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# **Codifying Community Benefits in US Climate and Clean Energy Projects**

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## **Acronyms and abbreviations**

**AES:** Applied Energy Services Corporation

**CBA:** community benefits agreement

**CBP:** community benefits plan

**CO<sub>2</sub>:** carbon dioxide

**DAC:** disadvantaged community

**DBEs:** disadvantaged business enterprises

**ENO GRIP:** Entergy New Orleans Grid Resilience and Innovation Partnership

**DOE:** Department of Energy (United States)

**HCA:** host community agreement

**HCB:** Host Community Benefits Program

**HSEO:** Hawai'i State Energy Office

**KIUC:** Kaua'i Island Utility Cooperative

**MW:** megawatts

**MWh:** megawatt hours

**PILOT:** payment in lieu of taxes agreement

**PPL:** PPL Corporation

**SMUD:** Sacramento Municipal Utility District

**US:** United States

## Executive summary

As climate and clean energy infrastructure projects expand across the United States (US), community benefits have become a central but inconsistently defined feature of project development. Carbon Direct analyzed 40 US-based climate and clean energy infrastructure projects to understand how developers, investors, and agencies define, implement, and monitor benefits to local and frontline communities. Our analysis revealed five core categories of benefits: fiscal, infrastructure, workforce, environmental, and procedural. We also found that these benefits are operationalized through four distinct frameworks: Community Benefit Agreements (CBAs), Community Benefit Plans (CBPs), Host Community Agreements (HCAs), and hybrid or other approaches. Further, our findings reveal that **community benefits are not peripheral to climate and clean energy infrastructure projects, but foundational to their success.**

The landscape of climate and clean energy technologies and associated commercial development is evolving rapidly. While earlier projects relied heavily on transactional payments to host communities, or investments in local infrastructure, newer frameworks increasingly integrate procedural equity, workforce standards, and measurable social outcomes. This is particularly true for projects modeled on CBP guidance from the US Department of Energy. Despite this recent progress, **a lack of shared standards and long-term accountability mechanisms continues to produce inconsistent and inequitable outcomes across sectors and communities.**

Projects that embed transparent, participatory, and durable benefits frameworks are more likely to gain social license, build long-term community partnerships, and deliver sustained climate and equity outcomes. **Standardizing language, metrics, and reporting frameworks across public and private sectors is critical to ensuring that the next generation of climate and clean energy infrastructure is both climate resilient and community aligned.**

## Key takeaways

- **Community benefits are a strategic imperative.** Beyond compliance, robust community benefit frameworks enhance project viability, investor confidence, and the long-term resilience of the US climate and energy transition.
- **Five core benefit types define the field.** Fiscal, infrastructure, workforce, environmental, and procedural benefits comprise the primary categories used by developers to describe and measure community benefits and outcomes.
- **Equity remains unevenly operationalized.** While procedural and participatory benefits are gaining traction, more traditional fiscal and infrastructure benefits still dominate.
- **A shared language for benefits is critical to success.** Developing a shared vocabulary, consistent reporting templates, and independent monitoring systems will be essential for equitable and durable community benefit outcomes.

## Introduction

Carbon Direct conducted a review of community benefits documents from 40 climate and clean energy infrastructure projects<sup>1</sup> in the US. We examined how these projects define, implement, and monitor community benefits for frontline communities.<sup>2</sup> Rather than assessing projects against idealized standards, our analysis traces the different approaches to community benefits currently shaping the landscape of climate and clean energy infrastructure in the US. **Table 1** lists our key findings from this review. We worked from the recognition that responsible climate solutions must generate public good and ensured that project developers and investors equitably distribute benefits to frontline and locally impacted communities.

**Table 1.** Key findings from Carbon Direct’s analysis of climate and clean energy infrastructure projects in the US

| Key findings                     | Finding detail                                                                                                                                                                                                                        |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Five core benefit types          | The five core benefit types are: fiscal, infrastructure, workforce, environmental, and procedural.                                                                                                                                    |
| Four distinct benefit frameworks | The four benefit frameworks are: Community Benefit Agreements (CBAs), Community Benefit Plans (CBPs), Host Community Agreements (HCAs), and hybrid/other models.                                                                      |
| High variability                 | Selected case studies illustrated how developers employ varying metrics and governance structures to implement and monitor community benefits.                                                                                        |
| Significant gaps                 | Comparisons between traditional and emergent benefit models reveal evolving norms and expectations in community benefit practice. There is a lack of a shared language for defining, implementing, and monitoring community benefits. |

Environmental and climate justice advocates assert that climate and clean energy infrastructure projects should help build a better world for the communities most impacted by historical and contemporary infrastructure development, all while making progress toward climate goals. Key to

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<sup>1</sup> We base our definition of “climate and clean energy infrastructure projects” on the definition of “clean energy project” from the Legal Information Institute: “The term ‘clean energy project’ means a project that demonstrates [one] or more of the following technologies: (A) Solar. (B) Micro-grids. (C) Geothermal. (D) Direct air capture. (E) Fossil-fueled electricity generation with carbon capture, utilization, and sequestration. (F) Energy storage, including pumped storage hydropower and compressed air storage. (G) Advanced nuclear technologies.” Legal Information Institute. 2021. Definition: clean energy project from 42 USC § 18761(a)(1). Legal Information Institute; [accessed 2025 Nov 13]. [https://www.law.cornell.edu/uscode/text/42/18761#a\\_1](https://www.law.cornell.edu/uscode/text/42/18761#a_1)

<sup>2</sup> Our discussion of frontline communities is based on the definition given by the National Wildlife Federation: “Frontline communities are communities overburdened by environmental hazards. They are often defined by locally unwanted land uses (like landfills or power plants) that negatively impact the health of community members and the health of the environment. Climate change compounds the burdens frontline communities face—and can make these communities increasingly climate-vulnerable.” National Wildlife Federation. n.d. Climate Change and Communities. [accessed 2025 Nov 13]. <https://www.nwf.org/Home/Our-Work/Climate/Climate-Change/Communities>

this work is ensuring that local impacted communities benefit from the emerging green economy.<sup>3</sup> To achieve this, society must hold people—especially those most impacted by the effects of climate change—and the planet as cornerstones of climate and clean energy infrastructure development.

### **Why is it important to focus on community benefits now?**

As the US mobilizes historic levels of public and private investment to decarbonize the economy, these infrastructure projects will reshape landscapes, economies, and livelihoods for decades to come. Yet the promise of a just transition<sup>4</sup> depends not only on the technologies deployed, but on the relationships and accountability structures built along the way. Our analysis shows that the concept of a “community benefit” does not exist in isolation, but instead represents a complex and evolving practice that determines who gains from, who bears the risks of, and whose voices are heard during project development.

The second Trump administration has, so far, resulted in major setbacks for climate and clean energy projects in the US and has slowed, but not halted, the building of a new green economy.<sup>5</sup> However, developing climate mitigation and adaptation infrastructure requires planning that spans decades, a time horizon much longer than the reach of any one presidential administration. While political timelines do have real impacts on ecological and climate outcomes, the good news is that climate technologies have developed rapidly in recent years. In some US states, these technologies have shown significant growth that is expected to continue.

**As the infrastructure required to support a green economy continues to develop, the need for mechanisms that support robust, equitable, and measurable community benefits becomes especially important.** Recent rollbacks of federal guidance on and requirements for community benefits paired with the present lack of standardized frameworks and best practices for evaluating and distributing community benefits in climate and clean energy projects, creates a precarious situation for communities. Now more than ever, it is imperative that developers, investors, and agencies have a shared language for defining, implementing, and monitoring project benefits to local and frontline communities.

In recent years, CBPs have emerged as a tool for defining, implementing, and monitoring community benefits from climate and clean energy infrastructure investments in the US. During the Biden administration, in response to the passage of the Inflation Reduction Act and the Justice40

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<sup>3</sup> The United Nations Environment Programme (UNEP) defines a “green economy” as: “one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. In its simplest expression, a green economy can be thought of as one which is low carbon, resource efficient and socially inclusive.” UNEP. 2011. Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication. UNEP; [accessed 2025 Nov 13].

[https://sustainabledevelopment.un.org/content/documents/126GER\\_synthesis\\_en.pdf](https://sustainabledevelopment.un.org/content/documents/126GER_synthesis_en.pdf)

<sup>4</sup> United Nations Development Programme Climate Promise. 2022 Nov 3. What is just transition? And why is it important? United Nations Development Programme Climate Promise; [accessed 2025 Nov 13].

