermore, community-based organizations and facilitators in this instance act as cultural brokers, which can help to bridge the gap between distinct cultures (National Center for Cultural Competence 2004).

> "Even the playing field. You might want to drop titles and degrees."

When working with diverse stakeholders, such as community members, organizations, planners, and city officials, power differentials might be challenging to address. Nasca, Changfoot, and Hill (2019) suggest setting clear expectations up front about what an equitable process looks like. Use accessible language and have an initial capacity-building meeting during which frequently used terminology is defined—this will help all stakeholders contribute meaningfully (Groundwork USA 2018; Nasca, Changfoot, and Hill 2019). Acronyms, for instance, are abundant in the NREL and U.S. Department of Energy lexicon. Those outside of NREL rarely, if ever, use these terms, so avoid them in community work. Avoid technical jargon unless the terms have been thoroughly defined. Another facilitation tip provided by an interviewee is to find and focus on common goals. What is the group trying to solve and achieve? This approach will help stakeholders avoid becoming too attached to a particular solution or pathway and instead focus on common, preferable outcomes.

## 4. Meet Communities Where They Are

In community work, there is a strong need for flexibility and an acknowledgement that no two communities are the same—and, thus, no two processes will be the same. Capacity building among community members is an important step toward achieving many of the goals outlined in this document.

**4.1 Build Knowledge**. Communities might be very well-versed on energy technologies, or they could just be starting the learning process. Getting all participants up to speed on the topic and associated benefits and challenges helps find common ground and ultimately develop solutions endorsed by all (Innes and Booher 2004). Provide the information the community needs to make well-informed decisions (Groundwork USA 2018). Depending on community members' experience, you might need to start at the beginning with an "Energy 101" workshop that describes technology and terminology basics.

> "Try, *'I might be telling you something you already know, and if so, please tell me.'*"

Give community members space and time to fully digest information. Encourage meetings without NREL between meetings with NREL. During meetings with NREL, use techniques that encourage participation. For

example, send out materials ahead of time to allow community members to process the information before the meeting. Because community members might not feel comfortable interrupting you, pause regularly for questions, feedback, and discussion. Another helpful practice is to give participants a few minutes to think independently before asking for participation. Be patient, and don't be afraid of silence.

> "Try, '*I'm going to give everyone 1 minute to think about this before we discuss*,' to help people not feel awkward about the silence."

If possible, offer help with technical assistance applications. If the community isn't ready or qualified for an application, could planning grants help? Inform community members of these opportunities. If it's in your power, ensure that groups that typically obtain less technical assistance receive communication about the opportunities, and help make the application process accessible (Conroy and Mastri 2021).

Additionally, don't meet only those directly participating in the technical assistance process where they are—also meet the broader community where they are. Develop a communication plan for reaching those not directly involved so that they can understand and learn from the technical assistance process as well. To broaden participation, you can "frame the technical assistance as professional development, which might encourage participation from those with less experience" (Conroy and Mastri 2021).

**4.2 Tailor Message Delivery**. Tailor communications to the individuals you are communicating with by considering and focusing on what the community finds important. The same solution likely has multiple benefits, so the conversation should be framed appropriately. In other words, focus on what's important to the community. For instance, if the community's focus is on energy security, that should be your focus as well. Reducing greenhouse gas emissions generally goes together with improving air quality; so, again, choose the focus that will resonate most with the community. Also consider message delivery. Should the presentation be data-driven, or would a storytelling approach be best?

Be mindful of language in your communications. Terms such as "energy independence," "agency," and "local resources" may better reflect community values in some rural communities than terms like "energy transition." Additionally, the pace of your speech matters, and you should match your pace to the pace of those you are working with. Finally, be thoughtful regarding language barriers and provide translations of materials whenever possible (Groundwork USA 2018). For instance, you might use Zoom's simultaneous translation feature.

