

Factbook for H2Hub Stakeholders

# Building Stronger Community Engagement in Hydrogen Hubs

February 2024





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***“The success of an H2Hub depends on engagement with and support from host communities, relevant labor partners and workforces, and other impacted groups.” (U.S. Department of Energy)<sup>1</sup>***

Hydrogen’s versatility, flexibility, and scalability can support the decarbonization of the existing energy system and shape the transition to a net-zero economy over the long term.<sup>2</sup> Importantly, nearly every region of the United States can produce and consume hydrogen.

These characteristics led to unprecedented federal funding for hydrogen through the Bipartisan Infrastructure Law (BIL) that launched the U.S. Department of Energy (DOE) Regional Clean Hydrogen Hubs (H2Hubs) demonstration program—an \$8 billion investment to drive the formation of a national clean hydrogen network and support the emissions reductions of hard-to-decarbonize sectors like heavy industry.<sup>3</sup> Developing an inclusive and equitable clean hydrogen industry will depend on a robust workforce and coalition-building with communities disproportionately impacted by industry operations, including disadvantaged, Tribal, labor, and environmental justice communities.<sup>a</sup> The nascent development of clean hydrogen markets and regionally focused hubs presents a novel opportunity for communities and project developers to forge a sustainable path to decarbonization that balances the need for accelerated action with the need for affordability and reliability given technology limitations and infrastructure requirements. In short, this is an opportunity to create a sequenced, pragmatic approach to the clean energy transition. An important component of this effort is meaningful community engagement.

**The goal of writing and distributing this factbook is to contribute to ongoing efforts by communities, hydrogen hub developers, and DOE to align on community engagement approaches and best practices. This work is part of a broader effort to drive productive conversation through sharing information and convening stakeholders.**

Community engagement is a multifaceted, time-consuming yet essential process that requires building relationships and trust among impacted communities, project developers and partners, and government officials. Achieving positive outcomes, for both communities and developers, requires constructive and meaningful engagement to ensure that community input is shaping hydrogen hub development.

One way to ensure that the hub processes have input from a broad range of community members—both established groups and individuals—is to include them in Community Benefits Plan (CBP) negotiations. DOE requires CBPs as part of the H2Hubs application. The “communities” defined in DOE’s CBP guidance include local frontline residents and disadvantaged communities that live near a proposed project and its infrastructure (“DACs”); Tribal communities that may have historical or sacred ties to a proposed project site (“Tribes”); labor groups that could receive jobs (“Labor”); and environmental justice groups that advocate for the safety and health of communities and the natural environment (“EJ”). The CBP process unfolding through the H2Hubs program is charting a new path forward for all stakeholders and provides an opportunity to redefine collaboration in clean energy development. Together, we can leverage this moment to create an equitable transition that tackles climate change while creating prosperity for disadvantaged, Tribal, Labor and environmental justice communities. Now is the time. Let’s get to work!

*Dr. Madeline Schomburg*

**Dr. Madeline Schomburg**  
Director of Research, EFI Foundation

<sup>a</sup> According to Justice40, a community can be defined by its geography (e.g., census tract) or common conditions. DOE recognizes disadvantaged communities identified by the White House Climate and Economic Justice Screening Tool (CEJST) that meet thresholds for 1) environmental, climate, or other burdens, and 2) socioeconomic burden. The factbook uses the term 'disadvantaged community,' reflective of DOE's terminology by publication. Future publications will adopt more current terms, like "underserved community."

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# Executive Summary

**This EFI Foundation factbook highlights the perspectives of individuals and groups affiliated with DACs, Tribes, Labor, and EJ groups. It reflects their preferred modes of engagement, attitudes toward hydrogen hubs, and perceptions of DOE's community engagement processes.**

The factbook data show that communities generally agree on the preferred forms of engagement on H2Hub development and on perceptions of hydrogen, including viewing hydrogen as a climate change solution. These data also underscore the importance of two-way communication. In an evolving industry such as hydrogen, a lack of communication, information, trust, or mutual understanding can hinder engagement.

The EFI Foundation offers this factbook to support ongoing conversations among DOE, hub developers and partners, and communities. Its role in this conversation is that of an information provider. The EFI Foundation is continuing to collect data to provide a comprehensive perspective for driving open and honest engagement among all stakeholders – the EFI Foundation's learning in this space is evolving.

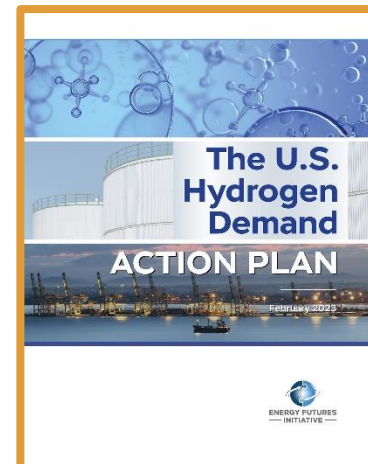
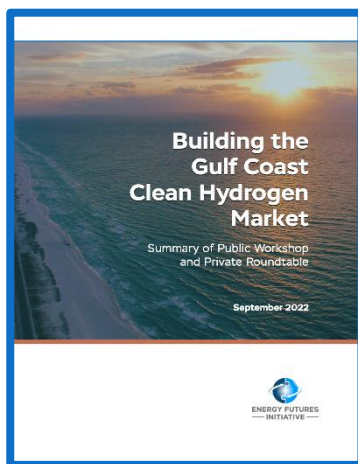
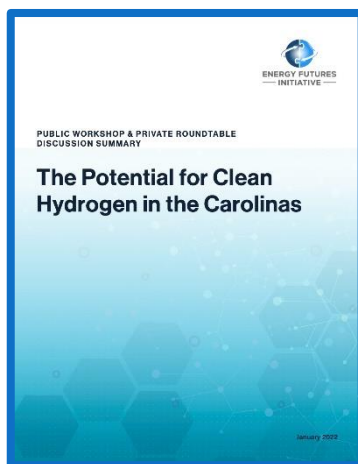
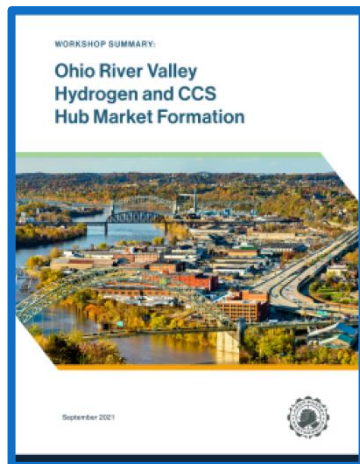
**The following are key takeaways from data collected so far.**

- 1. Community members overwhelmingly support hydrogen's potential to create new jobs and solve climate change.** Survey respondents who opposed hydrogen suggested that more information and more environmental protections could encourage them to support broader development. DAC and Labor respondents are more unsure of their position on hydrogen and its risks and benefits than Tribal and EJ respondents.
- 2. Community members prefer to engage with hub developers through citizen panels and public hearings.** Preferred engagement strategies vary by community type and level of hydrogen familiarity (but are consistent in their preference for these two). They also vary by H2Hub region. As of February 2024, all seven hubs have publicly committed to citizen panels, but only one hub has committed to public hearings.
- 3. Familiarity with hydrogen and CBPs increases community members' confidence that they will see benefits when hub developers follow DOE's CBP guidance.** DAC respondents are less familiar with hydrogen and CBPs and have less faith in DOE's CBP steps and methods than Labor, Tribal, and EJ respondents.
- 4. Binding agreements—contracts between a community and a developer that guarantee specific community benefits in return for local support of a proposed project—are one of the methods that community members prefer. However, case studies show that developers have had to be compelled to pursue them.** Support for hydrogen increases if binding agreements are used during H2Hub project development. More than half of H2Hub selectees have publicly committed to binding agreements. Those that have committed favor project labor agreements (PLAs) and it is unclear how agreements will be implemented.
- 5. Trust and information sharing are major hurdles to effective collaboration of the hydrogen industry with communities as they develop hydrogen hubs.** In an evolving industry such as hydrogen, it is easy for a lack of education or misunderstanding to create resistance.

# Community Engagement in Hydrogen Hubs

## This work builds on the EFI Foundation's previous research.

- In February 2023, the EFI Foundation released *The U.S. Hydrogen Demand Action Plan*,<sup>4</sup> which tracks recent activities in the U.S. hydrogen industry and models the impact of the Inflation Reduction Act's hydrogen-related policies. This report recommends that the DOE H2Hubs program use the Community and Workforce Plans outlined in its CBP guidance to maximize communication and engagement with local stakeholders.
- *The U.S. Hydrogen Demand Action Plan* also builds on two years of research into hydrogen market formation, including industry interviews and regional workshops with public and private stakeholders to understand investment decision-making and next steps for clean hydrogen development. The research team found interest in hydrogen from nearly every sector of the economy.
- Collectively, these workstreams have identified opportunities to build conversation among DOE, developers, and communities on the purpose of community engagement and the efficacy of engagement efforts made to date in the H2Hubs program. The EFI Foundation's research suggests that community members can be productive contributors to clean energy projects. Public engagement can enrich community outcomes, reduce site/community tensions, and create co-beneficial resolutions to challenges if both sides are willing to learn from each other.<sup>5,6,7</sup>
- Given that hydrogen is likely to be an essential part of the clean energy transition, and that community engagement will be an important part of deploying clean hydrogen, the EFI Foundation is focused on expanding its hydrogen work to ensure that this transition proceeds in an equitable and just manner that maximizes benefits for DACs, Tribes, Labor, and EJ communities.

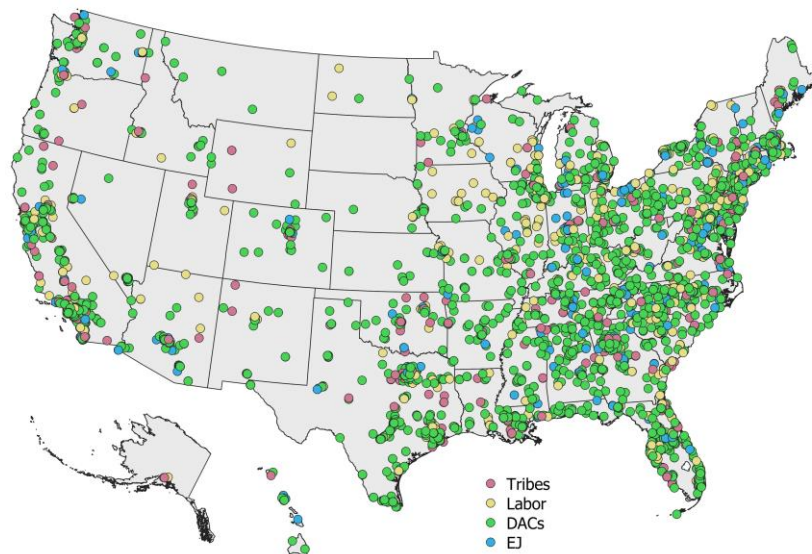


# Community Engagement in Hydrogen Hubs

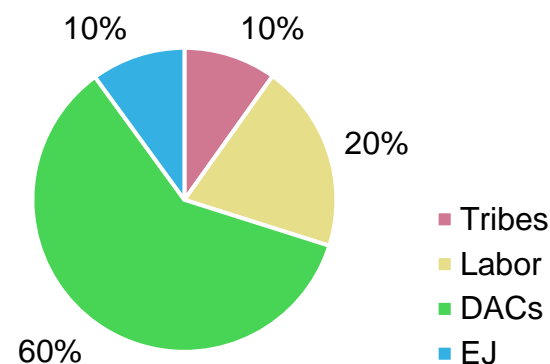
## This factbook consists of diverse stakeholder input.

The EFI Foundation aims to facilitate strong community engagement in hydrogen hub development. To that end, the team has conducted a community survey, analyzed agreements in energy project development, reviewed relevant literature, and engaged in conversations with stakeholders, including DOE, hub members, and other nonprofits.

**Figure 1. Survey responses by location and community type**



**Figure 2. Percentage of responses by community type**



Source: EFI Foundation.

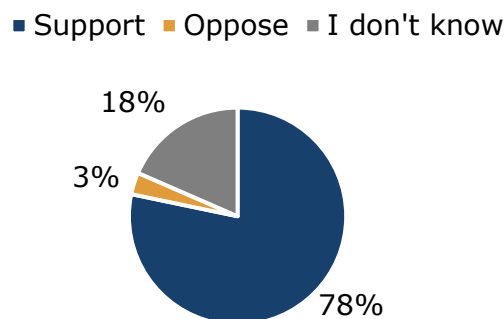
- The EFI Foundation survey elicited individual attitudes toward hydrogen hubs and community engagement. The survey was sent to individuals in all U.S. states with publicly identifiable H2Hub applications. (See Appendix A for survey methods.)
- 4,992 survey responses were collected *only* from individuals who self-identified as a member of one of the communities mentioned in DOE’s CBP guidance: Tribal nations (“Tribes”); disadvantaged communities (“DACs”); labor unions (“Labor”); and environmental justice groups (“EJ”). Responses were received from every state that submitted an H2Hub proposal, with the exception of South Dakota. These responses covered a wide distribution of urban and rural areas across each state (Figures 1 and 2).
- While all of the survey findings included in the factbook are statistically significant, the EFI Foundation recognizes that such findings may not necessarily translate to policy significance. For instance, if the difference between 2% of Tribes and 5% of EJ respondents opposing hydrogen is statistically significant, this difference would not necessarily warrant different policies for each group because overall opposition to hydrogen is still so low.



