# Enabling Equitable Adoption of Clean Energy Technologies and Practices Through a Collaborative Approach

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**ABSTRACT**

The federal Justice40 Initiative directs that at least 40% of the overall benefits of certain investments flow to disadvantaged communities (DACs), that all federal programs covered by Justice40 consult community stakeholders to determine the program benefits, and that the flow of benefits to DACs is tracked and reported. Unequal distribution of benefits, in terms of access to clean energy research design, development, and deployment, can burden some communities more than others and produce both negative health and environmental impacts, including higher rates of pollution, and higher energy burdens and insecurities in DACs. Decarbonizing the built environment can improve health and quality of life and spur economic opportunities.

This paper highlights the work of the Department of Energy-funded Systems Technology Energy Equity and Justice engagement project, which aims to enable the equitable development, deployment, and adoption of clean energy technologies and practices through a collaborative approach that joins community, nonprofit, academia, and industry leaders with national laboratory researchers. The paper features key strategies, guidance, and practical pathways to incorporate energy justice and equity practices into buildings-focused technology deployment activities through stakeholder identification and engagement, outreach, and communications, as well as developing methods for tracking and reporting the flow of benefits to DACs and target building sectors. The findings presented in this paper will be a reference for researchers, building owners, utilities, programs, and others involved in the deployment of energy-saving technology in buildings, and those who want to learn more about holistically incorporating energy justice and equity practices into their work.

## Introduction

Throughout modern history, low-income communities and communities of color have borne a disproportionate burden of pollution, extreme weather events, and other environmental consequences resulting from the fossil-fuel-dependent energy system. Consequently, these communities are poised to gain the most from the energy transition, including increased access to renewable energy and clean energy as well as energy efficient and decarbonizing technologies. (DOE Office of Energy Efficiency & Renewable Energy 2024). Prioritizing energy justice and equity (EJE) policies, programs, and investments is crucial for enabling a fair distribution of benefits and burdens within the energy system. This acknowledges that underserved

communities, already burdened by the current energy system, should not bear potential negative consequences of the energy transition, which requires for substantial financial and resource investment. This work aims to integrate the DOE National blueprint for decarbonizing the buildings sector "cross-cutting goals" of equity, affordability, and resilience into deployment efforts for commercial and residential buildings (U.S. Department of Energy 2024). Some of the overarching goals of EJE-focused work are to address the social, economic, and health-related challenges faced by communities disproportionately affected by the energy system, and simultaneously empower them to actively shape the processes governing energy systems and related research, design, development, and deployment programs (Rajpurohit, Said and Kennedy. 2022; Puig-Santana, Johnston and Hickcox 2024). By incorporating energy justice and equity recommended practices into deployment programs, it is more likely that the benefits of the programs will reach disadvantaged communities (DACs) or disinvested buildings.

## Energy Justice and Equity in the Department of Energy

The projects presented in this paper were designed and implemented by teams within the national laboratory system, with funding from the Department of Energy (DOE). As such, the current federal policy landscape has had an integral role in informing the program design and methodology. For instance, two recent key executive orders (EOs) issued by President Biden have been particularly influential: EO 14008, "Tackling the Climate Crisis at Home and Abroad" (issued in January 2021) (Executive Office of the President 2021), and EO 14096, "Revitalizing Our Nation's Commitment to Environmental Justice for All" (issued in April 2023) (Executive Office of the President 2023). Listed below are the specific directives within these EOs that served as guidelines for the team's EJE work.

EO 14008:

- Established the Justice40 Initiative (J40), which directs that at least 40% of the overall benefits of certain federal investments to flow to disadvantaged communities.
- J40 "covered programs" are characterized as federal investments in programs that address the following subjects: climate change, clean energy and energy efficiency, clean transit, affordable and sustainable housing, training and workforce development, remediation and reduction of legacy pollution, and the development of critical clean water and wastewater infrastructure. (The projects presented in this paper fall primarily under federal investments in clean energy and energy efficiency.)
- Directs covered programs to consult community stakeholders to co-develop program benefits, and to track and report the flow of benefits to DACs.