<https://climatepromise.undp.org/news-and-stories/what-just-transition-and-why-it-important>

<sup>5</sup> Environmental & Energy Law Program, Harvard Law School. 2025 Jan 20. Trump Rescinded Biden’s Executive Order 14008 Establishing Justice40 Initiative. [updated 2025 Mar 1]. [accessed 2025 Nov 17] <https://eelp.law.harvard.edu/tracker/rollback-trump-rescinded-bidens-executive-order-14008-that-establishes-justice40-initiative/>

Initiative under Executive Order 14008,<sup>6</sup> the US Department of Energy (DOE) developed a CBP process that detailed requirements for clean energy developers seeking federal funding. The DOE set a foundation and attempted to establish CPBs as instruments that could pull together multiple, seemingly disparate, interests—uniting them to encourage stronger development outcomes for projects and the communities they directly impact.

Recent state legislative efforts, like California’s SB 643,<sup>7</sup> have focused on formalizing community benefits from climate mitigation projects. While it did not get signed into law, it is likely that SB 643 would have required projects to turn to prevailing frameworks like CBPs. While not a perfect tool, a CBP does allow local stakeholders to leverage climate investments in their communities and negotiate terms that benefit their short- and long-term needs.

Mapping how developers, investors, and agencies define, implement, and monitor community benefits reveals both the diversity and fragmentation of the climate and clean energy sectors. The absence of a shared community benefit framework and supporting metrics has created inconsistency in how communities experience the impacts of climate and clean energy infrastructure projects, sometimes resulting in distrust, delayed implementation, and/or inequitable outcomes.<sup>8</sup> According to a Lawrence Berkeley National Laboratory study:

“Developers report that community opposition and local ordinances that limit or restrict renewable development are leading causes of project delays and cancelations. The only other factor that was selected as a top-three leading cause of cancelation and delay by a majority of both wind and solar developers was grid interconnection issues. . . . Over half of all respondents were very concerned, with over 80% at least moderately concerned, that community opposition will get in the way of decarbonization goals.”<sup>9</sup>

To help address community concerns, stakeholders can take steps to build transparency around and clearly communicate community benefit approaches across the climate and clean energy sectors.

**Ultimately, understanding how to effectively implement community benefits is not simply about regulatory or legal compliance. Community benefits are essential to the long-term viability of the climate and clean energy industry, and are central to strategic planning.** Projects that are able to integrate transparent, participatory, and locally grounded community benefit frameworks, while allowing the flexibility to tailor benefits to specific regional or project contexts, are more likely

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<sup>6</sup> Executive Office of the President. 2021. Tackling the Climate Crisis at Home and Abroad. Federal Register; [accessed 2025 Nov 13]. <https://www.federalregister.gov/documents/2021/02/01/2021-02177/tackling-the-climate-crisis-at-home-and-abroad>

<sup>7</sup> The California Legislature passed SB 643 to fund a carbon removal purchase program for the state. However, the legislation was rejected by the governor: [https://www.carbon-direct.com/insights/california-governor-vetoes-carbon-removal-program-\(sb-643\)-despite-climate-wins](https://www.carbon-direct.com/insights/california-governor-vetoes-carbon-removal-program-(sb-643)-despite-climate-wins)

<sup>8</sup> Carley S, Konisky DM. 2020. The Justice and Equity Implications of the Clean Energy Transition. *Nature Energy*. 5:569-577. [https://ecology.iwww.org/PDF/misc/Carley.2020\\_Energy-Justice-Lit-Review.pdf](https://ecology.iwww.org/PDF/misc/Carley.2020_Energy-Justice-Lit-Review.pdf)

<sup>9</sup> Nilson R, Rand J, Hoen B, Elmallah S. 2024. Halfway up the ladder: Developer practices and perspectives on community engagement for utility-scale renewable energy in the United States. *Energy Research & Social Science*. 117:103706. <https://doi.org/10.1016/j.erss.2024.103706>

to secure social license, sustain long-term community partnerships, and deliver lasting climate outcomes. Getting community benefits right is foundational to the success of climate and clean energy projects. Carbon Direct believes that supporting developers to fully integrate community benefits into project design processes, from inception to implementation, is critical to protecting the environment and the success of future generations.

## Methodology

In this white paper, we explore the question: *How have contemporary climate and clean energy infrastructure projects in the US articulated, described, and distributed benefits to local and impacted communities?* To understand this, we analyze community benefits documents from 40 different climate and clean energy infrastructure projects. The various implementation frameworks and mechanisms we examined reveal the evolving priorities and approaches currently shaping the social dimensions of climate and clean energy development.

## Scope

This study focused on 40 US-based climate and clean energy infrastructure projects to understand how stakeholders articulate and implement community benefits, either through CBPs or alternative frameworks. For this analysis, we drew from three primary databases: Columbia University's Sabin Center for Climate Change Law, the World Resources Institute, and a joint effort between California Forward and the Possibility Lab at University of California, Berkeley. Utilizing the methodology described below, we selected a sample of community benefits documents from 40 projects in these compiled datasets, which contained a total of 458 community benefits documents. Out of these 40 projects, we focused on Baron Winds, Connected Clean PowerCity Initiative, and Trailblazer CO<sub>2</sub> Pipeline as case studies to highlight the diversity of community benefit frameworks and implementation approaches across climate and clean energy technologies and US regions.

## Case selection

We began the case selection process by conducting informational interviews with experts in climate and clean energy technologies and the community benefits associated with them. We spoke with Carbon Direct experts who have backgrounds in various carbon mitigation technologies and consulted external experts in climate projects and community benefits to determine which case studies should be included in our sample, based on the quality of project design. The following four projects were named during informational interviews as exemplary cases: Calverton Solar Energy, Heritage Wind, South Coast Wind, and Trailblazer CO<sub>2</sub> Pipeline. The remaining projects, and corresponding community benefits documents, were selected at random and refined to ensure a representative sample size along the following criteria: US region, climate and clean energy technology, and community benefit mechanism.

The 40 projects we selected span a period from 2017 to 2024, and focused on infrastructure projects across seven technology classes: (1) onshore wind, (2) offshore wind, (3) utility-scale solar and storage, (4) CO<sub>2</sub> pipeline transportation, (5) hydrogen/clean energy hubs, (6) high-voltage direct current transmission, and (7) grid modernization and urban microgrid resilience.

Within these seven technology types, projects varied in their community benefits implementation, which were grouped into four distinct frameworks: (1) CBAs, (2) CBPs, (3) HCAs, (4) hybrid/other models such as payment in lieu of taxes agreements (PILOTs), good neighbor agreement/private neighbor agreements, settlement agreements, or engagement plans.

## Analysis

As part of our analysis, we used a structured qualitative approach that included manual and artificial intelligence (AI) methodologies for advanced assessment of large community benefit documentation datasets. We designed a structured question prompt series for AI tools to capture consistent information across all 40 varied case studies. We individually downloaded each of our community benefit documents for the 40 projects and ran them through the structured question prompt series one at a time. We then cross-referenced the resulting answers with original documentation. We read the original documents for validation, organized them, and cataloged the documents into an annotated bibliography. We also closely read a select sample of six community benefit documents prior to running them through the structured AI question prompt series (see [Appendix B](#) for further details on our methodology).

Our approach was informed by projects that included community benefit documentation of some kind. **Figure 1**, shows the distribution of climate and clean energy technologies across community benefits frameworks for the 40 sample projects.