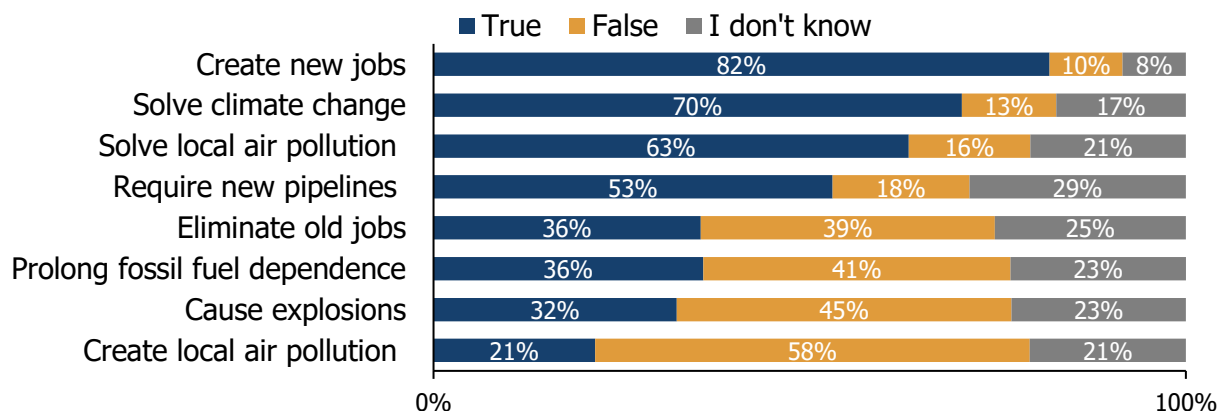
# Public Perceptions of Hydrogen

## Community members overwhelmingly support hydrogen's potential to create new jobs and solve climate change.

**Figure 3. Survey respondents' attitudes toward hydrogen**



**Figure 4. Percentage of respondents who believe hydrogen has the potential to ...**



Source: EFI Foundation.

- Nearly 80% of the 4,992 respondents indicate support for hydrogen energy (Figure 3). The most support came from EJ and Tribal respondents; roughly 83% of both groups support hydrogen energy.<sup>b</sup>
- Though opposition to hydrogen is low overall, it is lowest among Labor respondents (2% of Labor respondents). Labor support for hydrogen is not surprising as Labor is primarily concerned with job creation; 83% of Labor respondents believe hydrogen has the potential to create jobs.
- Respondents are strongly aligned on the belief that hydrogen has the potential to create new jobs (82% of respondents) and solve climate change (70%) (Figure 4).
- On the other hand, respondents are misaligned on the beliefs that hydrogen has the potential to eliminate old jobs (36% agree, 39% disagree); prolong dependence on fossil fuels (36% agree, 41% disagree); and cause explosions (32% agree, 45% disagree).
- Interestingly, 53% of respondents think hydrogen would require building new pipelines in their neighborhood, but that did not appear to diminish support for hydrogen.

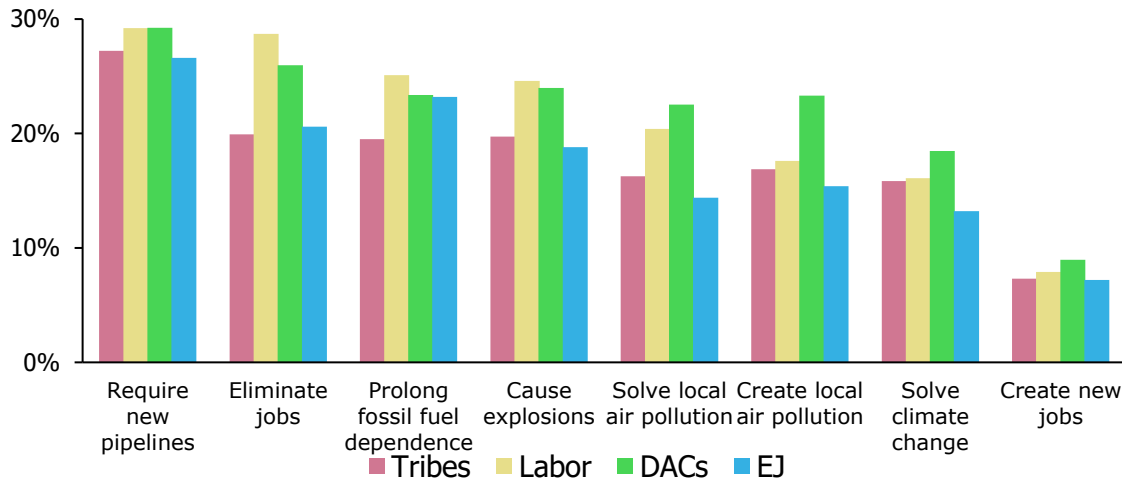
<sup>b</sup> All survey findings in the factbook were statistically significant at a p-value level of 0.05, indicating that the observed results are unlikely to have occurred by random chance alone.



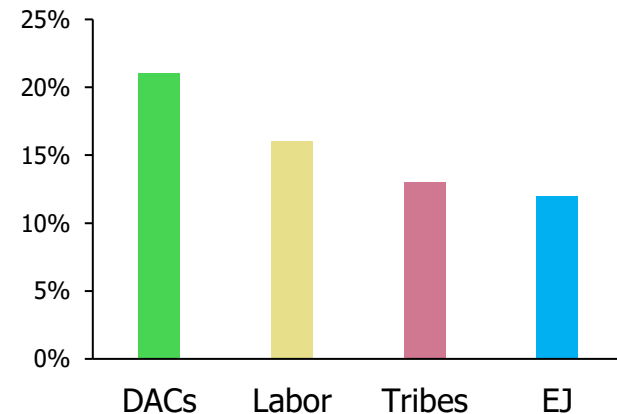
# Public Perceptions of Hydrogen

## Survey respondents are consistent in their position on and perceptions of hydrogen across community types.

**Figure 5. Percentage of respondents, by community type, who said “I don’t know” if hydrogen has the potential to...**



**Figure 6. Percentage of respondents, by community type, who said “I don’t know” regarding support for hydrogen**



Source: EFI Foundation.

- While there is a high degree of consistency, DAC and Labor respondents are more unsure of their position on and perceptions of hydrogen than Tribal and EJ respondents (Figure 5). Generally, Labor and DAC respondents are more likely than Tribal and EJ respondents to say “I don’t know” regarding different hydrogen narratives (Figure 6). DAC respondents are the most likely to be unsure about whether hydrogen will solve local air pollution problems, create local air pollution problems, or create new jobs. Labor respondents are the most likely to be unsure about whether hydrogen will eliminate old jobs, prolong dependence on the fossil fuel industry, or cause explosions.
- EJ respondents are most certain of their stance on hydrogen (only 12% said they don’t know whether they support or oppose hydrogen) and their beliefs about its potential impacts. Though they have the highest rate of opposition to hydrogen (5% oppose), they also have the highest rate of support (83%). Plus, EJ respondents’ results indicate they know more about hydrogen than any other community type (8% said they know nothing about hydrogen, and 41% said they know a great deal or a lot). However, familiarity with hydrogen is not statistically linked to support (or lack thereof) for hydrogen energy.
- DAC respondents, on the other hand, are the most unsure of all community types about their stance on hydrogen; 21% said they don’t know whether they support it or not. And they know the least about it; 17% said they know nothing at all, and 34% said they know a great deal or a lot. This presents an opportunity to work more closely with DAC respondents regarding their concerns with hydrogen development.

# Public Perceptions of Hydrogen

## Community members who oppose hydrogen need more information and more environmental protections to support it.

Figure 7. Survey respondents' reasons for hydrogen opposition

### Statements about a need for more information

"I'm afraid of what I don't know."

"I don't know much but I'd like to learn from unbiased sources."

"I would need to know that it's safe, that our kids would be safe."

"I would need to be reassured of the safety regarding hydrogen energy and the plants used to manufacture it and store it."

"Because this is a new technology, its economy and feasibility are not yet known, so I cannot fully support [it] for the time being."

"I would just need to find out cost and efficiency of the product."

### Statements about a need for more environmental protections

"Make it safe for animals plants and people."

"Increase environmental protection measures."

"Protect the environment."

"Addressing the carbon footprint of hydrogen production—develop carbon capture and storage technologies to reduce carbon emissions during hydrogen production."

*These excerpts are derived from 742 total responses to open-ended survey questions related to hydrogen and CBP attitudes. Source: EFI Foundation.*

- For those who responded that they were opposed to hydrogen energy, the survey then asked an open-ended question: "What would you need to know or what would need to change for you to support hydrogen energy?" An analysis of their responses, based on the frequency of respondents mentioning specific issues, can offer insights on how to address the concerns of individuals who do not support hydrogen (Figure 7). (See Appendix B for detailed information and methods.)
- Of the 742 respondents who offered open-ended responses, 25% indicated they would need more information about hydrogen and that stronger environmental protections would be needed to gain their support; 14% of respondents cited safety concerns that would need to be addressed to gain their support, with particular emphasis on hydrogen's combustibility and volatility; and 13% expressed doubts about hydrogen's utility as a decarbonization tool and said they would need evidence that it could actually reduce emissions in order to support it.
- Without access to regular project updates and information, affected communities are typically unable and unwilling to consent to proposed projects.<sup>8</sup> Historically, energy projects have lacked this level of engagement, leading to distrust.<sup>9</sup> To build confidence in communities, trusted organizations or individuals can serve as reliable intermediaries to address hydrogen concerns. For H2Hubs, communities should be asked who they want this voice to be.<sup>10,11,12</sup>
- The EFI Foundation concludes from the surveys that H2Hubs have the potential to reshape effective community engagement in energy project development by prioritizing transparent communication.

# Engagement Strategies and Community Benefits Plans

Figure 8. Stages of community involvement

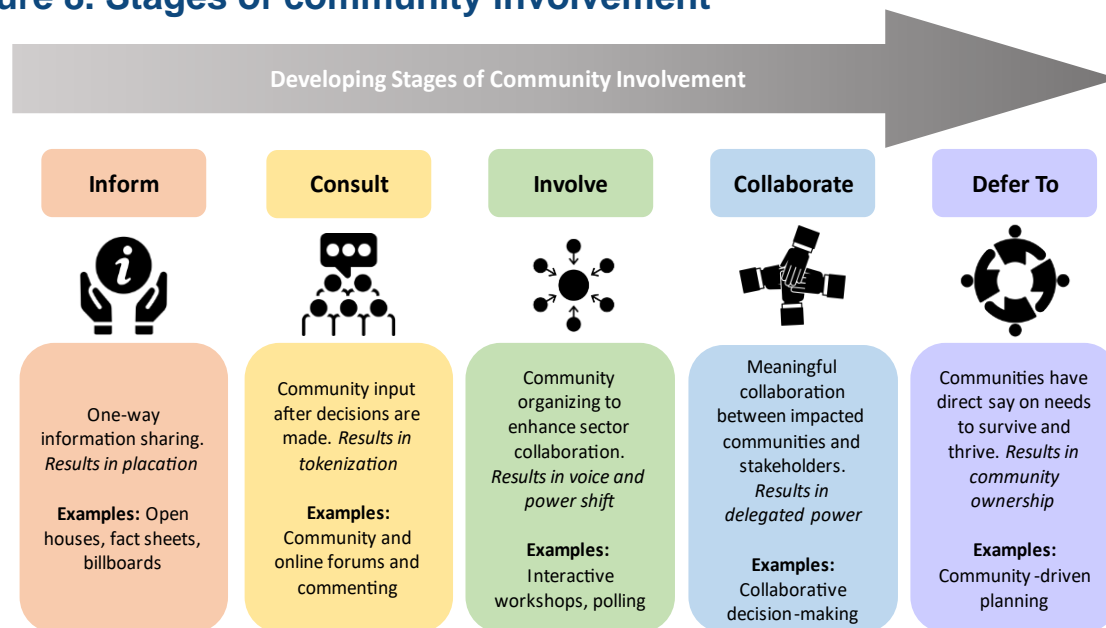
Community engagement methods fall along a spectrum, with increasing levels and degrees of community involvement and collaboration. Figure 8 depicts a continuum of community involvement, adapted by the EFI Foundation.<sup>13</sup> This spectrum categorizes levels of engagement based on goals of informing; consulting; involving; collaborating; and deferring to communities (see Appendix D for additional examples).

The stages, from left to right, demonstrate increasingly greater input from communities, culminating in substantial decision-making authority. Informing and consulting are an important step when building relationships with communities, but to be effective, these efforts must also lead to involving, collaborating with, and deferring to communities.<sup>14</sup>

Unlike methods of informing and consulting, which are generally one-time, information-sharing processes, involving, collaborating, and deferring to require a sustained two-way dialogue to find project-specific solutions.<sup>15</sup> Community engagement should capture a broad set of voices and help communities identify their priority issues. Diverse inputs offer valuable information to the developer, reduce the likelihood of litigation, build community commitment to complete a project, and can lead to a more receptive community for future projects or engagements.<sup>16,17,18,19</sup>

The H2Hubs CBPs provide an opportunity to improve community engagement by focusing on the right side of the continuum in the diagram. The plans are based on four policy principles: engaging communities and labor; investing in America's workforce; advancing diversity, equity, labor, and inclusion; and implementing Justice40.<sup>c</sup> To support H2Hub applicants, DOE's Office of Clean Energy Demonstrations (OCED) has provided a CBP guidance document that addresses several components of community engagement, including the steps and methods that constitute a good CBP.<sup>20</sup> The EFI Foundation survey asked respondents whether they think the steps and methods suggested in the CBP guidance document would lead to more benefits for their community, an increased likelihood of participation for their community, more influence over decision-making for their community and a more fair process for their community. The results are described in the following sections.

<sup>c</sup> Justice40 refers to the goal of Executive Order 14008 that 40% of benefits from federal investments are allocated to disadvantaged communities that are marginalized and disproportionately impacted by pollution (Executive Order 14008, March 15, 2021).



Source: EFI Foundation. Adapted from: See first figure mention in text for source.



# Engagement Strategies and Community Benefits Plans

## Definitions of key terms used in the next section of the factbook.

**Engagement** refers to long-term arrangements to engage the public through an ongoing process of informing, consulting, involving, collaborating, and empowering. Table 1 shows engagement methods and definitions that were offered to survey respondents. The survey included and expanded on the engagement methods offered in DOE’s CBP guidance. The survey included additional engagement strategies to build on the CBP guidance and incorporate methods with various community involvement levels.

**CBP methods** refer to the specific engagement methods included in DOE’s CBP guidance. Those listed in the guidance were public hearings, town hall meetings, open houses, informal, targeted chats, focus groups, one-on-one meetings, facilitated discussions, and virtual workshops.