**Principles in Practice**

NREL's work on the LA100 Equity Strategies project exemplifies several principles we have described. Procedural justice was operationalized by convening a steering committee of community-based organizations representing underserved neighborhoods and communities historically overburdened by the negative impacts of the energy system. Community meetings and listening sessions were held, in Spanish and in English, to hear many visions for what just energy transitions look like and how the community can get there.

**4.3 Be Mindful When Setting Meeting Agendas and Locations**. Spend time planning before each meeting, especially in the beginning of the process. Some communities find participating in the agenda planning process valuable, so consider creating the agenda with stakeholder input. Through a collaborative approach, create a timeline for NREL's engagement with the community with milestones, deadlines, and metrics for measuring success (ACS 2020).

> "The stakeholders wanted to participate in setting meeting agendas, so agenda items are now regularly solicited and incorporated in agenda planning."

As you plan, build in time for the community to ask questions, provide input, and digest the information you provide. Plentiful time should be dedicated to trust-building, as expressed by interviewees and echoed by Fisher and Ball (2003). Before moving into goal setting, early meetings with the community should build relationships with community members, an understanding of the community, and a shared understanding of the energy planning process.

Meeting locations matter. Equitable community work requires meeting community members where they are not just figuratively, but literally as well. Participation should be as easy as possible for community members. If meeting in person, find a central

location, or multiple locations, that will feel comfortable to locals, such as a library or school (Ayala, Drehobl, and Dewey 2021; ACS 2020; Bryson et al. 2012; Groundwork USA 2018). Additionally, to further minimize power differentials, as described in the previous section, make accommodations so that meetings are more accessible and choose meeting times and locations that prioritize lower-powered individuals. For example, you might want to provide food and childcare to participants or hold the meetings during the weekend (Groundwork USA 2018; Nasca, Changfoot, and Hill 2019). Ask your participants what would be best for them and let them know ahead of time that these services will be offered.

**4.4 Provide Compensation**. A key component of making participation as easy as possible is compensating under-resourced community members for their time (Ayala, Drehobl, and Dewey 2021; Conroy and Mastri 2021; Fisher and Ball 2003). NREL employees, community staff, and community-based organization employees are typically compensated for their time. Compensating community participants for whom it is not part of their job to support the process builds a more equitable process because participation is made easier and those with less time or resources can participate. Compensation can be accomplished in several ways: through a subcontract, honorarium, or by providing participants with gift cards.

## 5. Democratize Participation

The COVID-19 pandemic has impacted many aspects of community energy planning, and the virtual environment has created opportunities for the future.

> "Organizing a series of virtual, 1- to 2-hour meetings, every 2 weeks for several months worked well."

Making meaningful connections with community members can be challenging in a virtual environment. Virtual meetings need to be much shorter than typical in-person meetings to hold participants' attention. There are also equity concerns—some communities might not have easy access to computers or high bandwidth, in which case video calls might be challenging. The pandemic itself created specific challenges, as well. Schedules might be altered during the pandemic, and people might be more stressed, have less patience, and have less cognitive bandwidth for processing information. Thus, in virtual environments, and especially during the pandemic, rapport-building does not happen as naturally.

Some byproducts of the pandemic and virtual environments, however, have enhanced opportunities for more equitable processes. Virtual meetings can be more inclusive and reach a broader audience, which could be particularly true for community members responsible for childcare or elder care who do not have the ability to leave their homes as easily. Virtual meetings are also more inclusive for those working multiple jobs or who lack transportation options and might have difficulty traveling or attending in-person meetings.

Because virtual meetings need to be shorter, consider scheduling several meetings a couple weeks apart. Participants' attention spans can be maintained while helping to sustain momentum. These shorter meetings, spaced apart, provide the additional benefit of giving communities time to deliberate between meetings. You also must be more deliberate with rapport- and trust-building. Begin meetings with casual, non-energy-related conversation before moving on to the heavier topics.

> "I like to have the community manage the video calls. If they decide to record the calls, they have the recordings—not me."

