WORLD RESOURCES INSTITUTE

Electric School Bus INITIATIVE

EQUITABLE CITIES

WORKING PAPER

Equity Framework to Guide the Electric School Bus Initiative

Elizabeth Moses and Charles T. Brown

CONTENTS

Working Papers contain preliminary research, analysis, findings, and recommendations. They are circulated to stimulate timely discussion and critical feedback, and to influence ongoing debate on emerging issues.

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HIGHLIGHTS

- World Resources Institute's Electric School Bus (ESB) Initiative is supporting an equitable transition of the U.S. school bus fleet to electric by 2030 by partnering with interested communities, advocacy groups, and stakeholders.
- To ensure underserved communities are the first to experience the health and societal benefits of ESBs and are involved in transition decision-making, the project has committed to centering equity and developing an equity framework to outline the approach project staff will use to achieve the project's equity objectives.
- This paper explains the ESB Initiative's equity framework including key concepts and definitions and relevant equity intersections. It outlines the process the ESB Initiative used to develop the initial framework and plans for future iterations based on ongoing foundational equity research.
- The paper also summarizes how the ESB Initiative is translating the framework into action to achieve our equity objectives. This includes articulating overarching equity goals and strategies to guide project activities.
- With this framework, we hope to emulate equity best practice, be transparent and inclusive, and provide ESB stakeholders an opportunity to track our efforts and provide feedback. This includes sharing our implementation challenges around needed time and energy to build capacity to connect activities with equity goals.

EXECUTIVE SUMMARY

Background

The World Resources Institute (WRI) Electric School Bus (ESB) Initiative is working to electrify the entire U.S. fleet of school buses by 2030 by ensuring that all new school bus purchases are electric by 2025. The WRI project team has divided the ESB Initiative into five pillars, or work teams, to simultaneously aggregate demand, scale manufacturing, change policy incentives, develop financing models, and strengthen utility investments for ESB charging infrastructure. The goal of this systems-wide approach is to forge equitable pathways for school bus electrification that can be replicated across the country. The project is partnering with a wide range of local communities, school districts, industry experts, school bus operators, manufacturers, electric utilities, policymakers, and equity and environmental organizations.

Eliminating diesel school buses offers a real opportunity to spur decarbonization of the entire transport sector but is not without risks. In a typical year in the United States, 18–21 million students ride the bus to school, and more than 90 percent of those buses are diesel (FHA 2017; *SBF* 2020b; McLaughlin and Balik 2022). Electric school buses can benefit communities through safer, cleaner air; reduced greenhouse gas emissions; reduced school operating expenses; new jobs in green manufacturing; and valuable storage for renewable energy. But if not well managed, the potential drawbacks from electrification, such as higher upfront costs, pollution shifts from electricity energy sources and mineral extraction, export of old buses to other countries, and loss of maintenance and diesel bus manufacturing jobs, could also become a significant burden or result in changes to school bus availability and accessibility, vehicle waste, and battery disposal problems.

The benefits and potential risks from this transition may not be felt equally by all communities or students because of long-standing barriers that foster inequities around education and school bus transport. The history of overt discriminatory and systemic racism in the United States has led to dramatic disparities for many Black, Indigenous, People of Color (BIPOC), and low-income communities, as well as people with disabilities. These disparities could impact people at every phase of the ESB transition—from which school districts can take advantage of the opportunity, to which students will have bus access or experience route changes, to who can access new grid technology. Existing inequities could also impact who can access opportunities for funding and financing, the procurement and supportive policies created by federal and state officials, and whether new jobs created in manufacturing facilities pay wages that can support a family. The ESB shift could also exacerbate inequities internationally if old buses are exported to other countries. Without attention to these multiple and overlapping dimensions of equity, the transition to electric school buses could reinforce ingrained systems of inequality and further burden BIPOC communities and many underserved student populations and their families.

The ESB Initiative is committed to developing an equity framework to advance equity as a fundamental guiding principle for the project. The framework is meant to define parameters and principles that enable ESB project staff to navigate the complex territory of equity challenges and develop the capacity to engage in purposeful leadership action. This overarching commitment will help ensure that the transition to electric school buses can help tackle historic injustices and benefit the populations directly impacted.

About This Working Paper

This paper explains why and how the ESB Initiative has committed to equity and the process we are using to develop and implement the equity framework. The first section outlines the framework elements including key equity concepts and why equity matters to the ESB transition. It also defines how we are leading with equity and centering intersectionality—defined as the impact from the combination of identities that make up a whole individual—as our overarching approach to project decision-making. The second section describes the process we are using to create and refine the framework including how we are leveraging our leadership and foundational research to shape our strategy. The final section summarizes the steps we are taking to transform our framework into action to ensure that all project activities reflect our equity goals and principles. A summary of the possible equity intersections and additional terms and concepts are provided in the appendixes.