**CBP steps** refer to general actions outlined in DOE’s CBP guidance of what it considers to be good community engagement processes. This includes engaging to:

- Understand community culture, how decisions are made.
- Identify key community and labor partners, especially organizations representing frontline communities and workers, e.g., unions.
- Determine who will be most impacted by the hydrogen hub, including those who live nearby.
- Set goals for working with the community and the scope of the engagement plan.
- Establish methods, timelines, and budgets for working with communities.
- Designate who from a hub group will be in charge of working with communities and how.
- Determine and agree on success measures, both from the community perspective and from that of the hub groups.
- Pinpoint resources the hub groups will need to implement these strategies, including time, money, and personnel.
- Demonstrate two-way engagements, where hub groups respond to community concerns and make decisions accordingly.
- Discuss plans for binding community agreements.

**Table 1. Survey engagement methods**

Engagement Methods	
Citizen panels	A group of people who represent all the different kinds of people in each community are chosen to discuss an issue and make recommendations on how to proceed
Public hearings	A formal, in-person meeting to record questions from members of the public or give people a set time to speak to voice their opinions
Document co-creation	A process for hub groups and community members to make binding agreements about the benefits the hub groups will provide to the communities
Open houses	Often include information or education about a project, where the public can go around and ask questions like at a science fair
Scenario testing	A group of community members comes up with a few different hypothetical ways the project could go, including the types of benefits they could get out of it
Community mapping	Community members help hub groups create a map of the resources and assets that exist in your area
Working groups	A group of community leaders and relevant stakeholders who get together regularly to discuss the project
Town hall meetings	More of an open discussion than a formal public hearing
Virtual workshops	Can combine aspects of the above methods (open houses, town hall meetings) but it all takes place online
Digital storytelling	Community members bring their stories to life by creating movies, photographs, and other media

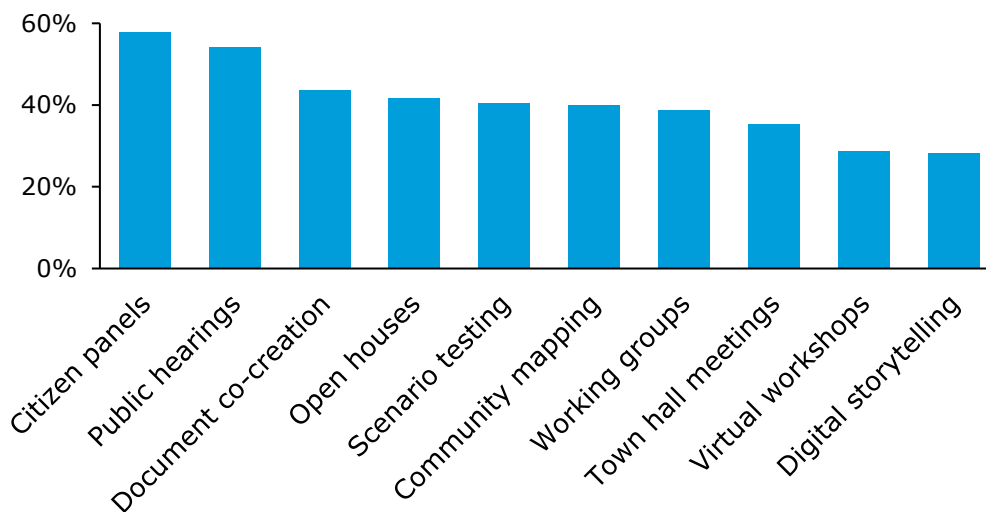
Source: EFI Foundation.

# Engagement Strategies and Community Benefits Plans

## Community members want engagement methods that involve, collaborate with, and defer to communities in CBP implementation.

- 84% of survey respondents said they would view the H2Hub process as fairer if their preferred engagement methods were implemented, and 86% said they would be more likely to support the H2Hub project if their preferred engagement methods were implemented.
- Based on the top 10 preferred methods among respondents (Figure 9), the EFI Foundation's survey revealed a need for more engagement-heavy methods to build on those offered in the CBP guidance.
- Our survey findings show that citizen panels and document co-creation, in particular, would be valuable additions to the engagement methods proposed in DOE's CBP guidance for developers.<sup>21</sup>
- Additionally, citizen panels and public hearings are the only two methods preferred by over 50% of survey respondents and can be especially important to consider when planning for community engagement.
- The guidance has a "workforce and community agreements statement" that discusses the merits of pursuing those agreements.<sup>22</sup> While DOE has emphasized the value of binding agreements, the department does not have the legal authority to require them because they are privately negotiated contracts.<sup>23</sup> There are various ways to create binding agreements between developers and communities—our survey offered document co-creation as one way. Developers can pursue document co-creation to involve, empower, and collaborate with communities.
- Additionally, though the DOE guidance does not mention citizen panels as a way for communities to provide project feedback, it does suggest gathering "feedback from an advisory board of stakeholders" when evaluating the effectiveness of a project's community engagement.<sup>24</sup> Note that respondents favor engagement methods that use a small, trusted group of community representatives. Taken together, this suggests that expanding DOE's recommended engagement methods can improve community-level support, with an emphasis on those that maximize community input from select representatives to minimize the time and effort required of the broader community.

**Figure 9. Top 10 preferred engagement methods among respondents**

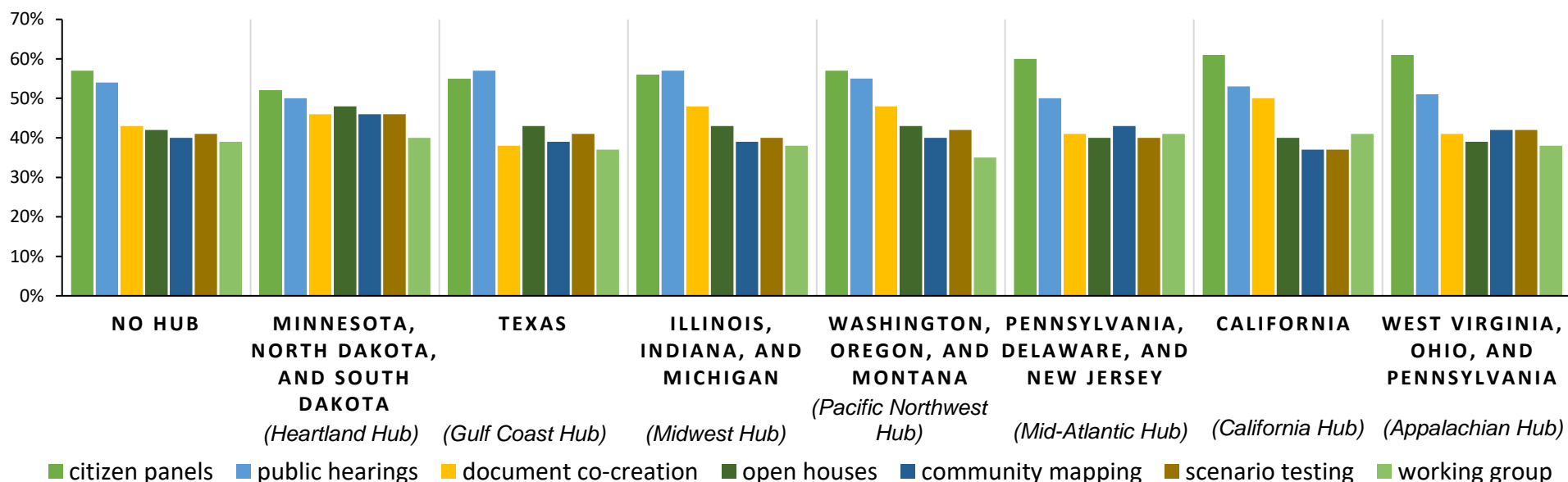


Four of DOE's suggested engagement methods made the top 10 among respondents: public hearings, open houses, town hall meetings, and virtual workshops. These tend to be one-time events, as opposed to methods that rely on sustained engagement.  
Source: EFI Foundation.

# Engagement Strategies and Community Benefits Plans

Respondents reveal regional preferences for engagement methods that so far have not been committed to by all the hubs.

Figure 10. Preferred engagement methods by hub region



- Based on publicly available data on the H2Hub selectees as of February 2024, all of the seven hubs have stated they plan to implement some form of citizen panels, such as community advisory boards, as a primary form of community engagement (Figure 10).<sup>25</sup> However, only one hub has publicly committed to public hearings as part of engagement plans. Based on the survey responses, citizen panels and public hearings largely match community preferences in all hub regions.
- A few example insights, relative to the nation as a whole:
  - Respondents in the California hub region are more likely to prefer citizen panels.
  - Respondents in the California and Midwest hub regions are more likely to prefer document co-creation (i.e., binding agreements).
  - Respondents in the Appalachian hub region are less likely to prefer open houses.
- The EFI Foundation’s state-level hub analysis captures a broader geographical range than the actual hubs, both in terms of infrastructure locations and impacts. However, there is insufficient data to conduct a more detailed analysis of specific hub locations. Because there is such high consistency across the nation in how respondents view community engagement strategies, the results may not change as more data are gathered for this effort.



# Engagement Strategies and Community Benefits Plans

## Most survey respondents are at least somewhat familiar with hydrogen and CBPs.

Figure 11. Hydrogen familiarity by community type

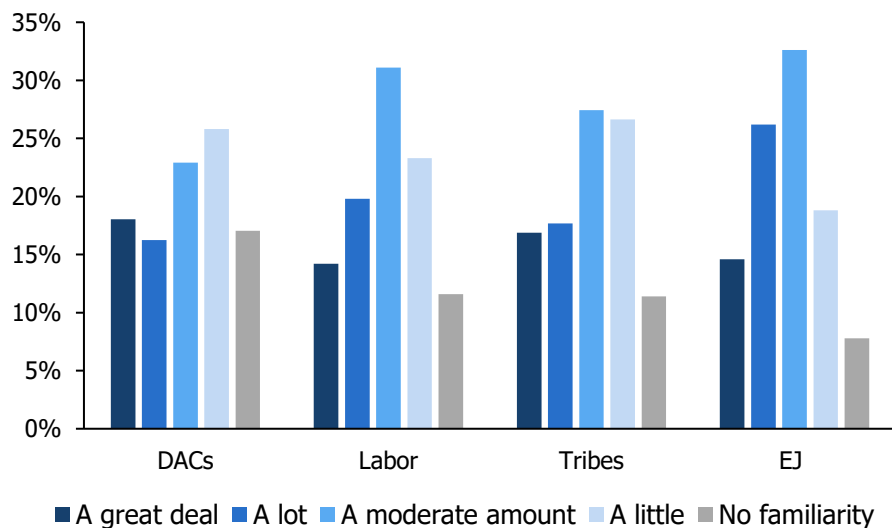
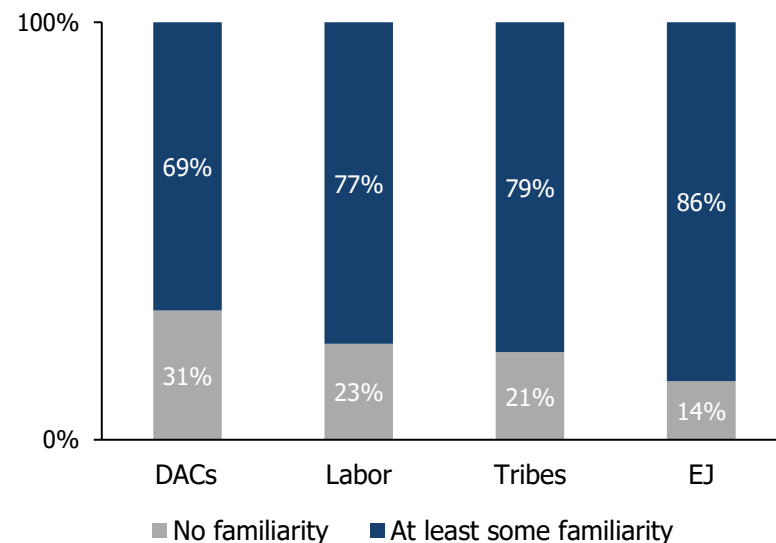


Figure 12. CBP familiarity by community type



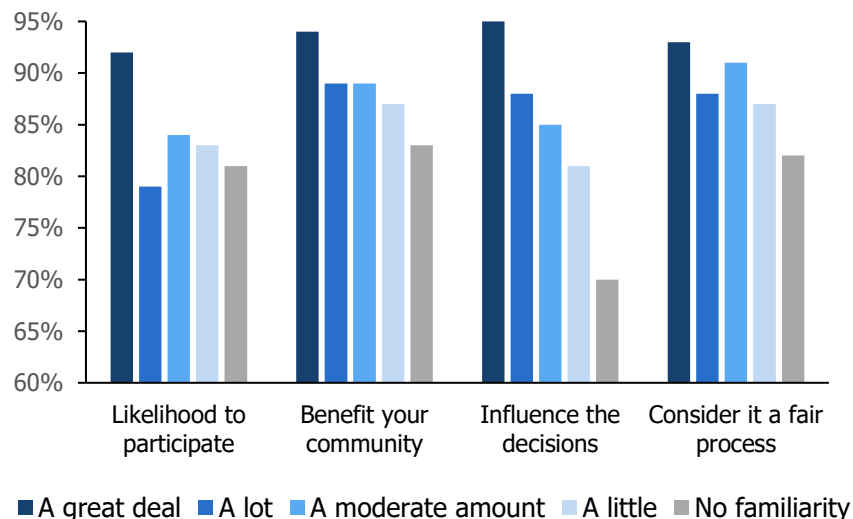
Source: EFI Foundation.

- DOE's CBP guidance recommends that H2Hub developers engage at the community group level, rather than with individual community members. However, DAC respondents are the only type of community that is not inherently organized (as opposed to EJ, Labor, and Tribal respondents), meaning that, based on this definition, they are potentially less likely to be engaged in relevant conversations. DAC respondents are also the least familiar with hydrogen and CBPs; 17% and 31% have no familiarity at all, respectively (Figures 11 and 12).
- As DAC respondents are in greatest need of conversations to build their hydrogen and CBP familiarity, engaging only at the group level leaves these individuals out of important discussions. This presents a potential gap between where engagement activities are occurring and where they are needed. Citizen panels could bridge this gap.
- Familiarity with CBPs and hydrogen plays a pivotal role in shaping community members' perceptions of the potential positive outcomes of following the steps and methods laid out in the CBP guidance. These insights indicate the importance of ensuring that information about CBPs is shared widely during these important early phases of the H2Hubs program.