Be mindful of nontraditional working hours and pursue strategies that democratize participation. Asynchronous scheduling of meetings might be helpful for community members. You can record presentations or meetings[1] and stream them for a certain time frame (with permission, of course). You can also allow participants to join meetings via phone and provide high- and low-bandwidth options (e.g., have phone call question-and-answer sessions). Try to then be available via email, phone, or one-on-one meetings for follow-up questions. You might need to be available more frequently, but more community members will be able to participate, creating a more equitable process. Democratization could also include non-meeting approaches, such as polling, questionnaires, and QR codes to link participants to websites where they can share feedback.

1 Be careful with recording meetings, however, because it can result in lower levels of participation. Community members may be concerned about attribution. Recorded meetings also create a record that could be accessed through the Freedom of Information Act (FOIA). It might be best to instead record presentations and stream those for community members to watch when they are able to.

## Conclusion

In this document, we outlined five best practices for engaging in community energy planning:

1. ***Do your homework*** and build a historical, cultural, social, and structural understanding of the community before meetings begin. Questions to consider:
   - Who are the stakeholders, and what is their expertise?
   - Who has historically been marginalized in this community?
   - What type of utility does the community have?
   - What types of planning documents have they established?
2. ***Be humble, authentic, and honest*** by listening more than you talk, by acknowledging your expertise and the expertise of community members, and by being straightforward about what community members can expect from the process. Questions to consider:
   - How can we leverage and prioritize stakeholder expertise?
   - How can we better understand the community?
   - What types of data and analysis can NREL provide for the community?
3. ***Respect and support community agency*** by codeveloping solutions and leveling the playing field. Questions to consider:
   - What are the community's goals, and how can their needs be centered?
   - How will we include community members in every step of the process?
   - What capacities can we build in the community?
   - How will we equalize and broaden power across the stakeholders?
4. ***Meet the community where they are***, both figuratively and literally, by making participation as easy as possible. Questions to consider:
   - How will we compensate under-resourced community members for contributing their expertise?
   - What information do community members need to meaningfully participate in the planning process?
   - How can the data and solutions be presented in a way that prioritizes the community's goals?
5. ***Democratize participation*** and leverage virtual and asynchronous meeting spaces. Questions to consider:
   - Whose voices are most likely to be heard during meetings?
   - How can other voices be included and amplified in virtual and in-person environments?

The themes presented here are interrelated and should not be thought of independently; for instance, respecting community agency requires elements of the other best practices. A cultural, social, and structural understanding of the community is required. An understanding of the community's expertise and how capacity can be built within the community can then be developed. Respecting community agency also requires acknowledging the voices that are typically underrepresented in community planning processes and elevating those voices.

All communities are different, which makes flexibility critical when working with communities. These best practices and the strategies used in community energy planning should be tailored to the community and stakeholders that you are working with to achieve the greatest impact and success in supporting data-driven community energy planning.


### Acknowledgements

We would like to express our deepest gratitude to those at NREL who contributed time and expertise in developing these best practices,



Community engagement on renewable energy siting at the Islesboro, Maine Energy Jamboree. Photo by Bryan Bechtold, NREL 69875

including Mary Hallisey, Alison Holm, Tony Jimenez, Eric Lockhart, Gail Mosey, and Sherry Stout—Thank you for sharing your insights with us.

## Additional Resources

In addition to the references in this document, readers can use the following resources for further learning.

**Resources for meeting engagement, including planning and facilitation techniques:**

- DOE. 2010. *Community Greening: How to Develop a Strategic Energy Plan.* DOE/GO-102010-2826. Golden, CO: National Renewable Energy Laboratory. **https://www.nrel.gov/docs/fy10osti/45652.pdf**.
- National Oceanic and Atmospheric Administration, Office for Coastal Management. 2021. "Meeting Engagement Tools." **https://coast.noaa.gov/digitalcoast/training/met.html**.