EO 14096:

- Established a policy to pursue a whole-of-government approach to environmental justice.
- Recognizes and addresses disproportionate and adverse environmental and health impacts resulting from federal activities. This includes identifying and mitigating historical inequities and systemic barriers related to federal policies and programs through meaningful engagement of individuals and communities that might be impacted by federal activities.

- Enhances equitable access to human health and environmental benefits for communities with environmental justice concerns and promotes the creation of high-quality, well-paying jobs within these communities.

Many DOE programs are designated as J40 covered. Consequently, DOE has made it a priority to incorporate the tenets of EJE into their programs and overall goals. Energy justice as a framework draws on both the deep scholarly and grassroots traditions of environmental justice approaches and principles (Jenkins 2018). DOE defines energy justice as "the goal of achieving equity in both the social and economic participation in the energy system, while also remediating social, economic, and health burdens on those disproportionately harmed by the energy system" (DOE Office of Energy Justice and Equity 2022). Furthermore, DOE has adopted four tenets of energy justice: procedural justice, distributive justice, recognition justice, and restorative justice (see Table 1) (DOE Office of Energy Justice and Equity 2022; Sovacool and Dworkin 2015; Romero-Lankao and Nobler 2021; DOE Office of Energy Justice and Equity 2022; Baker, DeVar and Prakash 2019; Walker and Day 2012; Ruano-Chamorro, Gurney and Cinner 2021; Hazrati and Heffron 2021). A fifth tenet of energy justice, cosmopolitan justice, has emerged within energy justice literature in recent years. Together, these five energy justice tenets, detailed in Table 1, can be used by researchers, engineers, designers, practitioners, and, in the case of this paper's subject, anyone who is working to promote use of clean energy technologies in buildings (Puig-Santana, Johnston and Hickcox 2024).

Table 1. The Five Tenets of Energy Justice and Equity

| | |
|---|---|
| Procedural Justice | Assuring "meaningful participation in decision-making" |
| Distributive Justice | Assuring "the benefits and burdens of DOE-funded projects are equitably distributed" |
| Recognition Justice | "Understanding the history and context of DOE-funded project development" |
| Restorative Justice | "Facilitating healing and harmony through DOE-funded project activity" |
| Cosmopolitan Justice | Identifying and addressing inequities throughout the entire life cycle of the energy system (Romero-Lankao and Nobler 2021; Heffron and McCauley 2017; McCauley, et al. 2019) |

Content in table reproduced with permission from the authors of the *Guidance for Integrating Energy Justice and Equity in Building Technology Deployment Programs* (Puig-Santana, Johnston and Hickcox 2024).

An ample project area in which the above energy justice tenets, and the previously mentioned EO directives, can each be integrated into DOE's work is through the conduit of technology campaigns (TCs), such as the Integrated Lighting Campaign (ILC), which promote the adoption of clean energy technologies in buildings. In most cases, DOE TCs have three main goals:

- Accelerate the adoption of efficient and electrified building technologies.
- Provide technical assistance (TA), resources, and guidance on implementation of key strategies.

- Achieve significant greenhouse gas emission reductions and energy savings for building owners.

DOE TC teams and their partners aim to meet the broader energy, equity, and market transformation goals and priorities of the offices that manage them (see Figure 1). To transform the market in a just and equitable way, the federal government goals of advancing climate action and economic health need to be aligned with the program policies of J40. Programs will need to create the conditions for increased participation from historically underrepresented communities in solutions. In the case of TCs, this means aligning with the goals of the DOE Commercial Buildings Integration (CBI) program as well as the Building Technologies Office (BTO) and the Office of Energy Efficiency and Renewable Energy. Together with DOE's EJE goals and J40 targets, the goals above can serve as a compass for TC goals and activities.