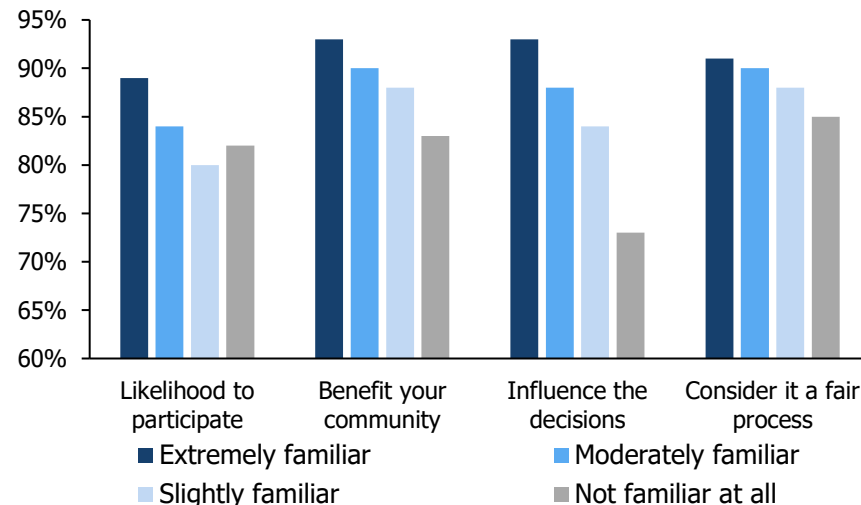
# Engagement Strategies and Community Benefits Plans

## Familiarity with hydrogen and CBPs increases community members' confidence that they will see benefits when hub developers follow DOE's CBP guidance.

**Figure 13. Perceptions of the CBP steps by hydrogen familiarity**



**Figure 14. Perceptions of the CBP steps by CBP familiarity**



The survey respondents included in these graphics are those who indicated “definitely yes” or “probably yes” to each of the potential benefits of the CBP methods and steps (i.e., they would consider it a fair process, they believe they would have influence on decisions, and it would benefit their community and increase the likelihood they would participate). These trends in confidence with DOE’s CBP steps are consistent with the survey responses related to CBP methods. Source: EFI Foundation.

- As a reminder, CBP steps refer to general actions outlined in DOE’s CBP guidebook of what it considers to be good community engagement processes, such as determining who will be impacted and the goals of engagement. CBP methods refer to the specific engagement methods included in DOE’s CBP guidance, such as public hearings and town hall meetings.
- Those who are more familiar with hydrogen are also more optimistic about the potential benefits of following the CBP steps suggested in the guidance document. Respondents who are more familiar with hydrogen are more likely to think the CBP steps will increase their influence over decisions and create a fair process (Figure 13).
- Respondents who are more familiar with CBPs are more likely to think that following the CBP steps suggested in the guidance document will increase their participation, community benefits, and their influence over decisions (Figure 14).

# Engagement Strategies and Community Benefits Plans

## DAC respondents have less confidence that CBP steps and methods will create benefits compared to Labor, Tribal, and EJ respondents.

Figure 15. Perceptions of CBP methods by community type

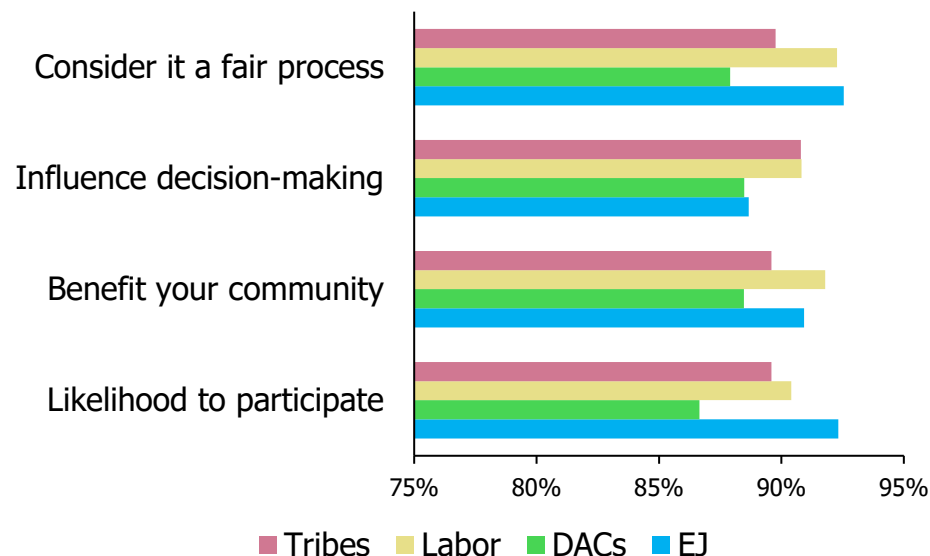
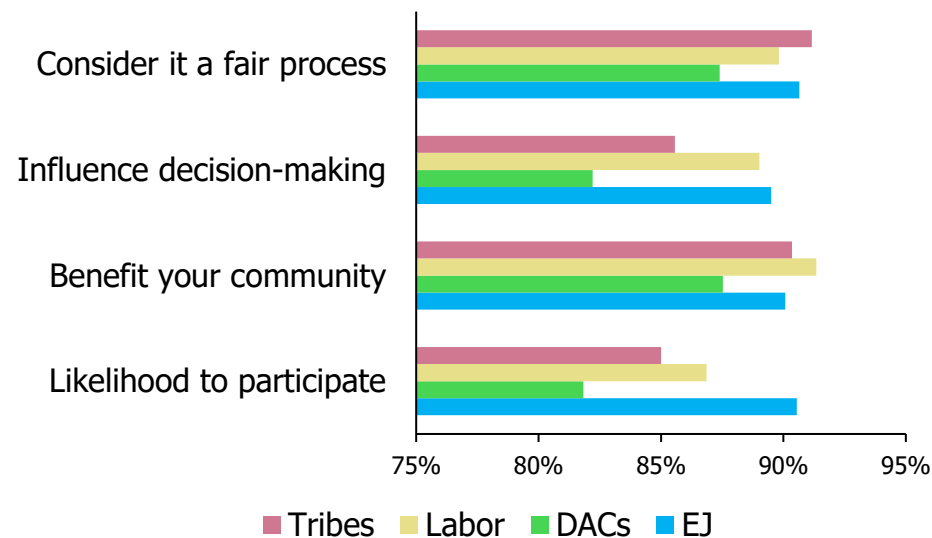


Figure 16. Perceptions of CBP steps by community type



The survey respondents included in this graphic are those who indicated “definitely yes” or “probably yes” to each of the potential benefits of the CBP methods and steps (i.e., they would consider it a fair process, they believe they would have influence on decisions, and it would benefit their community and increase the likelihood they would participate). Source: EFI Foundation.

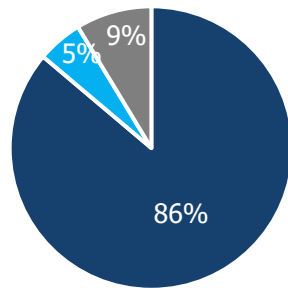
- DAC respondents are less likely than EJ and Labor respondents to believe that using the steps and methods laid out in DOE’s CBP guidance will increase their participation in hub development (Figures 15 and 16). DAC respondents are also less likely to think that the steps will increase their influence over decision-making (Figure 16).
- DAC respondents are also less likely than the other three groups to believe that using the steps laid out in DOE’s CBP guidance will create a fair process and are less likely than Labor respondents to think the steps will create benefits for their community (Figure 16).
- DAC respondents are also less familiar with hydrogen and CBPs than the other three groups. Given that the findings in this analysis indicated that familiarity with hydrogen and CBPs was strongly predictive of confidence in the CBP steps and methods, it stands to reason that a community that is low on familiarity will also be low on confidence.



# Engagement Strategies and Community Benefits Plans

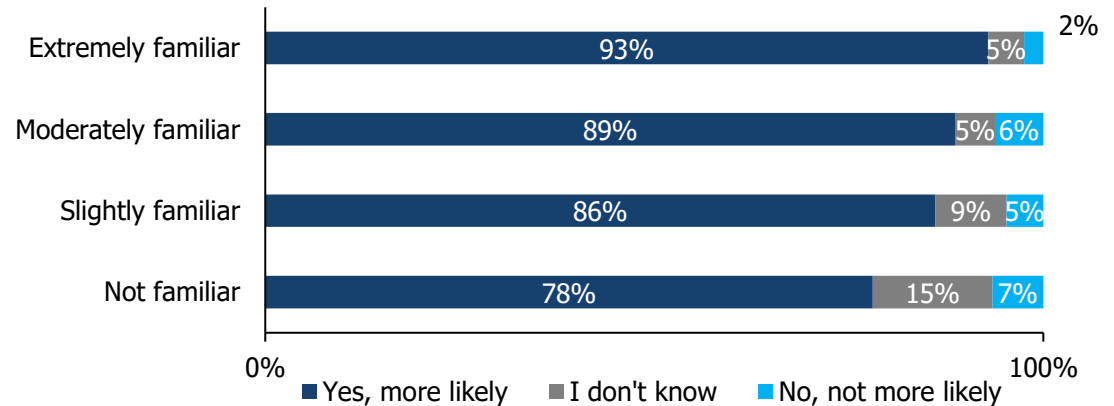
## Support for hydrogen increases if binding agreements are used during H2Hub project development.

**Figure 17. Respondents' likelihood of supporting hub development if binding agreements are used**



■ Yes, more likely ■ No, not more likely ■ I don't know

**Figure 18. Respondents' support for hub development if binding agreements are used, based on familiarity with the CBP process**



Source: EFI Foundation.

- Binding agreements function as contracts between a community and a developer that guarantee specific community benefits in return for local support of a proposed project. Careful development and implementation of binding agreements can build trust among stakeholders and increase the likelihood of a successful project.<sup>26</sup> DOE is unable to require these privately negotiated contracts, so it is incumbent on project developers to initiate binding agreements with community members.<sup>27</sup>
- Hub developers noted in conversations with the EFI Foundation that they were hesitant to commit to binding agreements because of the funding uncertainty inherent in the H2Hubs phased process.<sup>28</sup> H2Hubs are structured in a four-phase approach: Phase I is initial planning and analysis; Phase II is engineering designs and business development; Phase III is implementation; and Phase IV is full-scale operations. Hubs are reviewed at each phase to determine if the project will proceed.<sup>29</sup> Federal funding depends on receiving approval in each phase of the H2Hubs program. If a hub's funding award does not proceed as planned, the hub may not deliver on its commitments to community benefits.<sup>30</sup>
- Figure 17 shows that 86% of respondents said they would be more likely to support H2Hub projects that use binding agreements to guarantee benefits to their community. Respondents who are more familiar with the CBP process are even more likely to support projects with binding agreements (Figure 18). Building familiarity with CBPs, therefore, is an important first step in the community engagement process.

# Engagement Strategies and Community Benefits Plans

## Community members are concerned about H2Hubs process transparency and their role in engagement.

Figure 19. Questions from community members during H2Hubs community briefings



Source: EFI Foundation.

- Following the announcement of H2Hub selectees in October 2023, DOE hosted virtual community briefings for each of the hub selectees to "provide local communities and workers with a forum to learn about and provide input on the selected projects."<sup>31</sup> The question-and-answer (Q&A) component of the webinars acted as the primary venue for community members to voice opinions and ask questions. The EFI Foundation collected and analyzed 933 comments from the Q&A chat (Figure 19).
- Across all briefings, participants most frequently asked questions about the transparency of the H2Hub process (16% of comments). Many others inquired about how the H2Hub developers and DOE planned to engage with communities (14%); how the H2Hubs planned to develop regional infrastructure (12%); and which hydrogen technologies and production pathways each hub was planning to use (13%). DOE has released documents on frequently asked questions and common concerns related to hydrogen that could serve as resources for these impacted community members.<sup>32</sup> (See Appendix B for more information and details.)
- The Mid-Atlantic hub attendees asked the most questions (288 questions recorded, or 31% of the total), and their questions were primarily related to hydrogen infrastructure and technologies (16% and 15%, respectively). The Gulf Coast hub focused on community engagement (24% of Gulf Coast questions); the California hub focused on the process generally (29% of California questions); the Heartland hub focused on hydrogen technologies (25% of Heartland questions); and the Appalachian hub focused on economic impact (13% of Appalachian questions).

# Case Studies of Binding Agreements

**Binding agreements provide an avenue for developers to ensure host communities benefit from project development.**



*Lars Pedersen (right), then-CEO of Vineyard Wind, and Southeastern Massachusetts Building Trades Council President David Araujo sign a project labor agreement at the New Bedford Marine Commerce Terminal in July 2021. Photo source: [Vineyard Wind Project, 2021](#)*

- Through local, state, and federal legislation, government leaders have begun to prioritize projects focused on community collaboration. The EFI Foundation analyzed 16 binding agreements in analogous sectors to highlight advantages, challenges, and best practices to create and uphold binding agreements with host communities. (See Appendix C for detailed information and methods.)
- Clean hydrogen hub projects will include a broad range of development activities. The EFI Foundation examined agreements covering a broad spectrum of energy development that can offer hydrogen-relevant insights, including onshore and offshore wind, solar, fossil fuels, mining, and electrical transmission lines. The age of agreements ranges from a year to decades, and community signatories include community groups, labor unions, and local governments.
- Interestingly, survey respondents working in or adjacent to the hydrogen industry are more likely to choose document co-creation (i.e., hub groups and community members make a binding agreement about the benefits the hub groups will provide to the communities) than other engagement methods. Document co-creation is but one way of engaging a community. Workers' preference for binding agreements in general reflects the need for ongoing conversations about the ability of these documents to ensure worker and community protections and benefits.<sup>33</sup>



# Case Studies of Binding Agreements

## Successful binding agreements tend to be enforceable, inclusive, adaptable, transparent, efficient, and measurable.

- The EFI Foundation's analysis of several case studies shows six common principles of binding agreements:
  1. Enforceability through legally binding clauses.
  2. Inclusiveness by involving a variety of community stakeholders.
  3. Adaptability through provisions for amendment and renewal.
  4. Transparency through consistent communication.
  5. Efficiency in an orderly process and implementation.
  6. Measurable outcomes of the determined provisions.<sup>40,41</sup>
- Though DOE cannot legally require binding agreements, it can signal their importance by choosing projects and allocating funding toward those with the most robust binding agreements.
- Binding agreements that follow these guidelines will help to build relationships and create trust.
- Binding agreement negotiations should involve a diverse group of community stakeholders to ensure an accurate assessment of community needs. One case study, the Vineyard Wind project in Massachusetts involved local industry, nonprofits, and citizens and led to three different agreements: a community benefit agreement (CBA), host community agreement (HCA), and project labor agreement (PLA).
- Agreement amendments allow community members' evolving needs to be factored into the project. In a Montana case involving mining company Sibanye-Stillwater's operations, citizen-led oversight committees added amendments to the original binding agreement to voice changing concerns throughout the project's duration.<sup>42</sup>

### Box 1

#### Case study: Impacts of state legislation on offshore wind binding agreement development

The South Fork wind project demonstrates the positive impact of New York state policies that consider community benefits in clean energy project development. The Accelerated Renewable Energy Growth and Community Benefit Act ("Accelerate Act") requires developers of major renewable energy projects to cite host community benefits with affected municipalities.<sup>34</sup> Along with the Accelerate Act, New York has a history of policies that either require or highly encourage the use of host community agreements alongside project development.<sup>35,36,37</sup>

The South Fork wind project, 35 miles from Montauk, was subject to the Accelerate Act. Initial community resistance occurred in response to the transmission cable linking the wind turbines to the state's power grid, because the developer originally sited the cable to run beneath local neighborhoods. However, developers listened to community concerns and negotiated monetary and non-monetary compensation for communities through the host community agreement.<sup>38</sup> As a result, project development continued.