**Useful lists:**

- Ayala, Roxana, Ariel Drehobl, and Amanda Dewey. 2021. *Fostering Equity Through Community-Led Clean Energy Strategies.* Washington, D.C.: American Council for an Energy-Efficient Economy. **https://aceee.org/research-report/u2105**.
  - Includes community-based organizations working on clean energy.
- Groundwork USA. 2018. "Best Practices for Meaningful Community Engagement: Tips for Engaging Historically Underrepresented Populations in Visioning and Planning." **https://groundworkusa.org/wp-content/uploads/2018/03/GWUSA_Best-Practices-for-Meaningful-Community-Engagement-Tip-Sheet.pdf**.
  - Describes individuals who might be underrepresented in stakeholder meetings and common reasons why they are underrepresented.

**Guidelines relevant to community energy planning for local governments and community organizations:**

- Abt Associates. 2021. "Advancing Equity Through Technical Assistance." **https://www.abtassociates.com/files/insights/reports/2021/advancing-equity-through-ta-final.pdf**.
- American Cities Climate Challenge, Renewables Accelerator. 2022. "Helping U.S. Cities Advance Ambitious Renewable Energy Goals." **https://cityrenewables.org**.
- **Capire:** Numerous publications (e.g., guidelines, toolkits) on community engagement.
- Carbon Neutral Cities Alliance. 2016. *Energy System Transformation Playbook: A Step-by-Step Guide for Municipal Governments.* **https://carbonneutralcities.org/wp-content/uploads/2018/05/02-CNCA-Energy-System-Transformation-Playbook-FINAL-REVISED.pdf**.
- ChangeLab Solutions. 2022. "Planning: Prioritizing Health and Equity in Planning." **https://www.changelabsolutions.org/healthy-neighborhoods/planning-collection**.
- Curti, Julie, Farrah Andersen, and Kathryn Wright. 2018. *A Guidebook on Equitable Clean Energy Program Design for Local Governments and Partners.* The Cadmus Group and Urban Sustainability Directors Network. **https://cadmusgroup.com/papers-reports/a-guidebook-on-equitable-clean-energy-program-design-for-local-governments-and-partners.**
- González, R. *Community-Driven Climate Resilience Planning: A Framework, Version 2.0.* National Association of Climate Resilience Planners. **https://www.nacrp.org.**
- Zaleski, Sarah and Molly Lunn. 2013. *Guide to Community Energy Strategic Planning.* U.S. Department of Energy. **https://www.energy.gov/eere/slsc/guide-community-energy-strategic-planning**.

**Resources geared toward work with indigenous communities:**

- Fisher, Philip A. and Thomas J. Ball. 2003. "Tribal Participatory Research: Mechanisms of a Collaborative Model." *American Journal of Community Psychology* 32(3-4): 207–216. **https://doi.org/10.1023/B:AJCP.0000004742.39858.c5**.
  - Describes Tribal history since 1492 with resources for deeper learning, as well as tribal participatory research, or TPR.
- Robinson, Catherine J. and Tabatha J. Wallington. 2012. "Boundary Work: Engaging Knowledge Systems in Co-Management of Feral Animals on Indigenous Lands." *Ecology and Society* 17(2). **https://doi.org/10.5751/ES-04836-170216**.
  - Describes boundary work.
- Ford, James D., Ellie Stephenson, Ashlee Cunsolo Willox, Victoria Edge, Khosrow Farahbakhsh, Christopher Furgal, Sherilee Harper, Susan Chatwood, Ian Mauro, Tristan Pearce, et al. 2016. "Community-Based Adaptation Research in the Canadian Arctic." *WIREs Climate Change* 7(2): 175–191. **https://doi.org/10.1002/wcc.376**.
  - Describes community-based adaptation.
- Hill, Rosemary, Chrissy Grant, Melissa George, Catherine J. Robinson, Sue Jackson, and Nick Abel. 2012. "A Typology of Indigenous Engagement in Australian Environmental Management: Implications for Knowledge Integration and Social-Ecological System Sustainability." *Ecology and Society* 17(1): 23. **https://doi.org/10.5751/ES-04587-170123**.
- Describes indigenous ecological knowledge, or IEK.