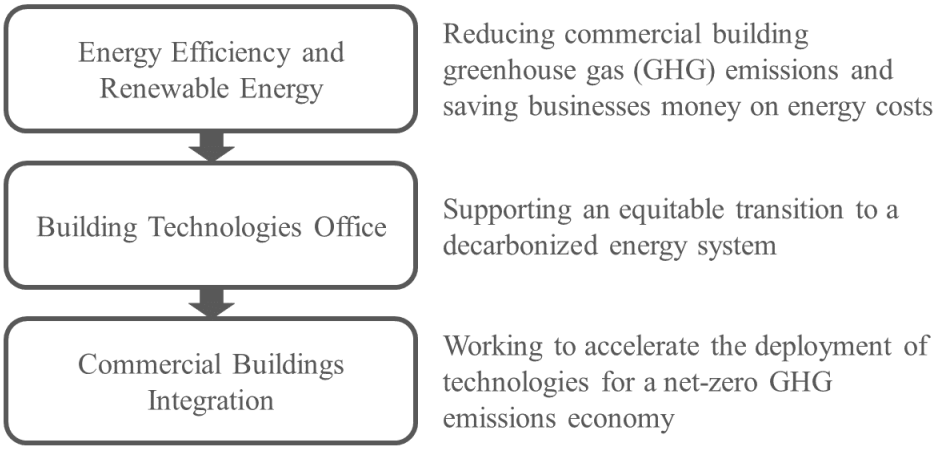


Figure 1. Goals and priorities of the DOE offices that oversee many technology campaigns. *Source:* PNNL.

## Energy Justice and Equity in Buildings and Technology Deployment: Materials Developed and Barriers Identified

In 2021, Pacific Northwest National Laboratory (PNNL) launched a project to develop practical guidance for those working on building technology deployment programs. The project's goal was to address the lack of a specific methodology for calculating the percentage of benefits reaching DACs or a set of practical steps for applying J40 to BTO deployment programs. The project studied existing programmatic frameworks for improving equitable outcomes for DACs, resulting in a guidance document for integrating EJE in building technology deployment programs, titled *Guidance for Integrating Energy Justice and Equity in Building Technology Deployment Programs: Tracking, Reporting, and Maximizing the Flow of Benefits from Building System Technology Deployment Activities to Disadvantaged Communities and Target Sectors,* and a supplemental reporting tool called the Energy Justice and Equity in Building Energy Systems Technology (EJE-BEST) deployment and reporting tool (Puig-Santana, Johnston and Hickcox 2024; Puig-Santana, Johnston and Hickcox EJE-BEST 2024)[1].

[1] https://www.pnnl.gov/projects/energy-equity/deployment-programs

While developing the tool and guidance document, the team found specific obstacles to aligning commercial building deployment programs with J40 goals. For instance, OMB M-21-28*, Interim Implementation Guidance for the Justice40 Initiative,* states that "each agency should establish a methodology for calculating the benefits that a) flow from each applicable covered program and b) accrue in DACs from each covered program" (Young, Mallory and McCarthy 2021). While there are many indexes used to understand EJE, such as energy burden, insecurity, poverty, or vulnerability, they are primarily residentially focused and cannot be easily applied to commercial, industrial, or multi-family building. Due to the lack of metrics or indexes focused on commercial buildings, further research on EJE in commercial buildings is necessary.

Determining how J40 benefits reach communities through commercial buildings is challenging. Therefore, an essential step to incorporating EJE into such programs is identifying the specific building types, typologies, or sectors capable of realizing J40 benefits for communities.

A building's geographical location within a DAC is not a reliable indicator that program benefits will directly reach the community. In simpler terms, if a commercial building receives a clean energy installation situated near or within a DAC, it does not automatically follow that the benefits will go directly to the adjacent community. Unfortunately, some predatory businesses may intentionally target DACs, such as merchant cash advance companies and payday loan businesses. The following sections detail strategies to overcome these barriers and bridge the gap between J40 guidance and deployment programs for commercial buildings.