**Distribution of climate technologies across community benefits frameworks**

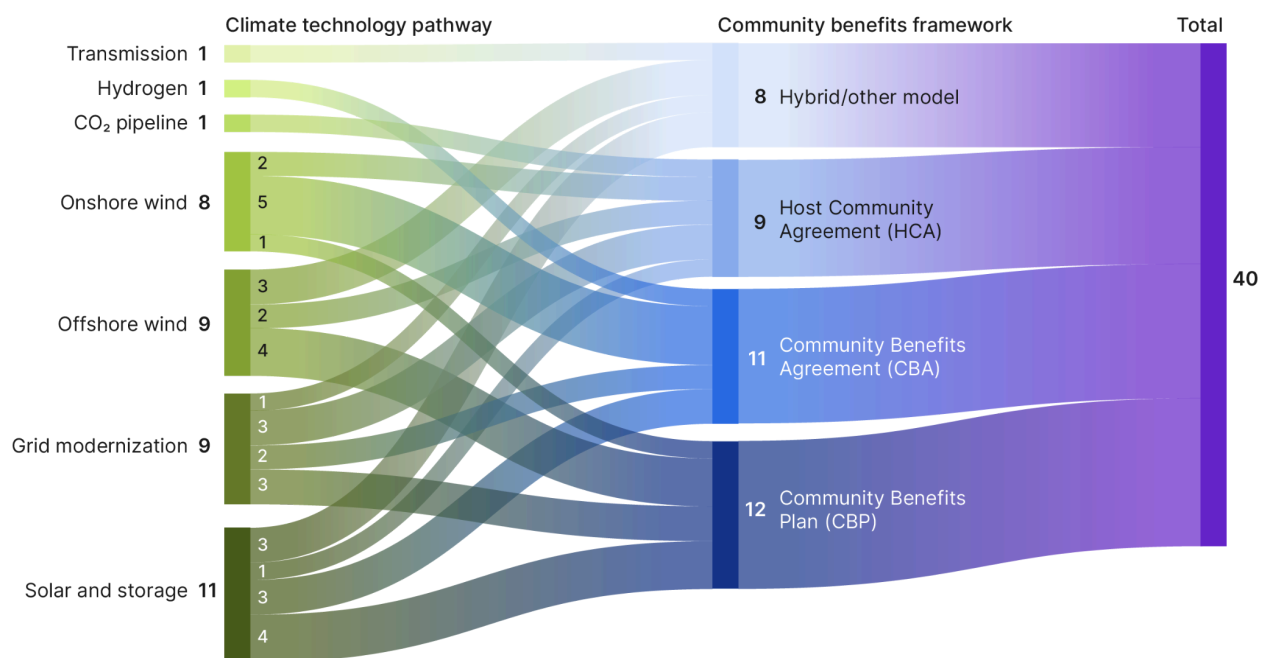


**Figure 1.** Distribution of climate and clean energy technologies across community benefits frameworks for the 40 projects we analyzed. Source: Carbon Direct.

Before conducting a deeper analysis, we reviewed the various community benefit frameworks present across the sample projects. These frameworks contain the contractual, procedural, or

organizational approaches projects use to develop community benefits. We then individually ran the documents from our 40 case studies through AI tools using our structured question prompt series methodology (see [Appendix B](#)) and captured responses in an annotated bibliography, tracking for specific descriptions and themes. This approach allowed us to conduct a large-scale analysis of a wide range of publicly available community benefit frameworks. Based on outputs, we then ran our annotated bibliography back through AI tools to identify emerging themes. From this, we developed the following taxonomy of community benefits from climate and clean energy infrastructure projects in the US.

## A taxonomy of community benefits from climate and clean energy projects in the US

Because varied community benefit frameworks are increasingly used for community negotiations and as indicators of social impact for investors, a taxonomy helps distinguish the different types of benefits, clarify intent, and provide a framework for evaluation. We developed our community benefits taxonomy around three emergent themes from our analysis: benefit frameworks, benefit categories, and benefit approaches.

- **Benefit frameworks:** The overarching process, document, legal or contractual framework, or other means of planning for, detailing, and delivering benefits. We found four distinct frameworks in our sample size of 40 projects.
- **Benefits categories:** The kinds of benefits that a project might deliver to a local community. Based on our sample size of 40 projects, we grouped these benefits into five core categories.
- **Benefit approaches:** The mechanisms by which benefits are actually delivered to local communities. We found approaches are driven by specific benefit characteristics that sometimes correlate with benefit framework or category. However, approaches are more specifically linked to project, context, and benefit characteristic.

### Benefit frameworks

The 40 projects we analyzed varied in the way they defined, implemented, and monitored community benefits and were grouped into four distinct frameworks:

1. Community Benefit Agreements (CBAs)
2. Community Benefit Plans (CBPs)
3. Host Community Agreements (HCAs)
4. Hybrid or other approaches

### Benefit categories

Our analysis revealed five core categories of benefits: fiscal, infrastructure, workforce, environmental, and procedural. These categories are defined below:

1. **Fiscal:** Traditional economic development, which often takes the form of indirect economic improvements such as tax revenue, workforce programs, etc.
2. **Infrastructure:** Physical or service benefits such as road repair, grid modernization, or broadband improvements, often measured by quantitative metrics like miles or number of facilities built.
3. **Workforce:** Job-oriented benefits including apprenticeships, local hire requirements, and prevailing wage commitments.

4. **Environmental:** Benefit outcomes such as emissions reductions, air quality improvements, resilience efforts, and habitat restoration.
5. **Procedural:** Inclusive decision-making, design, and implementation processes that ensure local participation and transparency.

Together, these five core categories reflect a varied approach to how developers conceptualize community benefits, from simple compensation payments toward a more integrated model that combines financial, social, and environmental value. Most current projects, particularly those previously funded through the DOE under its CBP requirements, blend several of these benefit types, linking economic investment in the proposed project with local capacity building, environmental performance, and shared decision-making. **Table 2** outlines how these benefit categories relate to the tracking metrics and defining language used across the community benefits documents from our 40 sample projects.

**Table 2.** Community benefits categories, tracking metrics, and defining language used in sample documents for climate and clean energy infrastructure projects in the US

| Type of benefit | Common tracking metrics                                                                                                                                           | Defining language                                                                                                                                                   | Project examples (see <a href="#">Appendix A</a> )                                                                                                                       |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fiscal          | Always denominated in US\$ and tied to metrics such as MW produced, tonnes of CO <sub>2</sub> mitigated, or year; described as compensation or local reinvestment | "Host fee," "PILOT," "community fund," "benefit payments," "grants," "per-MW contribution," "royalty," "resilience fund"                                            | SouthCoast Wind (US\$23 million over 33 years), Heritage Wind (HCA + PILOT + HCB credits), Trailblazer CO <sub>2</sub> Pipeline (US\$/tonne CO <sub>2</sub> sequestered) |
| Infrastructure  | Physical or service infrastructure co-benefits; often quantified in miles, MWh, or number of facilities                                                           | "Road repair," "emergency services support," "resilience upgrades," "grid modernization," "microgrid reliability," "broadband or water infrastructure improvements" | Baron Winds (road bonding), Maine Aqua Ventus (broadband fund), Viejas (Electric Vehicle Superhub)                                                                       |
| Workforce       | Increasingly standardized under DOE CBP template; measured in number of trainees, percent local/DAC hires, or US\$ spent with DBEs                                | "Apprenticeships," "local hire," "prevailing wage," "supplier diversity," "training and certification programs," "Good Jobs"                                        | PPL Grid of the Future, SMUD Connected Clean PowerCity, AES Marahu                                                                                                       |
| Environmental   | Typically justified as co-benefits, rarely monetized; metrics are modeled (MWh renewable, greenhouse gas emissions avoided or reduced)                            | "Emissions reductions," "resilience," "air quality improvement," "climate adaptation fund," "renewable integration," "agricultural co-use"                          | AES Marahu (greenhouse gas avoidance), Hawai'i/KIUC (outage reduction and resilience), Maine Aqua Ventus (renewable research and development benefits)                   |
| Procedural      | Benefits defined as processes (e.g., engagement,                                                                                                                  | "Community Working Group," "Wayfinders," "complaint resolution,"                                                                                                    | HSEO/KIUC, ENO GRIP, Viejas Microgrid, Trailblazer Pipeline                                                                                                              |

| Type of benefit | Common tracking metrics                  | Defining language                                                                               | Project examples (see <a href="#">Appendix A</a> ) |
|-----------------|------------------------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------------|
|                 | transparency, governance representation) | "annual reporting,"<br>"Justice40 alignment,"<br>"non-opposition clause,"<br>"Tribal ownership" |                                                    |

Note: AES = Applied Energy Services Corporation, CBP = community benefits plan, CO<sub>2</sub> = carbon dioxide, DAC = disadvantaged community, DBEs = disadvantages business enterprises, DOE = Department of Energy (United States), ENO GRIP = Entergy New Orleans Grid Resilience and Innovation Partnership, HCA = host community agreement, HCB = Host Community Benefits Program, HSEO = Hawai'i State Energy Office, KIUC = Kaua'i Island Utility Cooperative, MW = megawatts, MWh = megawatt hours, PILOT = payment in lieu of taxes agreement, PPL = PPL Corporation, SMUD = Sacramento Municipal Utility District, US\$ = United States dollars.

## Benefit approaches

Along with the four distinct benefit frameworks and five core benefit categories, we also found the sample documents used language that described a wide array of benefit approaches. These approaches are driven by characteristics such as benefit target, beneficiary, geographic scale, duration, whether a benefit is direct or indirect, the enforceability of a benefit, and if it targets social equity outcomes. **Table 3** outlines this composition of benefit characteristics and demonstrates the large swath of subtypes and resulting benefit approach outcomes by listing specific examples.