Peter Van Scoyoc, then-town supervisor of East Hampton, said, "I think it was a matter of just socializing the idea and, you know, weighing benefits versus detriments." This acknowledgment of community preferences in the resulting binding agreement ultimately led to the successful development of South Fork and showcased the advantages of collaborating with all stakeholders.<sup>39</sup>

# Case Studies of Binding Agreements

**Binding agreements include a range of benefits like employment, environmental protection, community enrichment, accessibility, and revenue sharing.**

**Table 2. Case study examples of effective community agreement conditions**

<b>Employment benefits</b> Create high-quality jobs for local and displaced workers	<b>Community enrichment</b> Support the development and well-being of the community	<b>Project accessibility</b> Provide tools to engage with developers and maintain transparency	<b>Revenue sharing</b> Share financial gains generated by the project	<b>Environmental protection</b> Protect local ecosystems
<ul style="list-style-type: none"> <li>• Pre-employment training and pre-apprenticeship programs.</li> <li>• Recruitment, employment, retention, and promotion of local populations.</li> </ul> <p><b>Example:</b> Downeast LNG (DELNG) created employment benefits with the town of Robbinston, Maine, where the developer agreed that 60% of full-time positions would go to local workers by the third year of project operations. If the developer did not meet this requirement, DELNG would have to pay \$50,000 for every 10% by which it failed to meet the 60% threshold.<sup>43</sup></p>	<ul style="list-style-type: none"> <li>• School funding (community college, K-12 schools).</li> <li>• Recreational funding (new parks, beaches, community centers).</li> <li>• Telecommunication support (internet access).</li> <li>• Training of project-relevant personnel (police, firefighters).</li> </ul> <p><b>Example:</b> In the Thacker Pass lithium mine project in Nevada, developer Lithium Americas and the local Fort McDermitt Paiute and Shoshone Tribes agreed to fund a new community center and elementary school and to make improvements to local roadways to move the project forward.<sup>44</sup></p>	<ul style="list-style-type: none"> <li>• Funding for long-term technical advisers to ensure community members are able to successfully negotiate and communicate with developers.</li> </ul> <p><b>Example:</b> In the case of the Sibanye-Stillwater mining company, the agreement created citizen-led oversight committees that have added amendments to the original binding agreement to maintain an open line of communication for communities to voice changing concerns throughout the project's duration.<sup>45</sup></p>	<ul style="list-style-type: none"> <li>• Direct funding to the city (property tax and host community payments).</li> <li>• Royalty payments (public or private landowners).</li> <li>• Reduction in energy bills.</li> <li>• Lifetime direct financial benefits with Tribal Nation joint ventures.</li> </ul> <p><b>Example:</b> In the Excelsior solar project in the town of Byron, New York, developer Excelsior Energy agreed to payments equaling \$24 million over 20 years, with an initial annual payment of \$1.066 million that would escalate by 2% each year.<sup>46</sup></p>	<ul style="list-style-type: none"> <li>• Urban forestry programs.</li> <li>• Local groundwater protections.</li> <li>• Minimize light, noise, and air pollution.</li> </ul> <p><b>Example:</b> In the Calverton Solar Energy Center in Riverhead, New York, developers NextEra and National Grid agreed to a \$250,000 payment for preservation of farmland, open space, undeveloped beach lands or shorelines, and nature preserves.<sup>47</sup></p>

- Agreements in hydrogen-analogous industries highlight the importance of clearly defined, measurable conditions that enable tracking of progress and success indicators (Table 2). While this can be challenging to define, the agreed-upon conditions need to be sufficiently flexible to serve the community's long- and short-term needs and to evolve as the project evolves, such as the Sibanye-Stillwater agreement's use of amendments over the lifetime of the project.<sup>48</sup>
- When the conditions of binding agreements are not appropriately budgeted or designed, such as in the case of Heritage Wind in New York, projects can lose support and incur more public backlash.<sup>49</sup> It is essential that the agreed-upon conditions are budgeted relative to the project size to avoid community dissatisfaction and project delays.

# Case Studies of Binding Agreements

**Binding agreements are one of the methods that community members prefer. However, case studies show that developers have had to be compelled to pursue them.**

**Table 3. Primary drivers for binding agreements based on case studies**

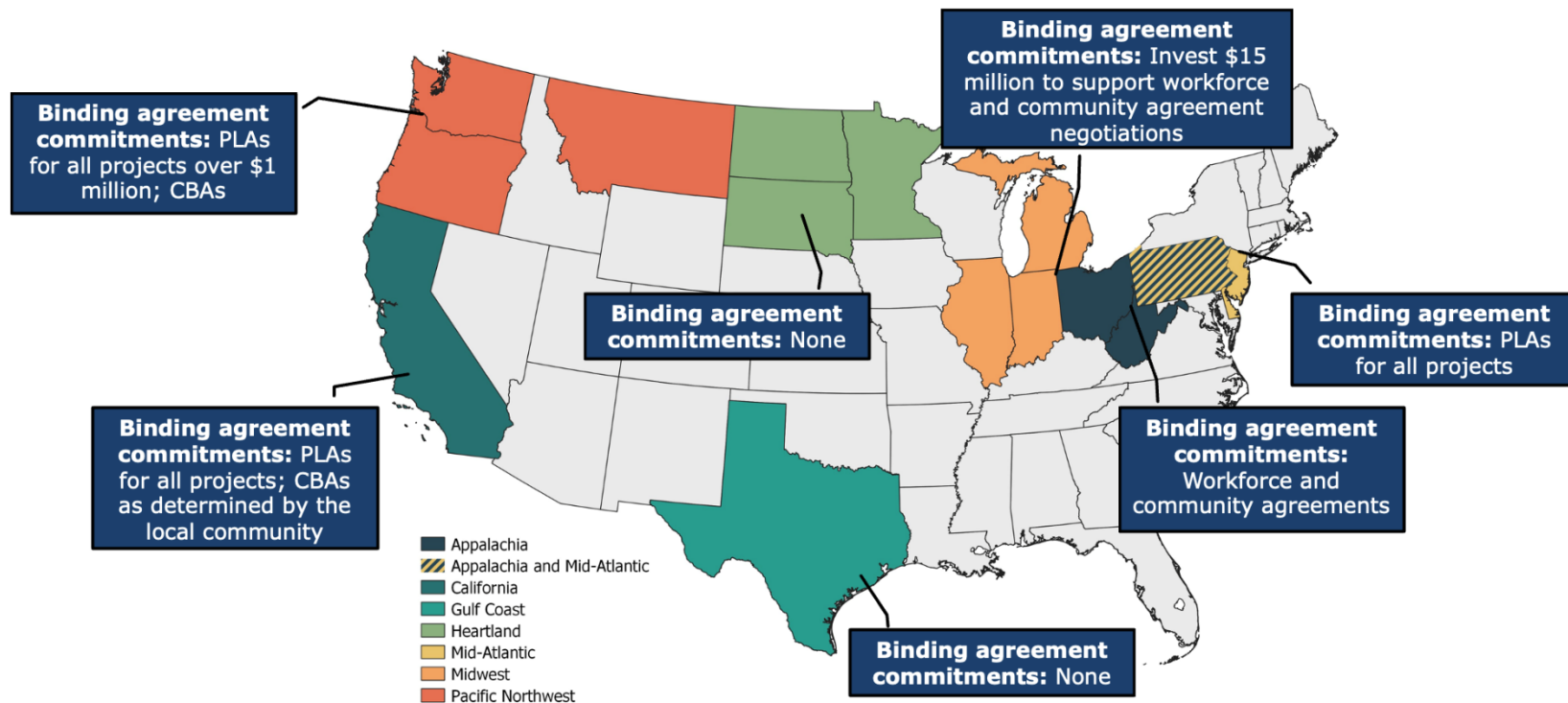
Motivation	Case study examples
<p><b>Legal actions:</b> In several cases, community groups filed lawsuits opposing energy projects. In some cases, a community agreement was initiated to avoid the lawsuit, and in other cases, an agreement was initiated because of the lawsuit.</p>	<ul style="list-style-type: none"> <li>• <b>Sibanye-Stillwater Good Neighbor Agreement:</b> Several nongovernmental organizations under the umbrella of the Northern Plains Resource Council opposed the mining operation through lawsuits because of water quality and other concerns. In 2000, several Northern Plains members decided working with the company would be a better option as community members wanted protection beyond the state requirements.</li> <li>• <b>Chevron refinery modernization project:</b> The project faced five years of authorization challenges from Richmond, California’s planning commission because of lawsuits and a 2012 fire. As part of the process of receiving authorization, the city signed an Environmental and Community Investment Agreement in 2014 (amended in subsequent years). In addition, a PLA was signed in 2013 with the Contra Costa Building and Construction Trades Council.</li> </ul>
<p><b>Federal and state preferences:</b> Some states are now requiring that companies initiate a community agreement as part of the regulatory process for approving a project.</p>	<ul style="list-style-type: none"> <li>• <b>Maine Aqua Ventus (MAV) offshore wind project:</b> The Maine Public Utilities Commission’s approval package required that the company either provide electric energy to the Monhegan Plantation Power District and a fiber-optic cable or a community benefits package. The company decided to pursue a CBA.</li> <li>• <b>Vineyard Wind and Vineyard Power:</b> This project benefited from the U.S. Bureau of Ocean Energy Management (BOEM), which, when auctioning offshore wind lease access in 2015, gave preference to bidders with binding agreements or power purchase agreements. Vineyard Wind had the winning BOEM bid and signed a CBA in January 2015.</li> </ul>
<p><b>Positive engagement:</b> Some developers have established a company policy relative to the relationship with the communities where their facilities are located, so they take the first step in reaching out to community leaders.</p>	<ul style="list-style-type: none"> <li>• <b>Lithium America:</b> The company’s policy of being a good neighbor, hiring locally, and providing job training led it to initiate a CBA with the Fort McDermitt Paiute and Shoshone Tribes for a lithium mining facility to support the battery supply chain.</li> </ul>

- The case study analysis shows project developers often need to be compelled through legal action or regulatory preferences to form a binding agreement with community members (Table 3). Only three of the 16 binding agreements in the analyzed case studies were undertaken voluntarily.

# Case Studies of Binding Agreements

Five of the H2Hub selectees have publicly committed to binding agreements but how they will be implemented is yet to be determined.

Figure 20. Map of H2Hubs and their respective binding agreement commitments



Source: EFI Foundation.

- According to OCED, as of February 2024, several states have committed to developing binding agreements. The Midwest hub stated it would invest in services to enable employment and support agreement negotiations but does not require any specific type of agreement.
- The binding agreement commitments in place tend to favor PLAs. PLAs favor Labor communities but still address only a subset of that group—construction workers—without committing to stipulations for other long-term, high-quality jobs that hydrogen hubs have the potential to provide, like electricians, engineers, and facility operators. Further, PLAs do not address community needs beyond employment. This means other community concerns, including community enrichment, environmental protection, project accessibility and revenue sharing, would not be addressed.



# Key Takeaways

Drawing on the EFI Foundation's community survey and case study analysis, this factbook highlights five takeaways and related recommendations that can inform how H2Hub developers, DOE, and groups representing community members can better achieve the goals of the CBPs:

- 1. Community members overwhelmingly support hydrogen's potential to create new jobs and solve climate change.** Survey respondents who opposed hydrogen suggested that more information and more environmental protections could encourage them to support broader development. DAC and Labor respondents are more unsure of their position on hydrogen and its risks and benefits than Tribal and EJ respondents.

**Recommendation:** Developers should commit to extra environmental protections and environmental remediation in binding agreements and should help ensure that all community members' questions are answered.

**Recommendation:** Groups and organizations representing different communities identified in the CBP guidance should collaborate and share information, specifically with DACs.

- 2. Community members prefer to engage with hub developers through citizen panels and public hearings.** Preferred engagement strategies vary by community type and level of hydrogen familiarity (but are consistent in their preference for these two). They also vary by H2Hub region. As of February 2024, all seven hubs have publicly committed to citizen panels, but only one hub has committed to public hearings.

**Recommendation:** DOE should update the CBP guidance document to include citizen panels, document co-creation, scenario testing, and community mapping as options, tailored to specific hubs. DOE also should prioritize projects for funding that include citizen panels, public hearings and an array of binding agreements as key engagement strategies.

**Recommendation:** Developers should perform a thorough assessment of community composition and consider regional preferences when selecting engagement methods. Further, developers must remember that multiple methods will be needed to engage with multiple communities, and binding agreements are but one method.

**Recommendation:** Groups and organizations representing communities should align internally on preferred engagement methods to be able to align with DOE and developers.