**Cross-lab collaboration opportunities:**

- Cross-laboratory state, local, and tribal project information exchange, which is a quarterly cross-lab meeting to help coordinate overlapping work and share lessons learned.
- If a community does not fit into one program, principal investigators (PIs) can identify other programs to help get them support.

Finally, several NREL resources, tools, and data sets are available that can be used to incorporate equity into clean energy planning. Table 1 presents some of those tools. Additional data sets and tools can be found on the **Energy Analysis Data and Tools** web page, on the **List of Data and Tools** web page, on the **NREL Data Catalog**, and on the State, Local, & Tribal Governments **Data and Tools** web page. Workday Learning provides training on stakeholder engagement and other topics related to diversity, equity, inclusion, and belonging.

Table 1. NREL Tools Useful for Community Energy Planning

| Name and Link | Description | Resolution | Technology |
|---|---|---|---|
| *Publicly Available* | | | |
| Annual Technology Baseline (ATB) | Access modeling input assumptions for energy technologies and transportation | Site-specific, state, national | Battery storage, coal, concentrating solar power (CSP), geothermal, hydropower, natural gas, nuclear, PV, wind |
| Cambium | Access hourly emission, cost, and operational data for modeled futures of the U.S. electric sector | State, national | Battery storage, biomass, coal, CSP, geothermal, hydropower, natural gas, nuclear, PV, oil-gas-steam, pumped hydroelectric storage, wind |
| ComStock and ResStock | Model the housing and commercial building stock and identify which building stock improvements save the most energy and money | Public use microdata areas, state | Building efficiency |
| Engage Energy Modeling Tool | Perform production cost and capacity expansion modeling | Local, state, national, international | Supply and storage technologies with various demand, transmission, and conversion inputs |
| Equitable Energy Investment Prioritization Data Set | Overlay environmental hazard and sociodemographic equity metrics with renewable energy development potential metrics | County | Geothermal, hydropower, PV, wind |
| Jobs and Economic Development Impact (JEDI) Models | Estimate economic impacts and job creation potential of power generation and fuel production | Site-specific, state | Coal, CSP, geothermal, marine, hydrokinetic, natural gas |
| Low-Income Energy Affordability Data (LEAD) Tool | Map or pull data sets with energy burden, building age and type, heating fuel type, and occupation type (i.e., renter- versus owner-occupied); can map and compare areas | Site-specific, state, national | Coal, fuel oil, natural gas, wood, PV |
| Probabilistic Resource Adequacy Suite (PRAS) | Analyze the resource adequacy of bulk power systems | Regional, continental | Electric power systems |
| PVWatts® | Estimate the energy and cost performance of PV installations | Site-specific | PV |
| Regional Energy Deployment System (ReEDS) | Simulate generation and transmission within the bulk power system through 2050 | Balancing area | Fossil fuels, nuclear, renewable energy |
| Renewable Energy Integration and Optimization (REopt) Tool | Evaluate economic viability and optimal size of renewable energy technologies; estimate system sustainability during grid outage | Site-specific, | Battery storage, PV, wind |
| Renewable Energy Potential (reV) Model | Assess renewable energy resource potential and cost at varying temporal resolutions | Site-specific, state, national, international | CSP, PV, wind |
| Scenario Planner | Build, view, and compare the impacts of different energy strategies for state and local planning | County, state | Fossil fuels, renewable energy, sustainable transportation |
| Standard Scenarios | Simulate U.S. power sector scenarios considering various factors | National | Battery storage, CSP, geothermal, hydropower, nuclear, PV, wind |
| State and Local Planning for Energy (SLOPE) Platform | Map technical potential and cost for several renewable energy technologies; map energy consumption, energy efficiency, transportation, and socio-demographics | County, state | Fossil fuels, renewable energy, sustainable transportation |
| System Advisor Model (SAM) | Calculate financial models and simulate the performance of renewable energy systems | Site-specific, | Battery storage, biomass, CSP, geothermal, marine, PV, wind |
| Tribal Energy Atlas | Map resource potential and installed energy on tribal lands; access data on infrastructure, environment, energy efficiency, and electricity and natural gas prices | Tribal lands, federal lands, county, state | Biomass, biomethane, geothermal, hydropower, PV, and wind |

| Name and Link | Description | Resolution | Technology |
|---|---|---|---|
| *Not Publicly Available* | | | |
| Resource Planning Model (RPM) | Perform capacity expansion modeling and production cost simulations; determine the solution with the lowest cost | State, national | PV, wind |
| Transportation Energy & Mobility Pathway Options™ (TEMPO) | Model future pathways related to the transportation system at hourly temporal resolutions; estimate affordability and infrastructure use impacts; assess energy use and emissions implications | County, state | Transportation |