**Table 3.** Disaggregated community benefit language describing a range of benefit approaches driven by benefit characteristics

| Benefit characteristic | Subtype                 | Example                                                                                                                 |
|------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Target                 | Mitigation              | Offsetting nuisance, risk, or land-use impact (typical in HCAs for wind, solar, and pipelines)                          |
|                        | Compensation            | Balancing public cost of hosting a project (e.g., municipal budgets, roads, and safety)                                 |
|                        | Reinvestment            | Directing project value back to community priorities (e.g., education, resilience, and climate adaptation)              |
|                        | Co-ownership            | Ensuring communities share in long-term value or decision-making (common in DOE CBPs, tribal contexts, or DAC contexts) |
| Beneficiary            | Individual/resident     | Direct household benefits such as bill credits, abutter funds, or training stipends                                     |
|                        | Municipal/institutional | Benefits channeled through local governments or institutions (e.g., HCA, PILOT, resilience fund)                        |
|                        | Community               | Collective or cooperative benefits such as tribal buy-outs, royalties, or community co-ops                              |

| Benefit characteristic | Subtype                         | Example                                                                                                          |
|------------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------|
| Geographic scale       | Regional                        | Benefits distributed through broader mechanisms like DAC allocations or climate resilience networks              |
|                        | Site-specific                   | Focused on immediate project area (e.g., town funds or road repairs)                                             |
|                        | Regional/tribal/island-wide     | Serving multiple communities or jurisdictions                                                                    |
|                        | Systemic/networked              | Multi-state or system-level initiatives                                                                          |
| Duration               | Upfront/one-time                | Delivered at signing, notice to proceed, or commercial operation date                                            |
|                        | Annual/recurring                | Provided regularly (e.g., per-MW, per-tonne, or per-year payments)                                               |
|                        | Performance-triggered           | Activated by measurable milestones (e.g., revenue percentage, tonnes of CO <sub>2</sub> stored, or MW generated) |
|                        | Legacy/lifetime/decommissioning | Designed for long-term stewardship or end-of-project activities (e.g., reclamation or repowering funds)          |
| Direct versus indirect | Direct                          | Benefits that reach individuals or households directly (e.g., bill credits or stipends)                          |
|                        | Indirect                        | Benefits that flow through public or institutional channels (e.g., municipal budgets or infrastructure upgrades) |
| Enforceability         | Contractual                     | Codified in legal agreements such as HCAs or CBAs                                                                |
|                        | Programmatic                    | Managed through structured reporting or monitoring frameworks (e.g., DOE CBPs)                                   |
|                        | Aspirational                    | Guided by voluntary goals or non-binding targets (e.g., Justice40 commitments)                                   |
| Social equity          |                                 | Indicates whether benefits are explicitly targeted to historically marginalized or disadvantaged groups          |

Note: CBA = community benefits agreement, CBP = community benefits plan, CO<sub>2</sub> = carbon dioxide, DAC = disadvantaged community, DOE = Department of Energy (United States), HCA = host community agreement, MW = megawatt, PILOT = payment in lieu of taxes agreement..

## Case studies

We focused on Trailblazer CO<sub>2</sub> Pipeline, Baron Winds, and Connected Clean PowerCity Initiative as case studies to illustrate the diversity of community benefit implementation in US climate and clean energy projects. Each project highlights different approaches: Trailblazer CO<sub>2</sub> Pipeline demonstrates a stakeholder-informed CBA, Baron Winds shows the challenges of procedural alignment through a HCA, and Connected Clean PowerCity Initiative exemplifies a structured CBP with measurable equity-focused outcomes. Together, they provide insights across benefit frameworks, categories, and approaches in varied regional and technological contexts.

### Trailblazer CO<sub>2</sub> Pipeline

*CO<sub>2</sub> transportation using a CBA in Nebraska (multiple counties)*



Large gas pipeline. Source: Adobe Stock.

The Trailblazer CO<sub>2</sub> Pipeline, developed by Tallgrass Energy, is a major CO<sub>2</sub> transportation project that repurposes existing natural gas infrastructure to enable large-scale CO<sub>2</sub> capture and storage. Covering multiple counties in Nebraska, the project converts a 392-mile natural gas mainline, long operated under the Federal Energy Regulatory Commission, into a CO<sub>2</sub> transport system capable of

handling over 10 million tonnes of emissions annually.<sup>10</sup> The negotiation of a comprehensive CBA with local nonprofits and landowner advocates is central to the project's industry viability strategy. The agreement includes measures intended to foster community and landowner trust, with several mechanisms addressing risk and social license. The Trailblazer CO<sub>2</sub> Pipeline project's model provides an example of infrastructure repurposing coupled with measurable benefits and adaptive community safeguards. Key components include:

- **Performance-based payments and milestones:** Community and landowner payments are explicitly tied to project outcomes, such as tonnes of CO<sub>2</sub> sequestered, with annual value sharing set at US\$0.10 per tonne through 2035. Benefit sunset clauses, project milestone triggers, and a US\$500,000 initial fund ensure that money only flows as the project progresses, aligning developer and stakeholder incentives.
- **Landowner protections:** The CBA codifies advanced notices for land surveys, gives landowners the option for annual or lump-sum easement payments, and allows termination of easements if the pipeline is not built within seven years (with further payments for extensions). Landowners have the option to select a one-time bonus of US\$15,000 if abandoned infrastructure is left in place.
- **Direct community investment:** A separate community investment vehicle (a fund), is established to support counties supporting the project's right of way. The fund is proposed to be established with an initial investment of US\$500,000 upon project completion and supplemented annually, based on operational CO<sub>2</sub> volumes.

The Trailblazer CO<sub>2</sub> Pipeline project's CBA includes a procedural and safety-first approach, referencing lessons learned from prior carbon infrastructure projects. The agreement includes two mandates:

- **Emergency preparedness:** More than US\$700,000 is committed to regional safety systems and first-responder training, including an alert network and recurring equipment grants, in coordination with public safety officials. Proactive annual mailers and a public project website guarantee accessible safety and incident information.
- **Transparency and accountability:** The CBA offers ongoing feedback mechanisms, channels for remedying disputes, and a "non-opposition" understanding that ensures community partners retain leverage while incentivizing both sides to honor agreements.

In alignment with our taxonomy, the Trailblazer CO<sub>2</sub> Pipeline project includes the following benefit categories:

- **Fiscal:** Annual per-tonne CO<sub>2</sub> sequestration payments to communities and landowners, and a US\$500,000 initial community investment fund.
- **Infrastructure:** Maintenance and repair obligations, and emergency preparedness investment.
- **Procedural:** Transparency, annual mailers, public website, dispute resolution, and performance milestones; and legally codified notice requirements and ongoing feedback mechanisms.

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<sup>10</sup> Columbia Law School, Sabin Center for Climate Change Law. 2024. Trailblazer CO<sub>2</sub> Pipeline Community Benefits Agreement. Columbia Law School, Sabin Center for Climate Change Law; [accessed 2025 Nov 14]. <https://climate.law.columbia.edu/sites/climate.law.columbia.edu/files/content/CBAs/Trailblaze%20CO2%20pipeline-Community-Benefit-Agreement.pdf>

- **Environmental:** Environmental risk reduction via safety and emergency preparedness funding.

## Baron Winds

*Wind farm using a HCA in Steuben County, New York*



Wind farm in New York State. Source: Adobe Stock.

The Baron Winds project's HCA illustrates how complexities and challenges stemming from a lack of shared language and poor alignment procedural equity can strongly influence both outcomes and stakeholder trust in US climate and clean energy infrastructure projects.

The Baron Winds project is a wind farm located in Steuben County, New York. The project proposed up to 76 wind turbines, with a generating capacity of 300 megawatts (MW). It unfolded through multiple agreements, including the Article 10 state siting process, a PILOT tax arrangement with the Steuben County Industrial Development Agency, and the project's HCA with the Town of Fremont.<sup>11</sup> Key fiscal and operational benefits, such as construction payments of US\$1,000 per turbine and annual host fees of US\$3,000 per MW with a consumer price index inflation adjuster, were codified alongside a structured complaint resolution program, a noise monitoring program, and annual fire chief engagement.