## Methodologies and Recommended Practices

As outlined by Rajpurohit and others, a "just energy system" is one that seeks to remediate the burdens on those who have been disproportionately harmed by the energy system by giving them an opportunity to influence, and participate in, the research design, development, and deployment processes, and ultimately assure that benefits are distributed equitably (Rajpurohit, Said and Kennedy 2022). Additionally, integrating equity into energy technology deployment requires recognition of how underserved communities have historically experienced a disproportionate burden of the adverse impacts of the wider energy system (environmental degradation from energy infrastructure, hazardous jobs in local fossil industries, energy insecurity, etc.), and have further been excluded from significantly benefiting from efforts to improve said system. Addressing these inequities through distributive justice involves designing program to: (1) align the program's intended and actual benefits, (2) identifying target sectors, and (3) plan and track benefits distribution to those target sectors. The following subsections describe each step in more detail. Within this research project, the team employed these strategies with a focus on J40 criteria. To determine the flow of J40 benefits through the program, teams must track the program goals (i.e., benefits to end users or stakeholders), how these benefits are flowing through the program, and to whom are they flowing (i.e., DACs or target sectors) (Puig-Santana, Johnston and Hickcox 2024). The underlying intention is to assure that programs designed to benefit underserved communities (or in the context of J40—DACs) are effectively and efficiently reaching those communities and producing tangible and direct results.

Tracking the benefits that reach DACs is a critical endeavor with far-reaching implications. By tracking the benefits of our projects and programs, we validate the effectiveness and fairness of our initiatives to lessen disparities across buildings and the communities they impact. Tracking the benefits that reach DACs is not just a bureaucratic exercise; it's a fundamental step toward a more equitable and sustainable future.

The PNNL team proposed a methodology for calculating the covered program benefits accruing to target sectors and DACs within the guidance document, and that approach is discussed in this paper along with many strategies and lessons learned from this project. The first steps to calculating program benefits include:

(1) Aligning program benefits and goals to J40 priorities.

(2) Mapping the flow of benefits through the project.

(3) Identifying the target sectors to whom the benefits should be flowing.

While this project was funded by CBI and therefore has a focus on commercial building spaces, the outcomes from the work include strategies such as stakeholder engagement and outreach strategies and metrics that could be applied for reporting on the J40 Initiative, all of which could be applied by teams working with other building types or other applications.

**Align Program Goals and Benefits**

The first step to trace the flow of benefits from programs to DACs via target building sectors is to identify the program's corresponding J40 goals. These goals are in sync with the priorities outlined in the J40 Initiative and could incorporate additional priorities set by sponsors or stakeholders. The program goal is typically synonymous with the program benefit, as the program strives to achieve these objectives within the target sectors or stakeholder groups, enabling them to reap the advantages of technology deployment (Puig-Santana, Johnston and Hickcox EJE-BEST 2024). To evaluate whether a program is equitable, teams should first identify which J40 Initiative the program can support, then adjust program measures to align with those goals. Once the program benefits have been aligned with the priorities of the J40 Initiative and other EJE goals, they are referred to as "aligned benefits."

**Map the Flow of Benefits Through Project or Program**

After identifying aligned benefits, teams must determine which program components (activities or sub-tasks of a program with their own unique outcomes) will yield the most substantial impact. Doing so will help them to effectively allocate program resources. Program components within BTO TCs typically include stakeholder engagement, TA, a recognition program, knowledge development and sharing, project management, and team travel.

In the context of DOE programs and beyond, aligning with the J40 Initiative requires tracking how funding and resources flow through each component, and support J40 goals. Therefore, teams should map whether expenditures on each program component result in direct, indirect, unknown, or no outcomes for the aligned J40 goals. For example, time or resources spent on stakeholder engagement, or energy advising, may directly impact a TC's goal to accelerate adoption of clean energy technologies, while time or resources spent on a recognition

program would not directly contribute to adoption because that program recognizes stakeholders who have already adopted the technology. Once the direct flow between goals and benefits has been determined, the team can move forward to tracking benefit-flow to target sectors (Puig-Santana, Johnston and Hickcox 2024).

### Identify Target Sectors

Equitable technology deployment necessitates identifying communities historically underserved by and disproportionately affected by energy systems. Teams should define the target sectors or populations that they would like their programs to serve, as well as those that may be inadvertently impacted.

Effectively identifying target sectors requires the development of creative and intentional strategies. J40-covered federal agencies must use the White House Climate and Economic Justice Screening Tool (CEJST), which maps burden indicators onto census tracts, to identify DACs by location. While CEJST may be required, interim guidance from the White House also indicates that it is not always possible to identify disadvantaged stakeholders or sectors based on geography alone (The White House CEQ 2023; Young, Mallory and Zaidi 2023; Young, Mallory and McCarthy 2021). Other building-oriented indexes, such as those that use energy burden and energy insecurity as metrics to measure burden, typically tend to focus only on residential and exclude commercial or multi-family buildings. Additionally, there has been little substantial research into how both energy burden and energy insecurity can be applied to the commercial space, as they have hitherto been defined only for households.