## References


ACS. 2020. *12 Tips for Community Engagement.* **https://www.advocacyandcommunication.org/wp-content/uploads/2020/05/ACS_Community_Engagement_Tips.pdf**.

Aloise-Young, Patricia A., Elizabeth C. Ross, Ellyn M. Dickmann, Jennifer E. Cross, Daniel Zimmerle, and MaryEllen C. Nobe. 2021. "Overcoming Barriers to Direct Current Power: Lessons Learned From Four Commercial Building Case Studies." *Energy Efficiency* 14: 10. **https://doi.org/10.1007/s12053-020-09920-1**.

Arnstein, Sherry R. 1969. "A Ladder of Citizen Participation." *Journal of the American Institute of Planners* 35(4): 216–224. **https://doi.org/10.1080/01944366908977225**.

Ayala, Roxana, Ariel Drehobl, and Amanda Dewey. 2021. *Fostering Equity Through Community-Led Clean Energy Strategies.* Washington, D.C.: American Council for an Energy-Efficient Economy. **https://aceee.org/research-report/u2105**.

Beierle, Thomas C. 2002. "The Quality of Stakeholder-Based Decisions." *Risk Analysis* 22(4): 739–749. **https://doi.org/10.1111/0272-4332.00065**.

Bidwell, David. 2016. "Thinking Through Participation in Renewable Energy Decisions." *Nature Energy* 1: 16051. **https://doi.org/10.1038/nenergy.2016.51**.

Brown, Greg and Sean Yeong Wei Chin. 2013. "Assessing the Effectiveness of Public Participation in Neighborhood Planning." *Planning, Practice & Research* 28(5): *563–588.* **http://dx.doi.org/10.1080/02697459.2013.820037**.

Bryson, John M., Kathryn S. Quick, Carissa Schively Slotterback, and Barbara C. Crosby. 2012. "Designing Public Participation Processes." *Public Administration Review* 73(1). **https://doi.org/10.1111/j.1540-6210.2012.02678.x**.

Chief, Karletta, Alison Meadow, and Kyle Whyte. 2016. "Engaging Southwestern Tribes in Sustainable Water Resource Topics and Management." *Water* 8(8): 350. **https://doi.org/10.3390/w8080350**.

Conroy, Kara and Annalisa Mastri. 2021. "Developing Equitable Training and Technical Assistance." Mathematica. **https://aspe.hhs.gov/reports/developing-equitable-training-ta**.

Curren, Ryan, Julie Nelson, Dwayne S. Marsh, Simran Noor, and Nora Liu. 2016. *Racial Equity Action Plans: A How-To Manual.* Berkeley, CA: Haas Institute for a Fair and Inclusive Society, University of California. **https://www.racialequityalliance.org/wp-content/uploads/2016/11/GARE-Racial-Equity-Action-Plans.pdf**.

DOE (U.S. Department of Energy). 2010. *Community Greening: How to Develop a Strategic Energy Plan.* DOE/GO-102010-2826. Golden, CO: National Renewable Energy Laboratory. **https://www.nrel.gov/docs/fy10osti/45652.pdf**.

EIA (U.S. Energy Information Administration). 2021. "Annual Electric Power Industry Report, Form EIA-861 Detailed Data Files: Utility Data." **https://www.eia.gov/electricity/data/eia861**.

———. 2019. "Investor-Owned Utilities Served 72% of U.S. Electricity Customers in 2017." August 15, 2019. **https://www.eia.gov/todayinenergy/detail.php?id=40913**.