Despite these formal mechanisms, definitions for core terms such as what counts as "completion," what triggers "decommissioning obligations," and what constitutes "compliant construction" were

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<sup>11</sup> California Forward. 2019. Host Community Agreement between the Town of Fremont and Baron Winds LLC. [accessed 2025 Nov 14]. <https://cafwd.app.box.com/s/bioqnnny3tppu4rd6xeakw2h022po0x58>

not fully standardized between the developer and community. This led to the need for additional clarification and disputes about milestone triggers, permit processes, and responsibility for road maintenance and utility upgrades. The absence of consensus mechanisms and use of after-the-fact mediation resulted in complaints related to noise,<sup>12</sup> road use,<sup>13</sup> and land use.<sup>14</sup>

Notably, the HCA required post-construction surveys and indemnification. Documentation also showed that the developer made project phase amendments to accommodate community complaints of wind turbine noise and height restrictions, indicating that initial construction schemas were not universally shared.<sup>15</sup> The Baron Winds project demonstrates that procedural benefits require a shared vocabulary, clear terms, and collaborative monitoring. In this case, a lack of clear language left room for interpretation and led to disputes and additional amendments, according to proceeding project documentation. When alignment between developers and communities on benefit language is absent, even the most well-intentioned community benefit proposals risk project delays, litigation, and eroded trust.

In alignment with our taxonomy, the Baron Winds project includes the following benefit categories:

- **Fiscal:** Host payments (e.g., US\$1,000 payment per turbine construction, annual fees per MW, consumer price index inflation adjustment), and PILOT tax arrangement.
- **Infrastructure:** Road use and repair agreements, and post-construction surveys.
- **Procedural:** Dispute resolution and complaint management, as well as annual fire chief engagement.
- **Environmental:** Noise monitoring, and restrictions on wind turbine height, road use, and land use.

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<sup>12</sup> New York State Department of Public Service. 2019. Application of Baron Winds, LLC for a Certificate of Environmental Compatibility and Public Need Pursuant to Article 10 to Construct a Wind Energy Facility. [accessed 2025 Nov 14].

<https://documents.dps.ny.gov/public/MatterManagement/CaseMaster.aspx?MatterCaseNo=15-F-0122>

<sup>13</sup> New York State Department of Public Service. 2019. Road Use Agreement. [accessed 2025 Nov 14].

<https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7BC899BCCA-F43A-448F-B22C-DFE1E6AB2773%7D>

<sup>14</sup> New York State Department of Public Service. n.d. Baron Winds Project Case No. 15-F-0122 Update to 1001.4 Exhibit 4 Land Use. [accessed 2025 Nov 14].

<https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7BA9804B27-1839-4827-958F-FFA66D96179C%7D>

<sup>15</sup> RWE in the Americas. 2025. Baron Winds Article 10 and NY State Compliance. RWE in the Americas; [accessed 2025 Nov 14].

<https://americas.rwe.com/our-energy/onshore-wind/onshore-wind-projects-and-locations/baron-winds-onshore-wind-farm/baron-winds-article-10-and-ny-state-compliance/>

## Connected Clean PowerCity Initiative

*Grid modernization project using a CBP in Sacramento County, California*



Solar farm in California. Source: Adobe Stock.

Funded through the DOE's Grid Resilience and Innovation Partnership program in 2023,<sup>16</sup> the Connected Clean PowerCity Initiative, led by the Sacramento Municipal Utility District (SMUD), proposed a procedural approach for measurable community benefit outcomes in contemporary climate and clean energy infrastructure. This case study shows the multiple intended co-benefits of a grid modernization project, which proposed to embed Justice40 principles, conduct robust stakeholder engagement, and develop community-defined benefits throughout the project lifecycle, setting a replicable model for the energy sector.<sup>17</sup>

SMUD's Connected Clean PowerCity project proposed to cover a wide section of Sacramento County, focusing on both technical upgrades like advanced grid technology and measurable local

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<sup>16</sup> Under the new Trump administration, this award was revoked: Bera A. 2025 Oct 6. Rep. Bera Condemns Trump Administration's Cancellation of \$50 Million Smart Grid Grant for Sacramento Municipal Utility District. US Representative Ami Bera; [accessed 2025 Nov 20].

<http://bera.house.gov/news/press-releases/rep-bera-condemns-trump-administration-s-cancellation-of-50-million-smart-grid-grant-for-sacramento-municipal-utility-district>

<sup>17</sup> Sacramento Municipal Utility District. 2024. Application for Federal Assistance SF-424 for Connected Clean PowerCity. [accessed 2025 Nov 14].

<https://netl.doe.gov/sites/default/files/2024-02/Sacramento%20Municipal%20Utility%20District.pdf>

benefits. Central to this project's approach are the strong partnerships with the federally recognized Wilton Rancheria Tribe of Miwok Indians, the International Brotherhood of Electrical Workers, workforce development agencies, and educational institutions. These partnerships were formalized through memorandums of understanding, labor agreements, and dedicated service contracts, all shaped by sustained input from disadvantaged communities and minority-serving institutions, as listed in the program's CBP.

The Connected Clean PowerCity project's CBP includes, "Specific, Measurable, Assignable, Realistic, and Time-Related (SMART) Milestones," and commits to providing interim reports at the end of the project's budget periods. The interim reports will detail the CBP's milestone progress to date and any updates to the CBP, based on stakeholder engagement and lessons learned. The project's final report will include a final CBP report. SMUD proposed monitoring milestones through quarterly and annual progress reports to both the DOE and community stakeholders, as well as interim updates designed to incorporate feedback and lessons learned. An oversight committee comprising SMUD, tribal, labor, and community partners would meet regularly to review milestones, troubleshoot emerging issues, and ensure that benefit flows are on track.

SMUD's safety, labor standards, and workforce policies are also codified, with hiring, promotion, and equity practices exceeding industry benchmarks. Measurable milestones back the project's pre-apprenticeship, apprentice, and local hiring targets, including training at least 3,000 people and placing 1,000 in clean energy jobs by a proposed date of 2024.

SMUD's project is intentionally designed with equity as a core principle. By centering the Wilton Rancheria Tribe of Miwok Indians as a key partner, the project prioritizes tribal rights and equitable access to clean energy infrastructure. Additionally, the project commits to targeting at least 40% of project benefits specifically to disadvantaged communities, consistent with the Biden administration's Justice40 Initiative. These benefits are defined both as direct investments (e.g., preferential hiring, contractor incentives, and technical training in under-resourced neighborhoods) as well as longer-term resilience and cost savings (e.g., bill discount programs, energy assistance, and new contracting opportunities for local businesses).

In alignment with our taxonomy, the Connected Clean PowerCity project includes the following benefit categories:

- **Fiscal:** Direct investments (e.g., contractor incentives, bill discounts, equity-oriented spending) and preferential hiring for disadvantaged communities, plus funding for technical training.
- **Infrastructure:** Grid modernization, smart technology deployment, electrification initiatives, and physical upgrades impacting community resilience.
- **Workforce:** Apprenticeship and pre-apprenticeship programs, along with clean energy job targets and local hiring milestones.
- **Procedural:** CBP oversight, stakeholder governance committee, SMART milestones, reporting requirements, quarterly/annual reviews, robust engagement protocols, Justice40-aligned focus, and community resilience investments.
- **Environmental:** Air quality, energy efficiency, and access to clean energy infrastructure.

## Cross-cutting observations

Across the projects we reviewed, several themes stand out that illustrate how ideas about community benefits are changing in US climate and clean energy development. Traditional community benefits models focused on direct financial compensation, such as host payments or tax agreements. These models are giving way to hybrid models that combine monetary, procedural, and equity-driven benefits. **More recent models link payments with participation and accountability, reflecting a broader effort to make community benefits more inclusive and durable.**

A clear shift is also underway toward what might be called “measurable equity.” Influenced by the Justice40 Initiative and the DOE’s CBP standards, some projects are adopting specific metrics for tracking who benefits from project infrastructure investments and how. Examples include tracking the share of funds directed to disadvantaged communities, the number of local workers hired, or the proportion of contracts awarded to diverse suppliers such as local businesses, women-owned businesses, or minority-owned businesses. This trend moves beyond general commitments to equity by embedding accountability directly into project design.

Another notable pattern is that developers are framing procedural elements, like equitable community engagement, as a benefit in itself. Creating opportunities for communities to participate in decision-making through working groups, advisory boards, or Tribal Councils is increasingly viewed as a core part of what makes a project beneficial. However, what remains to be seen are measurable evaluations of how effective and best-in-class procedural equity approaches translate to improved outcomes for frontline communities.

**Finally, while the field is beginning to converge around specific frameworks and metrics, implementation still depends heavily on local context.** The way benefits are structured and perceived varies between tribal, municipal, and regional settings. This suggests that even as common standards emerge, meaningful community benefits still rely on locally grounded design and collaboration.