More granular types of metrics are essential for accurately tracking benefit flow within commercial-building program deployment because a building being geographically situated within a CEJST-defined DAC does not necessarily indicate that program benefits are directly flowing to that community itself. For instance, there may be a commercial office building located within, or near, a DAC that is installing energy efficient or clean energy technology, but the building may serve residents of an adjacent community, meaning that community members within that DAC are not the ones receiving direct benefits of that installation. A practice to assure the intended DAC is being served through deployment would be to target “community asset buildings,” which are those that positively affect and reach into the surrounding community, such as schools and libraries (Flora and Flora 2008; UCLA Center for Health Policy Research 2023).

The above underscores the need for tools and metrics to identify key target sectors, especially underserved or disproportionately burdened stakeholders and communities in commercial buildings, to promote equitable technology deployment beyond residential areas.

## Integrated Lighting Campaign as a Case Study

The ILC at PNNL aimed to incorporate energy justice and equity recommended practices to improve the likelihood that the benefits of the program will reach DACs or disinvested buildings. The PNNL project team started by applying some of the EJE strategies and recommended practices to the ILC, a TC managed by PNNL on behalf of BTO. The purpose of many DOE TCs, as discussed previously, is to promote greater adoption of efficient building

technologies by providing TA, resources, and guidance on key implementation strategies. Led by experts at DOE national laboratories, TCs partner with industry to deploy energy-efficient building technologies, stimulate the market, and create widespread and lasting impacts. Although TCs have well-defined goals related to deployment of technologies, many of the goals, and the methods used to reach them, have been developed without a focus on DACs.

As J40-covered programs, DOE TC teams need to collaborate with community stakeholders from DACs or target building sectors. Together they will define the program benefits in the context of the J40 Initiative, and devise ways to measure, track, and report how the benefits flow to DACs.

The ILC is dedicated to equipping building owners, facility managers, occupants, and other stakeholders with the resources, knowledge, and guidance to successfully install, use, and maintain energy-efficient integrated lighting technologies. Like other TCs, the ILC follows legacy approaches developed over decades of market transformation initiatives, including certain terminology or activities within the campaign. For example, one strategy the ILC has traditionally used is recognizing exemplary lighting projects completed by influential early adopters or early majority. The recognition program is an opportunity to gather and document best practices and lessons learned that may be useful to other project, as well as to incentivize participation.

As equitable deployment and equitable decarbonization become higher priorities, TCs need to expand their focus on making it easier for historically underrepresented target building sectors (such as small buildings) and DACs to access these technologies. Therefore, it's an ideal time to redesign the components of TCs to reflect the current market environment, improve access to a diversity of potential adopters, and make the entire participant experience equitable across the board.

**Recommended Practice: Use Metrics for J40 Goal Alignment**

Following recommendations given by the PNNL project team, the ILC expanded the recognition program to highlight submissions from small buildings, those featuring innovative financing, and those addressing justice, diversity, equity, and inclusion. This brought attention to lighting projects that not only contributed to energy savings, but also improved the comfort, safety, and wellbeing of occupants and nearby DACs. These additional categories can benefit stakeholders in DACs and target building sectors (such as small buildings or community asset spaces) if they lead to the creation of case studies that inspire and empower communities to adopt new lighting technologies.

The ILC team worked to identify their aligned benefits, which are program and sponsor goals that align with the J40 priorities. Once established the aligned benefits allowed the ILC to redefine their goals to better promote energy-efficient building technologies to all Americans, including DACs and target building sectors. Then, the PNNL team recommended creating a feedback approach to hear directly from target stakeholders on which program benefits would best address their roadblocks to current technology adoption. The ILC conducted a stakeholder mapping exercise using a power-interest matrix to identify DACs and stakeholders in the target building sector (Cenek and Částek 2015; Murray-Webster and Simon 2006). Stakeholder mapping can help teams adapt their engagement strategies to reach stakeholders that are not

adequately represented in deployment program activities, and thereby establish appropriate feedback mechanisms (Puig-Santana, Johnston and Hickcox 2024).