Ewing, Jennifer, and Don Knapp. 2009. *Sustainability Planning Toolkit: A Comprehensive Guide to Help Cities and Counties Develop a Sustainability Plan.* ICLEI -Local Governments for Sustainability USA. **https://www.hud.gov/sites/documents/20399_iclei_sustainabil.pdf**.

Fisher, Philip A., and Thomas J. Ball. 2003. "Tribal Participatory Research: Mechanisms of a Collaborative Model." *American Journal of Community Psychology* 32(3-4): 207–216. **https://doi.org/10.1023/B:AJCP.0000004742.39858.c5**.

Gattiker, Thomas F., and Craig R. Carter. 2010. "Understanding Project Champions' Ability to Gain Intra-Organizational Commitment for Environmental Projects." *Journal of Operations Management* 28(1): 72–85. **https://doi.org/10.1016/j.jom.2009.09.001**.

GCoM. 2022. "Global Covenant of Mayors for Climate & Energy – Home." **https://www.globalcovenantofmayors.org**.

González, Rosa E. 2020. *The Spectrum of Community Engagement to Ownership.* Salinas, CA: Facilitating Power. **https://www.facilitatingpower.com/spectrum_of_community_engagement_to_ownership**.

Gross, Catherine. 2007. "Community Perspectives of Wind Energy in Australia: The Application of a Justice and Community Fairness Framework to Increase Social Acceptance." *Energy Policy* 35(5): 2727–2736. **https://doi.org/10.1016/j.enpol.2006.12.013**.

Groundwork USA. 2018. "Best Practices for Meaningful Community Engagement: Tips for Engaging Historically Underrepresented Populations in Visioning and Planning." **https://groundworkusa.org/wp-content/uploads/2018/03/GWUSA_Best-Practices-for-Meaningful-Community-Engagement-Tip-Sheet.pdf**.

Heffron, Raphael J., and Darren McCauley. 2017. "The Concept of Energy Justice Across the Disciplines." *Energy Policy* 105: 658–667. **http://dx.doi.org/10.1016/j.enpol.2017.03.018**.

HHS (U.S. Department of Health and Human Services). 2019. "Federal Restrictions on Lobbying for HHS Financial Assistance Recipients." **https://www.hhs.gov/grants/grants/grants-policies-regulations/lobbying-restrictions.html**.

Hicke, J.A., S. Lucatello, L.D. Mortsch, J. Dawson, M. Domínguez Aguilar, C.A.F. Enquist, E.A. Gilmore, et al. 2022. "Chapter 14: North America." In *Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.* Edited by H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, and B. Rama. Cambridge University Press. In Press.

ICLEI (Local Governments for Sustainability). 2021. "Our Members." **https://www.iclei.org/en/members.html**.

Innes, Judith E. and David E. Booher. 2004. "Reframing Public Participation: Strategies for the 21st Century." *Planning Theory & Practice* 5(4): 419–436. **https://doi.org/10.1080/1464935042000293170**.

International Association for Public Participation. 2018. "Spectrum of Public Participation." **https://www.iap2.org/resource/resmgr/pillars/Spectrum_8.5x11_Print.pdf**.

IPCC. 2022. "Summary for Policymakers." Edited by H.-O. Pörtner, D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, and A. Okem. In *Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Edited by H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, and B. Rama. Cambridge University Press. In Press.

Jenkins, Kirsten, Darren McCauley, Raphael Heffron, Hannes Stephan, and Robert Rehner. 2016. "*Energy Justice: A Conceptual Review.*" *Energy Research & Social Science* 11: 174–182. **http://dx.doi.org/10.1016/j.erss.2015.10.004**.

Liebe, Ulf, Anna Bartczak, and Jürgen Meyerhoff. 2017. "A Turbine is Not Only a Turbine: The Role of Social Context and Fairness Characteristics for the Local Acceptance of Wind Power." *Energy Policy* 107: 300–308. **http://dx.doi.org/10.1016/j.enpol.2017.04.043**.