## Evolving language

Earlier community benefits frameworks tended to describe benefits as transactional mitigation practices. These often took the form of traditional finance mechanisms, like fiscal payments and municipal infrastructure commitments, in exchange for social license to build. More recent frameworks strive for community-led reinvestment and more flexible, co-developed governance structures.

While community benefits from climate and clean energy infrastructure projects have expanded, no consistent and commonly held definition of community benefits exists across these projects. Additionally, the regulatory landscape in the US that governs community benefits varies in oversight, reporting, and enforceability. Significant ambiguity also surrounds best practices for identifying who actually benefits, and how governments, landowners, or frontline communities receive the intended gains.

The strength and permanence of oversight mechanisms for community benefits remain highly variable across the US policy landscape. The DOE loan guarantees and associated CBP guidance

previously established binding terms and federal accountability for many projects.<sup>18</sup> However, subsequent changes in the current federal landscape have weakened such oversight, leading to a rollback of requirements and funding for many projects, including the Connected Clean PowerCity project.<sup>19,20</sup> This shift represents a greater and more persistent challenge: a lack of robust, long-term monitoring and community-led evaluation structures across most climate and clean energy infrastructure projects. This lack of ongoing monitoring for implementation of community benefits creates difficulties in ensuring that agreed-upon benefits are sustained over the project's operational lifecycle.

## Patterns by US climate and clean energy technology sector

Distinct patterns emerge when we examine how project developers structure community benefits across different sectors of the climate and clean energy landscape (**table 4**). These patterns are not definitive of all projects in their respective sector. Rather, these are patterns that emerged from our sample size of 40 projects, which may be helpful to consider for specific climate and clean energy technology sectors.

**Table 4.** Benefit patterns by climate and clean energy technology sector

| Sector                              | Distinctive benefit pattern               | Implication                                                            |
|-------------------------------------|-------------------------------------------|------------------------------------------------------------------------|
| Wind/solar                          | Fixed host payments, limited engagement   | Hybridizes with workforce and procedural benefits                      |
| Grid modernization/transmission     | Workforce and supplier diversity emphasis | Aligns with United States Department of Energy's "Good Jobs" standards |
| Hydrogen                            | Justice40 and measurable KPI structure    | Institutionalizes equity tracking                                      |
| Tribal/island microgrids            | Ownership and sovereignty framing         | Introduces "community equity" subclass                                 |
| Pipelines/CO <sub>2</sub> transport | Performance-based payments (\$/tonne)     | Ties benefits to climate outcomes                                      |

In the wind and solar sector, many legacy projects rely on fixed host payments or tax agreements with limited community engagement. However, more recent projects are beginning to combine these traditional fiscal arrangements with workforce programs and procedural mechanisms such as community advisory boards or reporting commitments. This hybridization marks a shift from one-time compensation toward ongoing participation and shared value.

<sup>18</sup> United States Department of Energy. 2024. Guide to DOE Evaluation of Community Benefits Plan Costs. United States Department of Energy. [accessed 2025 Nov 14]. <https://www.energy.gov/sites/default/files/2024-10/Guide%20to%20DOE%20Evaluation%20of%20CBP%20Costs.pdf>

<sup>19</sup> Holmes B, Russo S. 2025. Opportunities to Improve Department of Energy Community Benefits Plans to Deliver Regional Benefits from Federal Energy Investments. Resources for the Future. [accessed 2025 Nov 14]. [https://media.rff.org/documents/WP\\_25-02\\_Final.pdf](https://media.rff.org/documents/WP_25-02_Final.pdf)

<sup>20</sup> Bera A. 2025 Oct 6. Rep. Bera Condemns Trump Administration's Cancellation of \$50 Million Smart Grid Grant for Sacramento Municipal Utility District. US Representative Ami Bera; [accessed 2025 Nov 20]. <http://bera.house.gov/news/press-releases/rep-bera-condemns-trump-administration-s-cancellation-of-50-million-smart-grid-grant-for-sacramento-municipal-utility-district>

In the grid modernization and transmission sector, community benefits often center on workforce development and supplier diversity, emphasizing fair labor standards, local hiring, and inclusive contracting. As utilities and developers expand grid infrastructure, these social and economic components are becoming as important as the technical or environmental considerations.

Within the hydrogen project, benefits are aligned with the Justice40 Initiative and measurable key performance indicator (KPI) structures. This reflects an institutionalized approach to tracking equity outcomes.

For tribal and island microgrids sectors, the defining feature of project benefits is an emphasis on ownership and sovereignty. These projects extend beyond benefit sharing to prioritize local or tribal control over assets and decision-making authority.

Finally, the pipelines and CO<sub>2</sub> transportation sectors are pioneering performance-based benefit structures, in which payments or investments are linked to measurable outcomes such as the number of tonnes of CO<sub>2</sub> safely transported or sequestered. This results-oriented approach directly connects community compensation to the climate performance of a project, reinforcing the principle that community benefits should scale with environmental outcomes.

## **Toward a shared language of benefits**

**Our analysis identified persistent blind spots in how equity is operationalized in US-based climate and clean energy infrastructure projects.** A key pattern is that material benefits often flow to host institutions, such as municipal governments or landowners, rather than being channeled directly to the local residents or historically marginalized groups they are intended to support. Furthermore, while the field of community benefits is expanding, the data confirms that tangible, economic, and material benefits (primarily workforce development and infrastructure improvements) remain the most common and formalized types of support. Conversely, procedural, co-governance, and more transformative equity-oriented benefits are the least formalized, least rigorously tracked, and, as a result, the least enforced elements within current community benefit frameworks.

Through this analysis, Carbon Direct aims to establish a baseline vocabulary for how climate and clean energy infrastructure projects in the US currently define and articulate community benefits. Our analysis offers community-based organizations, advocates, philanthropic organizations, developers, policymakers, and investors tools for informed decision-making by providing a clearer understanding of equity and benefit-sharing approaches in emerging climate and clean energy technologies. Future work can bridge these descriptive insights into robust evaluative frameworks.

The current fragmentation and lack of a comprehensive and unified approach to community benefits from climate and clean energy projects necessitates a deliberate effort toward convergence—starting with developing a shared vocabulary that is consistent across federal, state, local, and private sectors. For this shared language to be effective, reporting templates need to be standardized in the way they describe distributive and procedural outcomes; standardized descriptions must rigorously distinguish between mere community engagement activities and measurable community benefits. Furthermore, moving beyond transactional approaches requires supporting participatory governance models in project design that give communities a meaningful

role in decision-making. By building on this knowledge, emerging climate and clean energy infrastructure research and policy work can establish and leverage best practices that will ensure project development contributes to a more just and resilient future.

## Recommendations for decision makers

To ensure community benefits deliver lasting, equitable, and measurable value across the climate infrastructure landscape, developers, investors, and agencies should prioritize five key actions:

- **Standardize definitions and reporting frameworks.** Establish a common language and a set of minimum reporting metrics for fiscal, infrastructure, workforce, environmental, and procedural benefits that is modeled on common CBP guidance (i.e., from the DOE) and is adaptable across sectors.
- **Embed equity metrics from the start.** Require that measurable social equity and procedural equity outcomes are defined during project conception and included in procurement, permitting, and financing processes, not retrofitted after project approval.
- **Invest in local capacity and trusted partners.** Direct technical assistance and capacity-building funding toward community-based organizations and local governments to ensure they can negotiate, implement, and monitor benefits on an equal footing with developers and investors.
- **Create mechanisms for transparency and accountability.** Develop open, accessible public dashboards and third-party verification systems to track promised and delivered benefits over the project lifecycle.
- **Reward long-term commitment.** Incentivize developers and investors to commit to long-term community engagement, co-governance structures, and adaptive benefit agreements that evolve as community needs and technologies change.