The ILC team also worked to map the flow of benefits through the program components. Both knowledge sharing and TA or advising on energy topics could benefit DACs by facilitating the adoption of energy-efficient building technology within target sectors. Since the recognition component focuses on awarding the success of previously completed work, it is not considered to involve the direct flow of J40 benefits. Regardless, this aspect of the project still supports equity principles, including distributive justice when considering which installations are awarded. Additionally, the recognition and showcasing of success stories and case studies can inspire others within target sectors or stakeholders to adopt these technologies, and thus stimulates knowledge development. Based on this exercise, the ILC was able to redistribute program resources more evenly among the program components, increasing resources for both knowledge sharing and TA or energy advising.

**Recommended Practice: Centering Stakeholder Voices in All Aspects of Deployment Programs**

Effective stakeholder engagement plays a pivotal role in driving market transformation. When stakeholders are actively involved, they contribute to shaping policies, fostering innovation, and promoting sustainable practices. Engaging stakeholders assures that diverse perspectives are considered and that programs do not unintentionally exacerbate disparities in communities. By involving stakeholders early in the process, market strategies can be more robust and responsive. Stakeholder engagement also fosters trust and transparency. When stakeholders feel heard and valued, they are more likely to support policy objectives. Consensus-building around shared goals accelerates transformation.

Stakeholders provide on-the-ground knowledge. They can identify barriers (such as regulatory hurdles or technological gaps) and opportunities (such as emerging trends or untapped markets). Addressing these insights drives market evolution. Collaborative engagement allows stakeholders to co-create solutions. Whether it is designing incentive programs, developing standards, or implementing pilot projects, their active participation can lead to practical and effective outcomes. Stakeholder engagement is not just a box to check—it's a catalyst for meaningful change. When stakeholders are empowered, market transformation becomes more inclusive, sustainable, and resilient.

**Participatory Program Design – Integrating Stakeholder Priorities**

Deployment teams should consistently prioritize stakeholder input across all stages of program design, development, and implementation. This practice aligns with several key aspects of energy justice, including procedural, distributive, and recognition justice.

As described by Vogel in *Co-Creating a More Equitable World: The Transformative Benefits of Participatory Design,* there are three types of participatory design:

"Design for the user, design with the user and design by the user. In the first type, solutions are designed for a particular user need, and users are consulted throughout the process.

In the second, designers and users work together throughout the entire design process to co-design a solution together. And in the third type, users are taught the basics of design and provided access to tools and resources necessary for the design process, as they frame their own challenges and design their own solutions" (Vogel 2021).

Teams should actively integrate approaches that facilitate meaningful stakeholder engagement, ensuring that program decisions are informed by diverse perspectives throughout the program life cycle. Technology is often created with a focus on users, but not necessarily by or in collaboration with those who will use it. While excluding end-users from the design process may enhance efficiency in some cases, it can result in unintended negative outcomes or well-intentioned technologies that remain unused or are challenging to repair due to insufficient understanding of user needs and context (Puig-Santana, Johnston and Hickcox 2024; Vogel 2021).

**Stakeholder Engagement Plan**

Deployment programs can play an important role in helping owners, managers, and tenants of disinvested buildings access the health, social, and financial benefits of energy-efficient buildings (Langner, Hendron and Shanti 2013; DOE EERE Building Technologies Office 2013; Berkouwer and Dean 2021). Achieving the goal of equitable deployment necessitates consensus and collaboration among all relevant stakeholders. Stakeholder engagement can be initiated at any stage of a program, whether the program is just beginning or in its final year, engaging stakeholders and seeking their input is always valuable.