- 3. Familiarity with hydrogen and CBPs increases community members' confidence that they will see benefits when hub developers follow DOE's CBP guidance.** DAC respondents are less familiar with hydrogen and CBPs and have less faith in DOE's CBP steps and methods than Labor, Tribal, and EJ respondents.

**Recommendation:** DOE and hub developers should work with a trusted entity to disseminate information about hydrogen and CBPs, particularly in DACs, where familiarity with these topics is lowest. The EFI Foundation and others are working to identify trusted entities; the results of that research should inform DOE and the hubs' selection for that role.

**Recommendation:** Groups and organizations representing Tribal, EJ, and Labor interests should draw on their years

# Key Takeaways

of organizing experience to help DACs organize and advocate for their specific needs.

- 4. Binding agreements—contracts between a community and a developer that guarantee specific community benefits in return for local support of a proposed project—are one of the methods that community members prefer. However, case studies show that developers have had to be compelled to pursue them.** Support for hydrogen increases if binding agreements are used during H2Hub project development. More than half of H2Hub selectees have publicly committed to binding agreements. Those that have committed favor project labor agreements (PLAs) and it is unclear how agreements will be implemented.

**Recommendation:** Developers should create binding agreements with each community type found in their project region. For instance, developers may want to sign a community workforce agreement with Labor representatives and a community benefits agreement with EJ representatives.

**Recommendation:** DOE should prioritize funding for projects that commit to a broad array of binding agreements that are diverse in the people they serve and the types of benefits they deliver.

- 5. Trust and information sharing are major hurdles to effective collaboration of the hydrogen industry with communities as they develop hydrogen hubs.** In an evolving industry such as hydrogen, it is easy for a lack of education or misunderstanding to create resistance.

**Recommendation:** DOE and hub developers should seek to be as transparent as possible, keeping all stakeholders abreast of hub plans as soon as they are ready to be shared. DOE and hub developers should consider publicizing approved CBP submissions and the metrics by which CBPs were judged, for instance.

# Conclusion and Next Steps

The transition to net-zero emissions depends on accelerating clean energy deployments. To do so requires bringing communities into the project development process in new ways. While productive community engagement is complex, this factbook offers insights on how community members want to be engaged to create equitable and inclusive hydrogen hubs. With H2Hubs selections announced, the EFI Foundation aims to support community representatives, DOE, and developers in working to build trust and meaningful collaborations that advance H2Hubs equitably, rapidly, and successfully.

Moving forward, these findings demonstrate a need for a stronger focus on implementing preferred engagement strategies. As this factbook includes a diversity of individual perspectives, stakeholders may use this resource to align engagement plans and determined benefits with local preferences and community compositions. Survey findings call for augmenting community engagement strategies to consider methods not included in the CBP guidance, with an emphasis on the involvement of trusted community representatives. This approach holds the promise of making the H2Hub process fairer, ultimately garnering greater support for the projects.

These results also reveal the variety of community perspectives regarding hydrogen's role in decarbonization. Though individual community members express a great deal of support, it is important to account for the increased likelihood that those in disadvantaged communities may be unsure of their position. These findings underscore the need for customized and accessible information sharing. It calls for collaboration that respects the diversity within communities and addresses the familiarity gaps that exist among different community types.

One way to address specific community needs is through the co-creation of binding agreements between hub developers and communities. To strengthen the binding agreement development and implementation process, the EFI Foundation team plans to conduct a series of interviews with participants involved in specific cases. Deep dives into these case studies will create a better understanding of the benefits and hurdles of initiating, negotiating, and implementing binding agreements. Through this assessment, stakeholders will have clarity on best practices for developing agreements that lead to more enduring partnerships in future energy projects.

The factbook's survey brings new voices into conversations about the steps and methods for what DOE considers to be good community engagement. Understanding the complexity of this issue, the EFI Foundation is aiming to add more insights on what's needed and how it can be accomplished.

The level of community priority in the H2Hubs process is groundbreaking and exciting for the future of energy development. This factbook offers a look into respondents' preferences and priorities. To ensure collaboration is done right, these community voices must be heard.

# Appendix A. Survey Methods

The survey was developed using an online platform called Pollfish. Pollfish’s algorithm provides access to a broad range of survey respondents through 120,000-plus partner applications. Pollfish sends the survey as advertising alternatives for individuals who have the partner applications installed. Respondents are recruited through in-app invitations as banner ads or pop-ups. Then, respondents are able to confirm interest in the survey and create a profile. Respondents are able to take the survey as long as they fit the targeting criteria set by the survey maker. Pollfish’s AI technology performs consistent verification throughout the creation of the profile and as the respondent takes the survey to verify that the respondent is not a bot (by detecting the speed at which the survey is taken and the legibility of open-ended responses). If a bot is detected, its responses are removed from the survey results.<sup>50</sup>

- At the time of its creation (May 2023), the survey was distributed only to people living in states with publicly announced hydrogen hub applications—this included every state in the nation except for New Hampshire and South Dakota. It is important to note, however, that South Dakota was selected in October 2023 as part of the Heartland hub.<sup>51</sup>
- When fielding the survey 32,245 people were filtered out following the initial question: “Are you a member of one of the following groups?” Respondents were unable to complete the survey if they did not identify as a part of the following: Recognized Tribe; Labor union, worker organization, or workforce development organization; Disadvantaged community based on CJEST’s map; or Environmental justice organization, or other organization representing overburdened, underrepresented, or disadvantaged communities. With 4,992 survey completions, respondents that qualified to complete the survey were representative of the nation. According to CJEST, 34% of the US population are living in census tracts labeled as disadvantaged, and 13% of those that began the survey were cleared to complete it following the filter question.
- Communities are considered disadvantaged by CJEST: if they are in census tracts that meet the thresholds for at least one of the tool’s categories of burden, or if they are on land within the boundaries of Federally Recognized Tribes. The categories of burden include (1) at or above the threshold for one or more environmental, climate, or other burdens, and (2) at or above the threshold for an associated socioeconomic burden. In addition, a census tract that is completely surrounded by disadvantaged communities and is at or above the 50% percentile for low income is also considered disadvantaged.<sup>52</sup> Though the poverty level varies based on household size, the 2024 federal poverty level (FPL) is yearly income ranging between \$15,060 for individuals to \$31,200 for a household of 4. The official poverty rate is currently 11.5%.<sup>53</sup> Of our survey respondents, 12.9% reported yearly income under \$25,000, and an additional 13.06% reported a yearly income of \$25,000 to \$49,999, which is representative of the nation.
- Survey respondents were mostly representative of the nation demographically, though Hispanic respondents were underrepresented and White respondents were overrepresented. The U.S. Census Bureau estimates U.S. racial demographics for 2022 to be 59% white, 14% Black, 6% Asian, 3% multiracial, and 19% Hispanic or Latino. Survey respondents’ racial makeup was 70% white, 11% Black, 4% Asian, 2% multiracial, and 7% Hispanic or Latino. The Census Bureau estimates 50% of the population to be female persons, and the survey respondents were 48% female persons, 51% male persons, and 1% other persons.<sup>54</sup>



# Appendix A. Survey Methods

Survey questions and descriptive statistics for the survey results are shown below:

Are you a member of one of the following groups? If you are a member of more than one group, please select the one you would like to represent in the survey.		
Answers	Answers (%)	Count
Recognized Tribe	9.86%	492
Labor union, worker organization, or workforce development organization	20.03%	1,000
Disadvantaged community (blue area on the map)	60.10%	3,000
Environmental justice organization, or other organization representing overburdened, underrepresented, or disadvantaged communities	10.02%	500



Over the past few years, clean hydrogen energy has become an important part of solving climate change. The U.S. Department of Energy (DOE) is awarding \$8 billion to a handful of groups throughout the country who are working to create “hydrogen hubs” where clean hydrogen energy will be made and used. They are considering one in your area. Each hydrogen hub group must have a plan for providing benefits to its local communities. Many of the hub groups are actively working with communities to decide what those benefits should be. We are investigating whether this is going well or not and are doing this study to make sure that the money is really going to benefit your community. It’s okay if you don’t know anything about hydrogen energy—that’s helpful for us to know! NOTE: Your responses are completely anonymous. The results of this study will not be associated with any individuals or companies.

The U.S. Department of Energy (DOE) wrote a guidebook for hub groups to help them figure out how to work with your community to make sure you get the benefits you want from the hydrogen hubs in your area. The following questions are about the things included in that guidebook. You can read the whole guidebook on the DOE Office of Clean Energy Demonstration website by searching for "CBP Guidance."

How familiar are you with the concept of a Community Benefits Plan (CBP)?

# Appendix A. Survey Methods

Answers	Answers (%)	Count
Extremely familiar - I am working on one	20.93%	1,045
Moderately familiar	28.75%	1,435
Slightly familiar	23.72%	1,184
Not familiar at all - I have never heard of them	26.60%	1,328

The guidebook says that a “good” community engagement process will follow these steps: • Understand community culture, like how decisions are made. • Identify key community and labor partners, especially organizations representing frontline communities and labor unions representing workers. • Determine who will be most impacted by the hydrogen hub, like those living close by. • Set goals for working with the community and the scope of the engagement plan. • Establish methods, timelines and budgets for working with communities. • Decide who from the hub group is in charge of working with communities and how. • Settle on how to measure success, both from the community perspective and the hub groups’. • Pinpoint resources the hub groups will need to do everything above, like time, money and personnel. • Show evidence of two-way engagement, where hub groups respond to community concerns and make decisions based upon them. • Discuss any plans for binding community agreements. If hub groups followed each of the steps above:

	Count					Answers (%)				
	Definitely not	Probably not	Not sure	Probably yes	Definitely yes	Definitely not	Probably not	Not sure	Probably yes	Definitely yes
Would they be more likely to get you and your community to participate in hydrogen hub conversations?	169	450	1,087	2,190	1,096	3.39%	9.01%	21.77%	43.87%	21.96%
Would they be more likely to develop a project that will really benefit you and your community?	112	325	1,066	2,280	1,209	2.24%	6.51%	21.35%	45.67%	24.22%
Would you and your community be more likely to really influence the decisions that are made?	109	473	1,191	2,092	1,127	2.18%	9.48%	23.86%	41.91%	22.58%

# Appendix A. Survey Methods

Would you and your community be more likely to consider it a fair process?	116	332	1,050	2,320	1,174	2.32%	6.65%	21.03%	46.47%	23.52%
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The guidebook suggests the following methods for engagement to ensure that benefits actually flow to your community: • Public hearings: a formal, in-person meeting to record questions from members of the public or give people a set time to speak to voice their opinions. • Town hall meetings: more of an open discussion than a formal public hearing. • Open houses: often include information or education about a project, where the public can go around and ask questions like at a science fair. • Informal, targeted chats: short presentations to targeted audiences (e.g., environmental NGOs), followed by open discussion. • Focus groups: a small group of people brought together to talk about an issue. • One-on-one meetings: a project representative sits down with you or someone from your community for a personal meeting. • Facilitated discussions: conversations that are guided by a third party (neutral person). • Virtual workshops: can combine aspects of the above methods (open houses, informal chats, town hall meetings) but it all takes place online. If companies used all the methods listed above:

	Count					Answers (%)				
	Definitely not	Probably not	Not sure	Probably yes	Definitely yes	Definitely not	Probably not	Not sure	Probably yes	Definitely yes
Would they be more likely to get you and your community to participate in hydrogen hub conversations?	88	397	842	2,358	1,307	1.76%	7.95%	16.87%	47.24%	26.18%
Would they be more likely to develop a project that will really benefit you and your community?	88	342	886	2,347	1,329	1.76%	6.85%	17.75%	47.02%	26.62%
Would you and your community be more likely to really influence the decisions that are made?	75	351	1,046	2,307	1,213	1.50%	7.03%	20.95%	46.21%	24.30%
Would you and your community be more	129	319	748	2,407	1,389	2.58%	6.39%	14.98%	48.22%	27.82%

# Appendix A. Survey Methods

likely to consider it a fair process?										
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Please select up to 5 of the most important engagement methods. “Important” here means methods that are most likely to include lots of voices in decision-making and lead to real benefits for you and your community.			
Answers	Respondents (%)	Answers (%)	Count
Public hearings: a formal, in-person meeting to record questions from members of the public or give people a set time to speak to voice their opinions.	70.67%	16.59%	3,528
Town hall meetings: more of an open discussion than a formal public hearing.	57.09%	13.40%	2,850
Open houses: often include information or education about a project, where the public can go around and ask questions like at a science fair.	66.43%	15.59%	3,316
Informal, targeted chats: short presentations to targeted audiences (e.g., environmental NGOs), followed by open discussion.	46.37%	10.88%	2,315
Focus groups: a small group of people brought together to talk about an issue.	48.28%	11.33%	2,410
One-on-one meetings: a project representative sits down with you or someone from your community for a personal meeting.	46.37%	10.88%	2,315
Facilitated discussions: conversations that are guided by a third party (neutral person).	39.34%	9.23%	1,964
Virtual workshops: can combine aspects of the above methods (open houses, informal chats, town hall meetings) but it all takes place online.	50.88%	11.94%	2,540
Other	0.64%	0.15%	32

There are lots of other engagement strategies that are NOT included in the guidebook such as:

- Document co-creation: a process for hub groups and community members to make binding agreements about the benefits the hub groups will provide to the communities.
- Citizen panels: a group of people who represent all the different kinds of people in your community are chosen to discuss an issue and make recommendations on how to proceed.
- Community mapping: community members help hub groups create a map of the resources and assets that exist in your area.
- Working groups: a group of community leaders and relevant stakeholders who get together regularly to discuss the project.
- Digital storytelling: community members bring their stories to life by creating movies, photographs, and other media.
- Scenario testing: a group of community members comes up with a few different hypothetical ways the project could go, including the types of benefits they could get out of it.