To begin this framework creation process, the equity work team hosted a retreat and conducted an extensive literature review on a range of case studies, toolkits, and discussions of equity concepts and terms related to environmental justice, mobility justice, just transition, and historic inequities in the United States. Our review attempted to capture the variability in equity definitions and framework approaches to get a comprehensive view of how equity principles are used in practice and challenges faced by organizational decision-makers.

Our goal in sharing our development process and initial framework is to ensure that key stakeholders interested in the electrification of school buses understand how and why the ESB Initiative is prioritizing equity. Transparent and inclusive processes are a central tenet of equity. We hope that publishing our approach provides an opportunity for partners to hear about our equity-centered processes and ideas, provide input, and engage in a conversation about opportunities to advance equity through joint efforts.

The ESB Initiative Vision of Equity

The project has committed to leading with equity and centering intersectionality as our fundamental approach. Leading with equity means the ESB Initiative will ensure that all project activities and possible outcomes consider equity. We will not only scale pathways for electrification but also help address the racial, cultural, educational, safety and health, and socioeconomic disparities associated with school bus transport. We will advance a partner-driven, accountable approach that recognizes how existing systems of power grant privilege and access unequally and must be continuously addressed and changed.

By centering an intersectional lens, the ESB Initiative will consider how equity elements are influenced by different identities including race, gender, income, geography, education, ethnicity and language, mobility, occupation, and ability. We will monitor and address the needs, experiences, and knowledge of stakeholders, including those who could be negatively affected by planned ESB project interventions; use disaggregated data where relevant; and address unintended consequences of the ESB transition and our work.

Creating the ESB Equity Framework

To formulate our equity framework, the equity pillar is focused on a number of fronts to ensure we are aligning with best practice and building staff knowledge of our equity priorities. These include

- forming an ESB Initiative Advisory Council composed of leaders from around the country to provide high-level input in the project including supporting development of equity principles;
- creating an ESB Initiative *Engagement and Partnership Guide* to ensure inclusive connection with the diverse community of ESB transition stakeholders; and
- undertaking foundational research to evaluate the various types of equity relevant to the ESB transition and inform stronger, data-driven, and measurable equity goals and objectives.

Because comprehensive research was not conducted before the project began, as recommended by the best practice resources reviewed, we anticipate our equity framework and implementation strategy to change in response to new insights and ideas coming out of our deeper investigation, including feedback from stakeholders. As a result, the ESB Initiative equity framework will be finalized in three phases. With publication of this working paper, we are entering Phase 2:

- **Phase 1.** Development and publication of this initial document to showcase our work to date
- **Phase 2.** Completion of the equity data analysis, school district needs assessment, and stakeholder foundational research and revisions to the initial framework
- **Phase 3.** Refinement of the ESB Initiative partnership and research strategies, and full implementation in all pillar workplans