To enhance collaboration among stakeholders, teams should formulate an engagement and outreach strategy that places the individuals who work with or benefit from program outcomes at its core (Bourne 2016). A stakeholder engagement plan, hence, defines the individuals or groups the program will interact with, the methods of engagement, and the objectives of such interactions. It also specifies the timing and location of these outreach activities. Proponents of stakeholder recognize the importance of incorporating diverse viewpoints on social, cultural, environmental, and economic matters, thus advocating for their participation in program design (Aakhus and Bzdak 2015). By doing so, deployment program teams can proactively address barriers to access and participation, cultivate community support for sustained behavioral change, and ultimately deliver advantages to stakeholders (U.S. DOE Better Buildings 2017). Stakeholder engagement plans can vary widely based on the needs of an organization, but they usually include a stakeholder analysis, outline of proposed outreach channels and activities, and establishing stakeholder management system (e.g., customer relationship management system). Implementing a system akin to customer relationship management software can facilitate comprehensive management of stakeholder relationships throughout the entire program cycle.

To encourage equitable stakeholder engagement practices among technology deployment programs, PNNL developed a set of profiles for stakeholders with a vested interest or influence in the planning, execution, and results of clean energy initiatives. Each profile includes a detailed analysis of needs, motivations, engagement objectives, key messages, and sample outreach strategies. These can be found in the *Guidance for Integrating Energy Justice and Equity in Building Technology Deployment Programs* document (Puig-Santana, Johnston and Hickcox 2024).

**Build Strategic Partnerships**

Collaborating with respected local leaders, policymakers, nonprofits, and community-based organizations dedicated to supporting local residents can effectively prioritize community needs and enhance communication within the program (Ayala, Drehobl and Dewey 2021). Teams should engage stakeholders as equal partners in defining problems and collaboratively developing culturally relevant strategies and solutions. Often, local leaders hold elected positions within the local government, own small businesses, or lead established community organizations. However, some local influencers gain recognition through alternative channels, like building an online social media following, and are regarded as trusted voices within their communities—a valuable source of local knowledge. Local partners play a crucial role in identifying skill development opportunities and capacity-building related to clean energy technologies. Additionally, they can actively promote participation in community events, including local lunch-and-learn sessions, tradeshows, fairs, and business luncheons. Based on guidance from the PNNL EJE team, the ILC launched an outreach campaign focused on building strategic partnerships with state energy offices. Although still in its nascent stages, the outreach campaign has already revealed opportunities for collaboration in support of DACs and challenges faced by community members in specific states.

**Metrics used to Evaluate Performance of Stakeholder Engagement**

Assessing the effectiveness of stakeholder engagement efforts necessitates a methodical approach that involves monitoring relationships, documenting outreach activities, tracking progress, and reporting outcomes. One method is to use stakeholder mapping to better understand the relationship dynamic and role of each stakeholder in relation to the clean energy or deployment program. Techniques such as Power-Interest Matrix and Stakeholder Engagement Assessment Matrix provide a framework for systematically identifying, understanding, categorizing, and monitoring how those relationships evolve over time because of outreach and engagement activities. The ILC conducted stakeholder mapping and found various key groups and organizations were missing in their engagement plan. They are now working towards building relationships with state energy offices and community-based organizations, which opens new avenues for collaboration and gathering stakeholder feedback on efficacy of outreach activities. A more detailed explanation of these mapping techniques can be found in the *Guidance for Integrating Energy Justice and Equity in Building Technology Deployment Programs* document (Puig-Santana, Johnston and Hickcox 2024).

- **Targeted Engagements:** This metric tracks what percentage of program engagements were with target populations or sectors.
- **Budget Percent Reaching Targeted Engagements:** This metric identifies the percentage of overall program funding that was allocated for outreach, engagement, and gathering feedback from targeted populations and sectors.
- **Stakeholder Engagement Process and Success:** This metric tracks changes made to the program based on stakeholder feedback.