Thinking of these engagement strategies, plus the most important you selected from the guidebook, please select up to 5 of the most important engagement strategies. As a reminder, “important” here means methods that are most likely to include lots of voices in decision-making and lead to real benefits for you and your community.		
Answers	Respondents (%)	Answers (%)

# Appendix A. Survey Methods

Public hearings: a formal, in-person meeting to record questions from members of the public or give people a set time to speak to voice their opinions.	54.13%	10.83%
Town hall meetings: more of an open discussion than a formal public hearing.	35.30%	7.06%
Open houses: often include information or education about a project, where the public can go around and ask questions like at a science fair.	41.83%	8.37%
Informal, targeted chats: short presentations to targeted audiences (e.g., environmental NGOs), followed by open discussion.	24.34%	4.87%
Focus groups: a small group of people brought together to talk about an issue.	24.74%	4.95%
One-on-one meetings: a project representative sits down with you or someone from your community for a personal meeting.	24.26%	4.85%
Facilitated discussions: conversations that are guided by a third party (neutral person).	16.71%	3.34%
Virtual workshops: can combine aspects of the above methods (open houses, informal chats, town hall meetings) but it all takes place online.	28.85%	5.77%
Document co-creation: a process for hub groups and community members to make binding agreements about the benefits the hub groups will provide to the communities.	43.63%	8.73%
Citizen panels: a group of people who represent all the different kinds of people in your community are chosen to discuss an issue and make recommendations on how to proceed.	57.75%	11.55%
Community mapping: community members help hub groups create a map of the resources and assets that exist in your area.	40.06%	8.01%
Working groups: a group of community leaders and relevant stakeholders who get together regularly to discuss the project.	38.72%	7.74%
Digital storytelling: community members bring their stories to life by creating movies, photographs, and other media.	28.21%	5.64%
Scenario testing: a group of community members comes up with a few different hypothetical ways the project could go, including the types of benefits they could get out of it.	40.56%	8.11%
Other	0.92%	0.19%

Thinking about the most important engagement methods you just selected... If hub groups used your preferred community engagement methods:										
	Count					Answers (%)				
	Definitely not	Probably not	Not sure	Probably yes	Definitely yes	Definitely not	Probably not	Not sure	Probably yes	Definitely yes
Would they be more likely to get you and your	82	320	611	2,588	1,391	1.64%	6.41%	12.24%	51.84%	27.86%



# Appendix A. Survey Methods

community to participate in hydrogen hub conversations?										
Would they be more likely to develop a project that will really benefit you and your community?	88	227	707	2,457	1,513	1.76%	4.55%	14.16%	49.22%	30.31%
Would you and your community be more likely to really influence the decisions that are made?	81	263	825	2,406	1,417	1.62%	5.27%	16.53%	48.20%	28.39%
Would you and your community be more likely to consider it a fair process?	117	258	625	2,304	1,688	2.34%	5.17%	12.52%	46.15%	33.81%

Several hub groups have started using binding agreements that are legally enforceable to guarantee certain benefits to communities like yours. They can include things like a guaranteed wage rate or the number of local people who will be hired; investments in public services like building schools and parks; or environmental protections like decreasing local air pollution. These agreements are negotiated and signed by people from your community.

If there were a binding agreement that promised certain benefits to you and your community, would you be more likely to support the hydrogen hub project than if there were no binding agreements?		
Answers	Answers (%)	Count
Yes	86.16%	4,301
No	5.17%	258
I don't know	8.67%	433

If not, why not?

# Appendix A. Survey Methods

If there were a binding agreement that promised certain benefits to you and your community, would you be more likely to consider it a fair process than if there were no binding agreements?		
Answers	Answers (%)	Count
Yes	84.19%	4,203
No	6.43%	321
I don't know	9.38%	468

If not, why not?

How much do you know about hydrogen energy?		
Answers	Answers (%)	Count
A great deal	16.81%	839
A lot	18.09%	903
A moderate amount	25.96%	1,296
A little	24.68%	1,232
Nothing at all	14.46%	722

In general, do you support or oppose hydrogen energy?		
Answers	Answers (%)	Count
Support	78.27%	3,907
Oppose	3.27%	163
I don't know	18.47%	922

What would you need to know or what would need to change for you to support hydrogen energy?

In general, do you think the following statements about hydrogen energy are true or false? Hydrogen has the potential to:						
	Count			Answers (%)		
	True	False	I don't know	True	False	I don't know
Solve climate change	3,505	628	859	70.21%	12.58%	17.21%
Cause explosions	1,614	2,222	1,156	32.33%	44.51%	23.16%

# Appendix A. Survey Methods

Prolong our dependence on the fossil fuel industry	1,790	2,038	1,164	35.86%	40.83%	23.32%
Create local air pollution problems	1,073	2,884	1,035	21.49%	57.77%	20.73%
Solve local air pollution problems	3,154	806	1,032	63.18%	16.15%	20.67%
Require new pipelines to be built in my neighborhood	2,648	908	1,436	53.04%	18.19%	28.77%
Create new jobs	4,088	484	420	81.89%	9.70%	8.41%
Eliminate old jobs	1,774	1,951	1,267	35.54%	39.08%	25.38%

Do you work for a company or organization that engages with the hydrogen industry?		
Answers	Answers (%)	Count
Yes	31.83%	1,589
No	68.17%	3,403

## Demographics:

### Ethnicity:

Arab	1.04%	52	Latino	3.19%	159
Asian	3.73%	186	White	70.81%	3,535
Black	11.28%	563	Multiracial	1.92%	96
Hispanic	3.87%	193	Other	2.88%	144
			Prefer not to say	1.28%	64

### Education:

Middle school	2.60%	130	Vocational/Technical college	15.83%	790
High school	20.21%	1,009	University	36.94%	1,844
			Post-graduate	24.42%	1,219

### Marital Status:

Single	19.67%	982	Living with partner	11.04%	551
Married	54.45%	2,718	Widowed	2.50%	125
Divorced	8.25%	412	Separated	2.42%	121
			Prefer not to say	1.66%	83

# Appendix A. Survey Methods

## Number of Children:

None	27.80%	1,388	4	3.87%	193
1	26.32%	1,314	5	1.10%	55
2	29.93%	1,494	6 or more	0.50%	25
3	9.90%	494	Prefer not to say	0.58%	29

## Income:

Under \$25,000	12.90%	644	Between \$100,000 and \$124,999	15.16%	757
Between \$25,000 and \$49,999	13.06%	652	Between \$125,000 and \$149,999	14.04%	701
Between \$50,000 and \$74,999	12.94%	646	\$150,000 or more	10.74%	536
Between \$75,000 and \$99,999	17.29%	863	Prefer not to say	3.87%	193

## Employment:

Employed for wages	57.25%	2,858	Student	3.55%	177
Self-employed	16.15%	806	Military	0.34%	17
Out of work and looking for work	5.97%	298	Retired	4.85%	242
Out of work but not currently looking for work	1.58%	79	Unable to work	3.65%	182
Homemaker	4.21%	210	Other	2.46%	123

## State:

Alabama, United States	2.34%	117	Delaware, United States	0.24%	12
Alaska, United States	0.18%	9	Florida, United States	8.29%	414
Arizona, United States	1.96%	98	Georgia, United States	4.53%	226
Arkansas, United States	0.90%	45	Hawaii, United States	0.40%	20
California, United States	11.86%	592	Idaho, United States	0.38%	19
Colorado, United States	0.86%	43	Illinois, United States	3.75%	187
Connecticut, United States	1.14%	57	Indiana, United States	1.66%	83

# Appendix A. Survey Methods

Iowa, United States	0.60%	30	North Carolina, United States	3.93%	196
Kansas, United States	0.52%	26	North Dakota, United States	0.18%	9
Kentucky, United States	1.62%	81	Ohio, United States	3.25%	162
Louisiana, United States	1.60%	80	Oklahoma, United States	1.32%	66
Maine, United States	0.42%	21	Oregon, United States	0.84%	42
Maryland, United States	2.22%	111	Pennsylvania, United States	3.33%	166
Massachusetts, United States	1.84%	92	Rhode Island, United States	0.36%	18
Michigan, United States	2.66%	133	South Carolina, United States	2.50%	125
Minnesota, United States	0.86%	43	Tennessee, United States	3.73%	186
Mississippi, United States	1.36%	68	Texas, United States	7.69%	384
Missouri, United States	1.70%	85	Utah, United States	0.48%	24
Montana, United States	0.10%	5	Vermont, United States	0.12%	6
Nebraska, United States	0.28%	14	Virginia, United States	2.56%	128
Nevada, United States	0.92%	46	Washington, United States	2.06%	103
New Jersey, United States	3.33%	166	West Virginia, United States	0.68%	34
New Mexico, United States	0.56%	28	Wisconsin, United States	1.02%	51
New York, United States	6.67%	333	Wyoming, United States	0.16%	8

## U.S. Census Division:

East North Central	12.34%	616	Pacific	15.34%	766
East South Central	9.05%	452	South Atlantic	24.96%	1,246
Middle Atlantic	13.32%	665	West North Central	4.15%	207
Mountain	5.43%	271	West South Central	11.52%	575
New England	3.89%	194			



## EFI Foundation Survey Open-Ended Responses

Two team members were responsible for developing, assigning, and synthesizing codes for 742 open-ended survey responses. The codes were defined through an inductive coding process. The team conducted an interreliability test on a random subset of 10% of survey responses to assess the consistency and agreement among both coders, ensuring the validity of our coding process. Percent agreement between coders was 81%, and the Cohen's kappa was 0.77, a substantial level of agreement.<sup>55</sup>

The survey responses were derived from the following open-ended questions:

If there were a binding agreement that promised certain benefits to you and your community, would you be more likely to support the hydrogen hub project than if there were no binding agreements?

- a. If NO, why not?
  - i. 258 responses

If there were a binding agreement that promised certain benefits to you and your community, would you be more likely to consider it a fair process than if there were no binding agreements?

- b. If NO, why not?
  - i. 321 responses

In general, do you support or oppose hydrogen energy?

- a. If NO, what would you need to know or what would need to change for you to support hydrogen energy?
  - i. 163 responses

The coders developed and followed the following general principles:

1. Only code those excerpts that referred to either community benefits agreements or hydrogen.
2. Code at the sentence level.
3. Code with enough context to understand the meaning and intent.
4. If a sentence aligns with multiple codes, include all relevant codes.
5. Preferentially assign subcodes when they accurately capture the content.
6. If the sentence does not fit a subcode but is still useful to code, assign the relevant larger code.

The codes and their definitions are replicated below. Any typos within the definitions are preserved to maintain integrity of respondents' comments.

# Appendix B. Qualitative Coding Methods

1. Decarbonization: These excerpts reference the relationship between hydrogen's potential benefits and drawbacks in terms of its role in decarbonization initiatives broadly.
  - a. Extending the life of fossil fuels: This code references mentions of hydrogen as a mechanism to “extend the life of fossil fuels.”
2. Distrust: This code pertains to responses that reflect skepticism or lack of trust in aspects related to the hydrogen industry and community benefits agreements. This code should be used when general sentiments of distrust are made without explicit acknowledgment to the subcodes. An example would be: “Don’t trust it.”
  - a. Safety concerns: Statements expressing worries related to the safety of hydrogen due to its flammability and potential for explosions, suggesting a lack of confidence in its safe utilization (e.g., hydrogen explosions).
  - b. Relationship to stakeholders: Comments indicating skepticism about the interactions with those involved in hydrogen development and/or CBA processes. This code should be used when it is not clear if the distrust lies with government or industry (as captured by the subcodes). For example: “I’m not sure they have our best interests in mind.”
    - a. Relationship to government: This code references skepticism toward government entities as it relates to hydrogen development and CBAs. Examples are: “The government doesn’t keep its promises.” This could be coded alongside several codes, but “process opaqueness,” specifically, if the respondent mentions government AND lack of transparency. For example: “The government doesn’t want us to know what is going on.”
    - b. Relationship to industry: This code captures skepticism surrounding relationships to the developers as it relates to hydrogen development and CBAs. Examples are: “Oil and gas companies never want to help us. Why now?” This could be coded alongside several codes, but “extending the life of fossil fuels,” specifically, if the respondent mentions lack of trust with industry AND extending the life of fossil fuels. Examples include: “It seems like the push for hydrogen is driven by the same fossil fuel companies that have a history of prioritizing profits over environmental concerns.” If the excerpt is not explicit in “extending the life of fossil fuels,” ONLY use the “relationship to industry” code. An example of this would be: “It is a cop out for oil and gas companies.”
  - c. Process opaqueness: Expressions of doubt or suspicion regarding the transparency of hydrogen production and community benefit agreement processes and the accessibility of information, reflecting concerns about the ability to engage in discussions and decision-making. This code may capture concerns about the outcome changing without their awareness. Some examples are: “If the agreement doesn’t work out, I’m screwed” or “They could change their mind” (the latter would also be coded with Relationship to Stakeholders, since it references “they” along with the process changing).
3. Community impact: This code encompasses responses that highlight the overall potential impacts and risks of the hydrogen industry and benefits agreements on the community. For example, this code includes sentiments explicitly referencing NIMBYism and general sentiments that do not fall into the three subcodes below. This includes: “How will this affect me and my community?” “No benefits,” or “I would want to know more about how this will impact my neighborhood.” This code may also be frequently coded with “Inquiry” or “Lack of knowledge.”
  - a. Environmental impact: This code pertains to responses discussing the potential effects of hydrogen production, storage, and usage on the environment. It includes considerations of emissions that might alter the natural landscape and/or contribute to pollution.

# Appendix B. Qualitative Coding Methods

- b. Health impact: Statements highlighting concerns about the health effects of hydrogen-related emissions on humans and air quality, reflecting worries about potential negative health consequences.
- c. Economic impact: Responses discussing concerns about economic implications, such as job losses, high costs, and potential competition with other forms of clean energy.
- 4. Climate change denial: Refusal or skepticism regarding the validity of climate change. For example, this would include respondents who say they do not support hydrogen energy because they do not believe climate change is real.
- 5. Inquiry: Statements explicitly seeking knowledge about hydrogen technology and community benefits agreements and displaying curiosity about advantages and disadvantages. For example: “I would need to know more research on it.”
- 6. Lack of knowledge: Statements explicitly expressing a lack of knowledge regarding hydrogen and/or CBPs but without a desire to learn more. For example: “I don’t know.”
- 7. Role in engagement: Statements that pertain to how community members perceive and approach their involvement in engagement activities concerning community benefits agreements and the hydrogen industry. When possible, subcodes should be used to make the distinction between individual and community engagement, but this code should be used if it is not made explicit. For example: “More involvement in the process.”
  - a. Individual role in engagement: This code captures an individual’s interest in engaging, including considerations of the time individuals are willing to commit to engagement efforts as well as the inclination for some to prefer delegating engagement responsibilities to other individuals rather than participating directly. For example: “I would want to hear what the company has to say” or “I would want to be involved.”
  - b. Community role in engagement: This code encompasses responses that reference engagement on the community level, including getting other community members interested in the engagement process. For example: “Our community should have more say” or “I would want someone in the community who is an expert to be involved.”