## Appendix A: List of community benefit documents used in this analysis

### Documents from Columbia Law School, Sabin Center for Climate Change Law: Community Benefits Agreements Database

1. Community Benefits Agreement – Trailblazer CO<sub>2</sub> Pipeline (Tallgrass):  
<https://climate.law.columbia.edu/sites/climate.law.columbia.edu/files/content/CBAs/Trailblaze%20CO2%20pipeline-Community-Benefit-Agreement.pdf>
2. Heritage Wind – Public Outreach Summary & Community Engagement Plan:  
<https://climate.law.columbia.edu/sites/climate.law.columbia.edu/files/content/CBAs/Town%20of%20Barre%20HCA%20Summary.pdf>
3. Town of Riverhead and LI Solar Community Benefits Agreement for the Calverton Solar Energy Center: <https://perma.cc/H7GP-ZMKM><sup>21</sup>
4. Host Community Agreement between the Town of Portsmouth, RI, and SouthCoast Wind Energy LLC:  
<https://climate.law.columbia.edu/sites/climate.law.columbia.edu/files/content/CBAs/Portsmouth%20-%20SouthCoast%20HCA.pdf>
5. Town of Osborne and Weaver Wind Community Benefits Agreement:  
<https://climate.law.columbia.edu/sites/climate.law.columbia.edu/files/content/CBAs/07.%20Osborn%20Maine%20Amended%20CBA.pdf>
6. Host Community Agreement between the Town of Charlotte and Cassadaga Wind LLC:  
<https://climate.law.columbia.edu/sites/climate.law.columbia.edu/files/content/CBAs/12.%20Town%20Of%20Charlotte.pdf>
7. Host Community Benefit Agreement between the Town of Byron and Excelsior Energy Center, LLC:  
<https://climate.law.columbia.edu/sites/climate.law.columbia.edu/files/content/CBAs/02.%200Town%20of%20Byron%20Solar.pdf>
8. Host Community Agreement among South Fork Wind, LLC, Town of East Hampton, and the Trustees of East Hampton:  
<https://climate.law.columbia.edu/sites/climate.law.columbia.edu/files/content/CBAs/05.%200East%20Hampton%20Executed.pdf>
9. Town of Ripley and Connectgen Chautauqua County LLC Host Community Agreement:  
<https://climate.law.columbia.edu/sites/climate.law.columbia.edu/files/content/CBAs/01.%20Town%20of%20Ripley%20Agreement.pdf>; also see also town resolution here:  
<https://climate.law.columbia.edu/sites/climate.law.columbia.edu/files/content/CBAs/01.%20Town%20of%20Ripley%20Resolution.pdf>
10. Good Neighbor Agreement between Vineyard Wind, LLC and the Town and County of Nantucket, Maria Mitchell Association, and Nantucket Preservation Trust:  
<https://climate.law.columbia.edu/sites/climate.law.columbia.edu/files/content/CBAs/06.%200Nantucket%20GNA.pdf>

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<sup>21</sup> This project represents an outlier in our analytic methodology. The document link points to a secondary source, which is news coverage about the project and the project's CBA. Our analysis focused on these secondary source details for this project. All other sources in the appendix point directly to sources with primary community benefits documents.

11. Host Community Agreement between the Town of Medway, MA and Medway Grid LLC:  
<https://climate.law.columbia.edu/sites/climate.law.columbia.edu/files/content/CBAs/Medway%20Grid%20BESS%20HCA.pdf>
12. Community Benefits Agreement between the City of Salem and Salem Wind Terminal LLC (Crowley Maritime):  
[https://climate.law.columbia.edu/sites/climate.law.columbia.edu/files/content/CBAs/salem-crowley\\_2024-02-21\\_community\\_benefits\\_agreement\\_-\\_executed.pdf](https://climate.law.columbia.edu/sites/climate.law.columbia.edu/files/content/CBAs/salem-crowley_2024-02-21_community_benefits_agreement_-_executed.pdf)

#### **Documents from World Resources Institute: Database of Community Benefits Frameworks Across the US**

13. Community Benefit Agreement – Maine Aqua Ventus (Monhegan Island, 2017):  
<https://drive.google.com/file/d/1ZtwlFgya72Dt1PXeai-93-WGTLvoQFM/view>
14. Payment in Lieu of Taxes (PILOT) Agreement between GLC-(MA) Taunton, LLC; Trustees of Double H Realty Trust; and the Town of Berkley, Massachusetts:  
<https://drive.google.com/file/d/1bFKhLffHXN96KOdWwMzzsxeRaz-ub4bK/view>
15. Stipulation and CPCN for the New England Clean Energy Connect (NECEC) Transmission Project: [https://drive.google.com/file/d/1Q1DyyUTuos6stG4vVqKWH\\_a2p03emGoo/view](https://drive.google.com/file/d/1Q1DyyUTuos6stG4vVqKWH_a2p03emGoo/view)
16. Community Benefits Agreement between Deepwater Wind South Fork, LLC and the Town of East Hampton and Trustees of the Freeholders and Commonalty of East Hampton:  
[https://drive.google.com/file/d/1UibuE4reifkY2WjeyDZz71CMxbcl\\_OW/view](https://drive.google.com/file/d/1UibuE4reifkY2WjeyDZz71CMxbcl_OW/view)
17. Settlement Agreement among Maui Electric Company, Kahana Solar LLC, West Maui Preservation Association, and Hawaii Division of Consumer Advocacy:  
<https://drive.google.com/file/d/1GAljCkN40OMK8cRh5wxD5HAh21wBMbVu/view>
18. Wind Project Neighbor Agreement between Lexington Chenoa Wind Farm, LLC (EDP Renewables) and Landowners in McLean County, Illinois:  
<https://drive.google.com/file/d/1str3XQ07Ui0uhs9D3QKfje080wjiX1Ti/view>
19. Community Benefits Agreement between Castle Wind LLC and the City of Morro Bay, California: [https://drive.google.com/file/d/17d5CRph\\_mAMy4RYXTFYdUGfBEPgo6\\_Fk/view](https://drive.google.com/file/d/17d5CRph_mAMy4RYXTFYdUGfBEPgo6_Fk/view)
20. Host Community Agreement between North East Offshore LLC and the City of New London, Connecticut:  
[https://drive.google.com/file/d/1rO7-E\\_4Uddra2b84rpTyKrL7uTO2kGXX/view](https://drive.google.com/file/d/1rO7-E_4Uddra2b84rpTyKrL7uTO2kGXX/view)
21. Solar Benefits Agreement for the Wright Solar PV Project (CUP 12-017):  
<https://drive.google.com/file/d/1P3siMe6Yyg-oZgfdm4rctC4GwqcSqfZN/view>

#### **Documents from California Forward x Possibility Lab at University of California, Berkeley: Energy Project Benefits Agreement Database**

22. Connected Clean PowerCity (DOE GRIP Smart Grid Application):  
<https://netl.doe.gov/sites/default/files/2024-02/Sacramento%20Municipal%20Utility%20District.pdf>
23. PPL Electric Utilities Corporation – Community Benefits Plan (Grid of the Future Project):  
<https://cafwd.app.box.com/s/kgah5udm8gkyhi61vloz9t5flqgagqyb>
24. Hawaii State Energy Office & KIUC – Community Benefits Plan: Utility Solar Grid Forming Technology (USGFT), TA3-049-E (DOE FOA-0002740):  
<https://cafwd.app.box.com/s/x4lt0znfnfyogev4qqvkv4cfx8qvbseky>
25. Viejas Microgrid | Community Benefits Plan (DOE LPO loan guarantee):  
<https://cafwd.app.box.com/s/qxc502zkj37id63xwe83kthplgj91b63>