Nasca, Tessa F., Nadine Changfoot, and Stephen D. Hill. 2019. "Participatory Planning in a Low-Income Neighbourhood in Ontario, Canada: Building Capacity and Collaborative Interactions for Influence." *Community Development Journal* 54(4): 622–642. **https://doi.org/10.1093/cdj/bsy031**.

National Center for Cultural Competence. 2004. *Bridging the Cultural Divide in Health Care Settings: The Essential Role of Cultural Broker Programs*. Georgetown University Center for Child and Human Development, Georgetown University Medical Center. **https://nccc.georgetown.edu/documents/Cultural_Broker_Guide_English.pdf**.

National Community-Based Organization Network. 2003. "What is a CBO?" University of Michigan School of Public Health. **https://sph.umich.edu/ncbon/about/whatis.html**.

National Conference of State Legislatures. 2021. "Limiting Public Funds for Lobbying." **https://www.ncsl.org/research/ethics/50-state-chart-limits-on-public-funds-to-lobby.aspx**.

Romero-Lankao, Patricia, and Erin Nobler. 2021. *Energy Justice: Key Concepts and Metrics Relevant to EERE Transportation Projects*. Golden, CO: National Renewable Energy Laboratory. NREL/MP-5400-80206. **https://www.nrel.gov/docs/fy21osti/80206.pdf**.

Sierra Club. 2022. "Check Out Where We Are Ready For 100%." **https://www.sierraclub.org/ready-for-100/map**.

Sovacool, Benjamin K., David J. Hess, Roberto Cantoni, Dasom Lee, Marie Claire Brisbois, Hans Jakob Walnum, Ragnhild Freng Dale, Bente Johnsen Rygg, Marius Korsnes, Anandajit Goswami, Shailly Kedia, and Shubhi Goel. 2022. "Conflicted Transitions: Exploring the Actors, Tactics, and Outcomes of Social Opposition Against Energy Infrastructure." *Global Environmental Change* 73: 102473. **https://doi.org/10.1016/j.gloenvcha.2022.102473**.

Sovacool, Benjamin K., Mari Martiskainen, Andrew Hook, and Lucy Baker. 2019. "Decarbonization and Its Discontents: A Critical Energy Justice Perspective on Four Low-Carbon Transitions." *Climate Change* 155: 581–619. **https://doi.org/10.1007/s10584-019-02521-7**.

Sovacool, Benjamin K., Raphael J. Heffron, Darren McCauley, and Andreas Goldthau. 2016. "Energy Decisions Reframed as Justice and Ethical Concerns." Nature Energy 1: 16024. **https://doi.org/10.1038/nenergy.2016.24**.

Stubben, Jerry D. 2001. "Working With and Conducting Research Among American Indian Families." *American Behavioral Scientist* 44(9): 1466–1481. **https://doi.org/10.1177/0002764201044009004**.

*This work was authored by the Joint Institute for Strategic Energy Analysis (JISEA), operated by Alliance for Sustainable Energy, LLC, for the U.S. Department of Energy (DOE) under Contract No. DE-AC36-08GO28308. Funding provided by the JISEA Sustainable Communities Catalyzer. The views expressed herein do not necessarily represent the views of the DOE, the U.S. Government, or sponsors.*

NREL Transforming ENERGY

COLORADOSCHOOLOFMINES EARTH • ENERGY • ENVIRONMENT

COLORADO STATE UNIVERSITY

Massachusetts Institute of Technology

Stanford University

University of Colorado Boulder

JISEA is operated by the Alliance for Sustainable Energy, LLC, on behalf of the U.S. Department of Energy's National Renewable Energy Laboratory, the University of Colorado-Boulder, the Colorado School of Mines, Colorado State University, Massachusetts Institute of Technology, and Stanford University.

NREL/TP-6A50-82937 • August 2022

*Cover photo by John De La Rosa, NREL 28048*

JISEA.org | @JISEA1

JISEA Joint Institute for Strategic Energy Analysis