## DOE H2Hub Community Briefing Questions and Answers (Q&As)

Using the same general principles, two team members were also responsible for developing, assigning, and synthesizing codes for 933 questions and comments across seven total hydrogen hub community briefings following DOE hub selections.<sup>56</sup> The survey codes were revised through an inductive coding process to align with themes within the briefings. The team conducted an interreliability test on a random subset of 10% of Q&A comments within each briefing. Percent agreement between coders for this coding process was 76%, and the Cohen’s kappa was 0.75, a substantial level of agreement.<sup>57</sup>

The codes and their definitions are replicated below.

- 1. Inquiry: Questions within the hydrogen hub community briefings that are related to hydrogen or CBPs that do not fit within any of the other codes. Use sparingly—all other codes should be considered/prioritized before labeling an excerpt with this code. Unlike the other codes, this code should not be used alongside other codes and is only intended to be used alone when a relevant question is made that should be captured but lacks an appropriate code. For example: “How do you know?” or “What geospatial tools will be used on the assessment to advance equity?”

# Appendix B. Qualitative Coding Methods

2. Hydrogen technology inquiry: Excerpts referring to participants' questions for more information regarding the technologies related to the production and use of hydrogen. This code encompasses those comments related to the different "colors" of hydrogen. For example: "Is Ammonia considered a media of energy storage/transport and even direct fuel?" or "What type of hydrogen would be produced in this project? Is it blue hydrogen?"
3. Hydrogen infrastructure inquiry: Excerpts referring to participants' questions for more information regarding the infrastructure associated with the production, storage, transportation, and distribution of hydrogen (i.e., production facilities, storage and transportation methods, etc.). It may be frequently coded with the "require new pipelines" code. For example: "Is the list of projects and their location available to the public at this moment?" or "How many miles of CO<sub>2</sub> and H<sub>2</sub>, respectively, pipelines will be built?"
4. Decarbonization: These excerpts reference the relationship between hydrogen's potential benefits and drawbacks in terms of its role in decarbonization initiatives broadly. This code can include comments OR questions about hydrogen's decarbonization role. This code can be used with positive OR negative sentiments. When an excerpt is explicitly positive or negative, leave a memo indicating the distinction for future analysis. If the "decarbonization" comment or question is more explicitly tied to the subcode "extending the life of fossil fuels," use the subcode. This code may be frequently used with "hydrogen technology inquiry." For example: "You say natural gas will benefit like it's a good thing" or "Capturing carbon emissions does not make them go away. There is much too little discussion of the process of CCS."
  - a. Extending the life of fossil fuels: This code references mentions of hydrogen as a mechanism to "extend the life of fossil fuels."
5. Process inquiry: Questions regarding the hydrogen hub process and the accessibility of information. The subcodes should be used if one party (government or industry) is explicitly targeted with the question or comment. If both parties are mentioned, do not use subcodes "government" and "industry" together. Instead, use this code EITHER when both parties are mentioned or when it is unclear who the question or comment is toward. This code may capture concerns or questions about the outcome changing without their awareness. Some examples are: "How will economic sustainability be assessed?" or "Who identifies impacted communities - hub applicant or OCED?" or "Can we see a list of participants in this wonderful presentation?"
  - a. DOE process: This code references questions or comments directly to DOE only about hydrogen hub engagement, funding, decision-making, and other aspects related to the hydrogen hub process. Examples are: "Will OCED be providing more details about each hub beyond the press release details? Likewise, will OCED be providing regular updates like this presentation (not newsletter updates) on the hubs as they develop?"
  - b. Industry process: This code references questions or comments directly to industry only about hydrogen hub engagement, decision-making, and other aspects related to the hydrogen hub process. Examples are: "ARCH2's list of community supporters includes no grassroots, racial justice, environmental justice groups and little environmental representation. If this plan is so important to DOE and these projects, why did ARCH2 not engage these stakeholders and what will be different moving forward?"
  - c. Community role in engagement: Statements that pertain to how community members perceive and approach their involvement in engagement activities concerning community benefits agreements and the hydrogen industry. For example: "We want more involvement in the process" or "How frequently will communities be engaged?" or "Were community members involved in writing the CBP?"

# Appendix B. Qualitative Coding Methods

6. Community impact: This code encompasses responses that highlight the overall potential impacts and risks of the hydrogen industry and CBPs on the community. For example, this code includes sentiments explicitly referencing NIMBYism and general sentiments that do not fall into the four subcodes below. This includes: “How will this affect me and my community?” or “Question for Neil Banwart; you recently presented in Kane County Illinois with local governments and stakeholders—the map from your location slide appears to not include Kane County. Is this accurate?”
  - a. Environmental impact: Responses or questions discussing the potential effects of hydrogen production, storage, and usage on the environment. It includes considerations of emissions that might alter the natural landscape and/or contribute to pollution. Examples include: “will the hubs have a plan to monitor and control related air quality pollutants like NOx, PM, VOC, PFAS, and other environmental impacts (ex. water use, waste management, traffic, noise, light, dust, land disturbance, biodiversity and wildlife impacts)?”
  - b. Health impact: Statements or questions highlighting concerns about the health effects of hydrogen-related emissions on humans and air quality, reflecting worries about potential negative health consequences. Examples are: “We will need more physicians, nurses, hospice workers, emergency response workers and undertakers once [before] we all perish from your plan.”
  - c. Economic impact: Responses or questions discussing concerns about economic implications, such as job losses, high costs, and potential competition with other forms of clean energy. Examples include: “Will taxpayers continue to bail out these projects if they are not cost-competitive?” or “how many years will the expected 18,000 construction workers be supported by the hydrogen hub. How will the phaseout of this employment effect be addressed?”
  - d. Safety concerns: Questions or statements expressing worries related to the safety of hydrogen due to its flammability and potential for explosions, suggesting a lack of confidence in its safe utilization (e.g., hydrogen explosions). Examples are: “during any type of incident, small or catastrophic. Why hasn't there been any input or funding allocations from local first responders to help us mitigate any type of emergencies. We do not have funding resources to ensure that we have the equipment and manpower to mitigate any type of emergencies that could occur.”



# Appendix C. Binding Agreement Case Study Methods

Binding agreements were located through an exhaustive web search and snowball sampling based on informal conversations with involved stakeholders. The full list of case studies is below with the name of the project, the binding agreement signatories, where the project is located, the type of agreement and when it was signed, as well as a few key sources of information that we used to develop the details of the case study.

Name	Signatories	Location	Agreement Type/Year	Sources
Alaska/Alyeska Trans Alaska Pipeline System Community Workforce Agreement	Alaska Pipeline (now Alyeska Pipeline); Alaska Federation of Natives	Alaska	“The signing of the ANUA [Alaska Native Utilization Agreement] is mandated by the Agreement and Grant of Right-of-Way for the Trans Alaska Pipeline (Grant of Right-of-Way), an agreement that stipulates details of pipeline construction and operation. The Grant of Right-of-Way was first agreed to in 1974.” The 2007 renewal of ANUA assured the commitment into perpetuity. (Source: <a href="#">DOI, Office of the Secretary, 2004</a> ; <a href="#">Alaska Native Program</a> )	<a href="#">DOI, Office of the Secretary, Alaska Native Program</a>
Bay State Massachusetts Offshore Wind Project Labor Agreement	Bay State Wind (a joint partnership between Ørsted and Eversource); International Brotherhood of Electrical Workers (IBEW); International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers (IABSO); and the Utility Workers Union of America (UWUA)	Massachusetts	PLA signed in 2018.	<a href="#">Press release: “IBEW, IABSO and UWUA Sign Agreements,” 2018</a> <a href="#">Ørsted, 2018</a>
Block Island Offshore Wind Rhode Island Project Labor Agreement	Deepwater Wind (eventually acquired by Ørsted in 2018); local trade unions	Rhode Island	PLA signed in 2016.	<a href="#">BlueGreenAlliance</a> <a href="#">Ørsted: Bryan Wilson</a>
Chevron and City of Richmond, California, Refinery Modernization Project Community Benefit Agreement	Chevron; City of Richmond; Contra Costa Building and Construction Trades Council	California	Environmental and Community Investment Agreement (ECIA) was first signed in 2014, with amendments the following years. PLA was signed in 2013.	<a href="#">Press release: “Labor Unions and Chevron Reach Agreement to Build Richmond Refinery Modernization Project”</a> <a href="#">Chevron Refinery Modernization Project</a>

# Appendix C. Binding Agreement Case Study Methods

and Project Labor Agreement				<a href="#">Environmental and Community Investment Agreement</a>
Diablo Canyon Nuclear Power Plant California Community Impact Mitigation Agreement	Pacific Gas & Electric Company (PG&E); County of San Luis Obispo, in coordination with the San Luis Coastal Unified School District (SLCUSD) and a local coalition of cities	California	Agreement submitted as a "Community Impact Mitigation Program"	<a href="#">Community Impact Mitigation Program</a> <a href="#">NRDC: Update on Agreement</a>
Eversource Energy/Ørsted North East Offshore Wind New London, Connecticut, Host Community Agreement	Eversource Energy/Ørsted; City of New London	Connecticut	Host community agreement signed in 2021.	<a href="#">Office of Governor Ned Lamont</a> <a href="#">Host Community Agreement</a>
Excelsior Energy Solar Energy Byron, New York, Host Community Benefit Agreement	Excelsior Energy, subsidiary of NextEra Energy Resources; Town of Byron	New York	Host CBA signed in 2021.	<a href="#">The Daily News, 2022</a> <a href="#">NextEra Energy</a> <a href="#">Host Community Benefit Agreement</a>
Heritage Onshore Wind Host Community Agreement	Apex Clean Energy; Town of Barre, Orleans County	New York	Host community agreement signed in 2021.	<a href="#">Heritage Wind</a> <a href="#">New York State Office of Renewable Energy Siting</a>
Maine Aqua Ventus (Monhegan Plantation) Offshore Wind Community Benefit Agreement	Diamond Offshore Wind; Town of Monhegan Plantation; University of Maine	Maine	Draft in 2017. CBA currently under negotiation.	<a href="#">Island Institute</a> <a href="#">Monhegan CBAC Report</a> <a href="#">Community Benefit Agreement</a>
Pacific Gas & Electric (PG&E) Transmission Line Wildfires Community Benefit Agreement	Six Northern California counties (Butte, Lassen, Plumas, Shasta, Sonoma, and Tehama); PG&E	California	In 2022, PG&E reached a CBA with a coalition of community groups in California. The CBA was a response to the company's role in a series of wildfires that killed dozens of people and destroyed thousands of homes in 2019 and 2021.	<a href="#">PG&amp;E</a>

# Appendix C. Binding Agreement Case Study Methods

Calverton Solar Energy Center Riverhead, New York, Community Benefit Agreement	Long Island Solar Generation (NextEra Energy and National Grid); Town of Riverhead	New York	CBA signed in 2021.	<a href="#">RiverheadLOCAL, 2021</a> <a href="#">Riverhead News Review, 2020</a>
Robbinston, Maine, Liquefied Natural Gas (LNG) Import Terminal Community Benefits Agreement	Downeast LNG (DELNG); Town of Robbinston	Maine	CBA signed in 2011. The project has since been canceled.	<a href="#">CBC, 2016</a> <a href="#">Host Community Benefits Agreement</a>
Sibanye-Stillwater Good Neighbor Agreement	Stillwater Mining Company; Northern Plains Resource Council; local community organizations	Montana	Good Neighbor Agreement signed in 2000.	<a href="#">Northern Plains Research Council, 2000</a>
South Fork, New York, Offshore Wind Farm and Cable Host Community Agreement	Town of East Hampton and the East Hampton Town Trustees; South Fork Wind (a joint venture between Ørsted and Eversource)	New York	Host community agreement signed in 2021.	<a href="#">Host Community Agreement</a>
Thacker Pass Nevada Lithium Mine Project Community Benefit Agreement	Fort McDermitt Paiute and Shoshone Tribes; Lithium Americas Corp.	Nevada	CBA signed in 2022.	<a href="#">LithiumAmericas, 2022</a> <a href="#">GlobeNewswire: CBA signed at Thacker Pass</a>
Vineyard Offshore Wind CBA/HCA/PLA	Vineyard Wind LLC (Copenhagen Infrastructure Partners and Avangrid Renewables); Town of Barnstable; the Alliance to Protect Nantucket Sound; local fishery and fishing industry; Southeastern Massachusetts Building Trades Council	Massachusetts	CBA signed in 2015. Host community agreement signed in 2018. PLA signed in 2021.	<a href="#">E&amp;E News, 2023</a> <a href="#">Swain, 2019</a>

# Appendix D. Examples of Community Engagement Methods

## Examples<sup>58,59,13</sup>

### Inform

- General information channels
- Websites
- Public meetings
- Social media
- Videos
- Site visits, open houses, and tours
- Infographics and fact sheets
- Presentations
- Displays, billboards, and exhibits

### Consult

- Focus groups
- Polls
- Surveys
- Voting
- Comment boxes
- Interviews
- Social media listening
- Door-to-door
- Community and online forums
- Open houses
- Town halls
- Workshops
- Kitchen table talks
- Public comment and online commenting

### Involve

- Visioning
- Mind mapping
- Digital storytelling
- Crowdsourcing ideas
- Community mapping
- Hackathons
- Design charrette
- Participatory budgeting
- Scenario testing
- Community organizing and advocacy
- Interactive workshops
- Polling
- Community forums
- Open planning forums with citizen polling

### Collaborate

- Memorandums of understanding (MOUs) with community-based organizations
- Citizen advisory committees (panels)
- Collaborative data analysis
- Co-design and co-implementation of solutions
- Collaborative decision-making
- Large group meetings
- Working groups
- Open space forums
- Online communities
- Document co-creation (e.g., CBA)

# Appendix D. Examples of Community Engagement Methods

## Defer To

- Community-driven planning
- Consensus building
- Participatory action research
- Participatory budgeting
- Cooperative models



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