26. Host Community Agreement between the Town of Fremont and Baron Winds LLC (2019): <https://cafwd.app.box.com/s/bioqnny3tppu4rd6xeakw2h022po0x58>
27. Agreement Between Anne Arundel County, Maryland and Annapolis Solar Park, LLC (including Land Lease and Forest Conservation Easement): <https://cafwd.app.box.com/s/zmpl9el98eqei696fbtwjb9gwbcw1dwa>
28. Blue Sky East / Bull Hill Wind Project – Tangible Benefits Section (LURC DP 4886 Deliberation Notebook): <https://cafwd.app.box.com/s/euqwytzhm3gou7bge8hqb15p383a1zx2>
29. ARCHES (Alliance for Renewable Clean Hydrogen Energy Systems) – Community Benefits Plan (CBP): <https://cafwd.app.box.com/s/4ha1z2bg42jvsy8lhj7r8t7mr5962q85>
30. Host Community Agreement between Eight Point Wind, LLC and the Town of West Union, Steuben County, NY: <https://cafwd.app.box.com/s/42sm7vceh9xfurps34kgbnns6b0asva9>
31. Solar Facility Siting Agreement between Dinwiddie County, Virginia and Lily Pond Solar, LLC: <https://cafwd.app.box.com/s/h1ajh6tvaube49qaf3lto20y7h2k9wmn>
32. Amended and Restated Community Benefit Agreement between the Town of Oakfield, Maine, and Evergreen Windpower II, LLC (First Wind): <https://cafwd.app.box.com/s/5a05wrhrw18zpt4imu8r0ainpteevetf>
33. Railbelt Innovative Resiliency Project (RIR): Concept Paper and Community Benefits Framework (Alaska Energy Authority): <https://cafwd.app.box.com/s/mz31n10vdm702ah15th35js531wotq5f>
34. Community Benefits Plan for Smart Grid Deployment to Support Rural-Focused Resiliency at a Small-Scale Electric Co-Op Project (SYEMC): <https://cafwd.app.box.com/s/slljf7dpeafnuq0es249jgztpyy41acs>
35. San Antonio Community Energy Resiliency Program (CERP) – CPS Energy and City of San Antonio DOE CBP: <https://cafwd.app.box.com/s/kugml65yupn9m1bqzh73890qd9q4znb6>
36. System Hardening Reliability Improvement Program (SHRIP) – City of Lake Worth Beach DOE CBP: <https://cafwd.app.box.com/s/fo2flyo1qlvhbo9f14n6jsdv43gyw9uk>
37. Community Benefits Agreement between Vineyard Power Cooperative and Offshore MW (Vineyard Wind 1): <https://cafwd.app.box.com/s/osuuh86an1elrhp6l2i7rmrhubwqjm68>
38. Hawaiian Electric (HE) Community Benefits Plan – DOE FOA-0002740 (Concept Paper ID: TA1-133-E): <https://cafwd.app.box.com/s/09ln23xpyby65v8andh43urm1s01ucdq>
39. Entergy New Orleans (ENO) Grid Resilience & Innovation Partnership (GRIP) Community Benefits Plan (CBP): <https://cafwd.app.box.com/s/d5sz5wrf05rmpwzj65hd5canvfxv42bl>
40. AES Marahu Community Benefits Plan (Puerto Rico, 2024): <https://cafwd.app.box.com/s/dluqjfwhttm07b0iblcumbmqvf63y5zp>

## Appendix B: AI-supported methodology prompts

Our analysis used a structured qualitative approach that included manual and AI methodologies for advanced assessment of large community benefit documentation datasets. We began by conducting informational interviews with key stakeholders that have expertise in carbon mitigation strategies and community benefit design. The information we gathered during these interviews helped us to design our question prompts for use with AI tools. We wrote a standardized set of questions meant to collect project information as well as nuanced language about community benefit descriptions. We used AI tools to help synthesize background materials and identify themes across case studies. All AI-assisted outputs were reviewed and verified by Carbon Direct team members for accuracy, alignment with source materials, and consistency with our methodological standards. The result was the following prompt script designed to capture the breadth of community benefit indicators across climate technology types, scales, geographies, and impact.

### AI prompt script

1. Title of Plan or Document
2. Developer
3. Organizations
4. Date Published
5. Type (e.g., policy, CBA, case study)
6. Geographic focus
7. CDR-Relevant? (Yes/No/Partial)
8. Summary of Key Points
  - a. What the project is (technology, location, scope, developer)
  - b. Its relevance to community benefits (e.g., DAC hub, improved forest management project, biomass conversion)
  - c. Role in climate/energy policy (e.g., DOE funding, voluntary markets, etc.)
9. Notable Equity or Community Benefit Features
  - a. Any mention of distributive benefits (e.g., jobs, revenue sharing, infrastructure)
  - b. Explicit community engagement mechanisms (e.g., free, prior, informed, consent; consultations; advisory boards)
  - c. Target beneficiaries (e.g., local residents, tribal nations, historically marginalized groups)
10. Implementation and Monitoring Mechanisms
  - a. How benefits are operationalized (e.g., contracts, memorandums of understanding, CBA, policy or reporting requirements)
  - b. Oversight or monitoring structures (e.g., community boards, DOE stipulations, non-governmental organization watchdogs)
  - c. Level of enforceability (i.e., binding vs. voluntary)
  - d. Are communities decision-makers, advisors, or recipients?
11. Strengths
  - a. Innovations or best practices (e.g., novel partnerships, co-governance, long-term planning)
  - b. Alignment with environmental justice or distributive equity frameworks
  - c. Replicability for future carbon dioxide removal/community benefit design
12. Limitations or Critiques
  - a. Gaps between promises and delivery

- b. Risk of elite capture or greenwashing
  - c. Limited community input or benefit distribution
  - d. Conflicts or contested land tenure
13. Relevance to White Paper Themes
- a. What the case study shows about prevailing frameworks for community benefits
  - b. How it compares to other project types
  - c. What lessons or gaps it surfaces for improving state-of-the-art equity design
14. Benefit Categories
- a. Which of the following are the categories of benefits being described?
    - i. Economic/Material
    - ii. Environmental/Ecological
    - iii. Procedural/Governance
    - iv. Social/Capacity Building
    - v. Transformative/Equity-Oriented
15. How are Benefits defined/articulated?
- a. How are “benefits” defined or justified?
    - i. Statutory (e.g., “tangible benefits” in Maine law)
    - ii. Administrative (e.g., “community benefits package” in permit conditions)
    - iii. Negotiated (e.g., CBA or host agreement language)
    - iv. Voluntary (e.g., DOE Justice40-aligned plans)
  - b. What is the stated purpose of the benefits?
    - i. Mitigation? Compensation? Redistribution? Co-ownership?
  - c. Where is the definition found?
    - i. Quote or summarize relevant sections of the agreement or permitting statute.
16. What are the metrics used to capture benefits from the categories identified and what were the outcomes for each metric?
- a. Economic/Material Benefits
    - i. What types of direct or indirect economic benefits are generated for local communities (e.g., jobs, local contracting, tax revenue)?
    - ii. How are hiring, procurement, or training opportunities structured and monitored?
    - iii. Are there explicit targets (e.g., percent local hires, percent Minority and/or Women-owned Business Enterprises contracts)?
    - iv. What evidence exists of revenue-sharing or host community benefit agreements?
    - v. How are these economic benefits distributed among different stakeholder groups (e.g., workers, residents, tribal governments, local governments)?
    - vi. Intended outputs: percent local hires; number of jobs created; percent contracts to local firms; dollar amount or percent of revenue shared; local tax revenue generated
  - b. Procedural/Engagement Benefits
    - i. What formal mechanisms exist for community engagement and participation (e.g., advisory boards, consultations, public meetings)?
    - ii. How early and frequently are communities engaged during project development?
    - iii. Is there documentation of free, prior, and informed consent or equivalent processes?

- iv. How is feedback from stakeholders incorporated into project design or benefit allocation?
- v. What grievance or dispute-resolution mechanisms are in place, and how accessible are they?
- vi. What are the intended outputs (e.g., number of engagement meetings; percent community input incorporated; evidence of advisory board; number of grievances resolved; presence of free, prior, and informed consent or equivalent process)?
- c. Environmental/Ecological Benefits
  - i. Does the project address prior ecological damage, historical harms, or environmental degradation?
  - ii. Are there investments in habitat restoration, land rehabilitation, or pollution mitigation?
  - iii. How is progress measured (e.g., acres restored, water/air quality improvements, community satisfaction)?
  - iv. Does the project include reparative or trust-building elements (e.g., partnerships with Indigenous stewards or environmental restoration funds)?
  - v. How are restoration outcomes verified or monitored over time?
  - vi. What are the intended outputs (e.g., acres restored/conserved; number of restoration or remediation projects; air/water quality indicators; amount of restoration funding; community satisfaction indicators)?
- d. Social/Capacity Building Benefits
  - i. Are there programs for education, workforce development, health, or cultural initiatives?
  - ii. Do benefits target historically marginalized or low-income communities?
  - iii. Are funds allocated for capacity building (e.g., technical assistance, grant writing, training)?
- e. Transformative/Equity-Oriented Benefits
  - i. Does the project include shared governance, ownership, or decision-making authority with local or tribal communities?
  - ii. What formal agreements or governance structures (e.g., memorandums of understanding, co-ops, joint ventures) are in place?
  - iii. To what extent do community partners influence project priorities or spending decisions?
  - iv. Are there examples of local or tribal policy co-design, or capacity-building for long-term self-determination?
  - v. What evidence exists that co-governance arrangements are sustained beyond project construction or initial funding?
  - vi. Intended outputs: number of co-governance or ownership agreements; percent community decision-making authority; number of policies co-developed with community; longevity of governance structures
- f. Cross-Cutting Questions
  - i. How are outcomes tracked and reported to the public or funding agencies?
  - ii. What data gaps exist that limit assessment of community benefit outcomes?
  - iii. Are there independent verification or monitoring bodies involved?

- iv. How might metrics evolve as project phases (e.g., planning, construction, operation) advance?

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