**Recommended Practice: Improve Accessibility**

Stakeholders should be able to access and use the resources and outputs that a project or program develops. Facilitating access by removing obstacles assures broader participation from diverse stakeholders and assures that all participants feel at ease to fully participate. Approaches to prioritizing accessibility will vary depending on the stakeholder group the team aims to engage and their specific needs. For instance, this could involve communicating in the community's primary language, scheduling flexible and convenient meeting times for stakeholders who have limited availability, or offering closed-captioning or live transcription during virtual meetings for individuals with hearing impairments. Additionally, providing information in various formats, such as infographics, audio materials, or visual aids, can enhance accessibility for people with different learning preferences. Providing materials in print or using analog channels for communications is essential for reaching audiences who have limited internet or broadband access. In the ILC TC review, that the PNNL team found some program design, submission guidelines, and terminology that could potentially confuse and dissuade prospective applicants. For example, the ILC, and many other DOE BTO TCs, use the legacy terms "participant" and "supporter" for different participation pathways in the campaign. Before a prospective applicant could fill out the recognition submission form, they were required to self-select as either a "participant" or "supporter"; however, each campaign has its own definition of these terms, which could be confusing and present a barrier to participation. These terms are also arbitrary and may not necessarily reflect how target participants see their role in building technology installation, maintenance, and operation. The ILC modified the website and program to remove the use of these terms, opting instead to let applicants describe their role in their own words, and the application form no longer requires that self-selection step for participation.

Auditing the ILC website revealed potential barriers to the recognition submission process. For example, the ILC website described projects with potential for recognition as "exemplary," which might deter submitters who are unsure if their project will be "exemplary" enough. Exemplary can mean something different for different installations in different locations. Project advisors and stakeholders suggested that the campaigns replace the prominent up-front terminology "exemplary" with more open-ended submission guidelines. The "exemplary" terminology was removed and the ILC team completed an overhaul of the submission process, with promising results. Previously, the burden rested on the submitter to select a category for consideration, meaning their application focused solely on those aspects of the project or installation. Now, instead of selecting a category, the submitter can describe different aspects of their project and the review committee then determines the categories in which they should receive recognition. In the year following the implementation of these changes, there were almost more than three times the number of submissions across categories and the submissions provided a more comprehensive picture of each lighting project, as submitters felt compelled to share additional details they wouldn't have shared otherwise.

**Metrics Used to Evaluate Accessibility**

Adhering to recommended practices in communication and outreach significantly improves the efficacy of a program's stakeholder engagement process. By employing straightforward and accessible language and using various communication channels, programs can expand their reach while ensuring fairness and inclusivity in engaging diverse audiences.

Teams should prioritize making contact information and feedback channels easily accessible to stakeholders. This facilitates informed decision-making processes that incorporate input from all stakeholders. Listed here are a few key practices that could be used to monitor progress toward EJE or J40 goals:

- **Easily Accessible Contact Information**: Indicates whether the program website features easily accessible contact information and a clear request for feedback from the public.
- **Plain and Inclusive Language**: Indicates whether the program communications have been reviewed for accessible and inclusive language.
- **Multichannel Engagement**: Captures the use of offline and online communication channels, such as local newspapers, industry publications, radio stations, social media platforms, and/or community-specific forms.

## Conclusion

While there are many different EJE directives and initiatives, it can be very helpful for teams and programs to have practical steps or strategies to guide the integration of these approaches and principles. Even for projects or programs that may have an indirect impact on DACs, there can be great value in considering EJE in goal setting, communication strategies, development of strategic partnerships, and more. Through the process of developing the *Guidance for Integrating Energy Justice and Equity in Building Technology Deployment Programs*, and the EJE-BEST tool, this team identified many approaches that can be useful for teams to implement. These approaches include (1) using metrics for tracking progress and success, (2) centering stakeholder voices, and (3) improving accessibility to resources and information.

This paper has explored how identifying metrics for success is critical and will require time for the team to discuss and determine which metrics are most applicable to their program and to their stakeholders, as well as which metrics they can quantify with the data available. Readers are encouraged to apply the EJE-BEST tool to their program design and deployment work and to submit feedback or suggestions on areas for improvement for the tool.

In the pursuit of a sustainable and just energy transition, centering stakeholder voices is paramount to assuring that the communities' unique needs, cultural contexts, and aspirations are considered. Engaging local leaders, conducting participatory planning, and co-designing solutions lead to more effective outcomes. Pathways for agile communication with stakeholders can also help to identify the best pathways and approaches for communication and dissemination, which can improve the efficacy of resources or other program outcomes.

Applying principles of EJE helps to identify and address disparities. In summary, a collaborative approach—one that values equity, inclusion, and shared responsibility—will support the principles of energy justice and more equitable access to clean energy technologies. By working together, we can create a future where energy access, affordability, and sustainability are accessible to all.

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