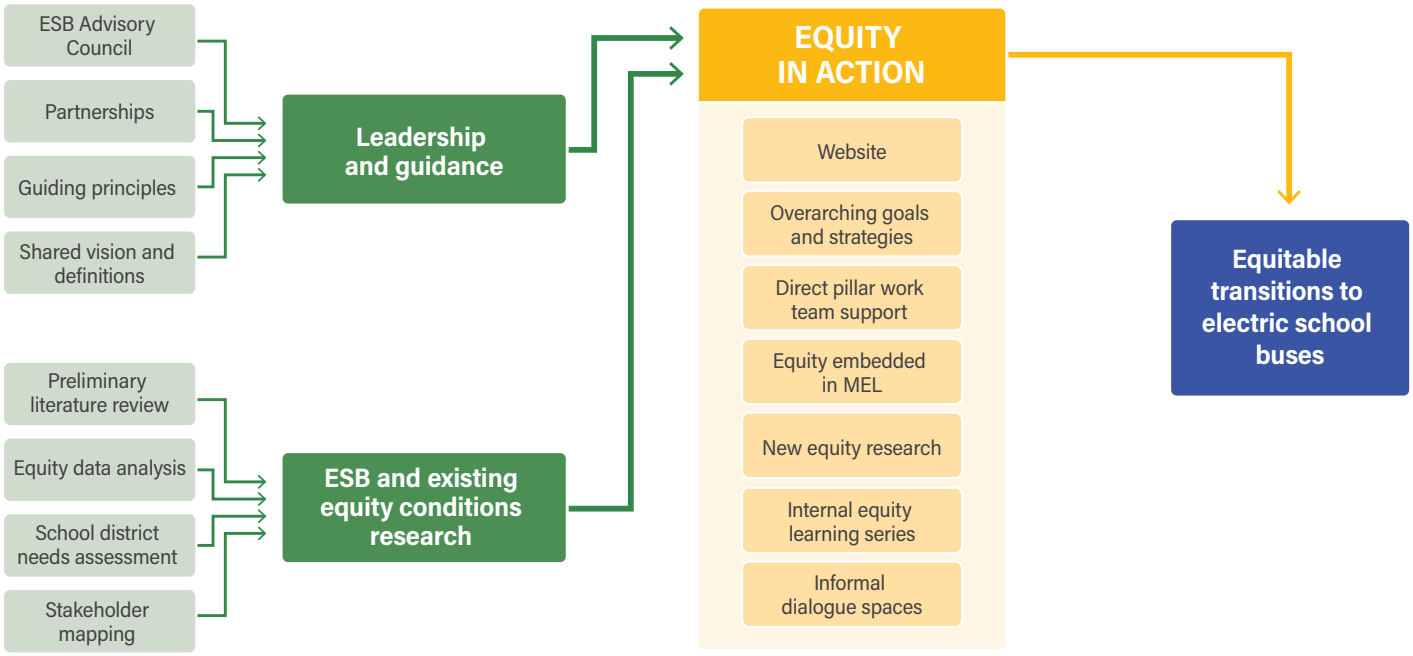
The Framework in Action

The ESB Initiative has created a series of forums and processes designed to support project staff and ensure that equity is integrated across the projects' workplans; research; and monitoring, evaluation, and learning indicators. The specific components to put the framework into action are presented in Figure ES-1.

Details of these processes and platforms are as follows:

- Overarching equity goals and strategies: We have developed five overarching goals and four strategies to guide workplan development and ensure that project policies, practices, and activities are aligned with our common equity project vision. They include goals around how to incorporate equity risks and impacts and foster inclusion and accountability, and strategies for applying these goals to the research, assistance, partnerships, and communication aspects of the project.
- MEL framework: The publicly available, project-wide results framework includes equity MEL indicators to measure outcomes, outputs, and activities. These include both specific indicators as well as markers for measuring how the equity framework has been incorporated into the ESB Initiative project design and implementation.

Figure ES-1 | **Process for Leading with Equity in the Electric School Bus Initiative**



Note: MEL = monitoring, evaluation, and learning.

Source: Authors.

- Internal support and informal dialogues: To provide ongoing support to ESB Initiative staff, the equity team provides direct work team guidance; forums for peer-to-peer learning; and informal opportunities to discuss equity-related opportunities, challenges, and questions.
- Public website: The ESB Initiative public website will share resources; relevant electric bus transformation policy, procurement, and operational information; and WRI's ESB Initiative project plans and progress with stakeholders.
- Equity guidance and review process for future research: Guidance for including equity considerations in project research is under development. In addition, the ESB Initiative's research strategy includes an equity review to ensure that all project research proposals align with our overall equity vision and goals.

Conclusion

Developing an equity framework that prioritizes equitable and inclusive processes and outcomes isn't typical for WRI and is unfamiliar to many ESB Initiative staff. The time and energy needed to integrate equity can often feel like a burden that slows or overly complicates urgent project objectives. But our efforts to lead with equity are critical for ensuring that the ESB transition helps address the threat of climate change and galvanizes systemic change that improves the lives of all communities. Developing an equity framework provides a clear and accountable approach for ensuring that these high-level goals and objectives are translated into concrete action. It can also serve as a model for an equity-first approach to many other just transitions we need to see related to climate-focused and green technologies.

1. INTRODUCTION

1.1 Background to the Electric School Bus Initiative

In November 2020, World Resources Institute (WRI) commenced the Electric School Bus (ESB) Initiative to ensure that all new school bus purchases are electric by 2025, aiding the growing momentum toward equitably electrifying the entire U.S. fleet of school buses by 2030. To achieve this outcome, WRI is undertaking a systems-wide approach by partnering with local communities, school districts, industry experts, school bus operators, school bus manufacturers, electric utilities, policymakers, and equity and environmental organizations to transform the school bus market holistically and equitably in the United

States. With a mission to build unstoppable momentum toward an equitable transition of the U.S. school bus fleet from diesel to electric vehicles, the ESB Initiative has the following objectives:

- Increase the number of school districts and private school bus operators in the ESB procurement process
- Improve ESB availability, quality, and purchase prices with a more environmentally and socially responsible supply chain
- Increase school district and private school bus operator access to ESB financing and public funding
- Improve school district and private school bus operator options for ESB finance and operational models
- Improve utility interconnection and investments for ESB charging infrastructure, including supportive rates and tariffs
- Increase ESB public funding and available financing mechanisms and policy to increase demand and reduce barriers

As outlined in Box 1, the project has divided our work and staff into five focus areas, or pillars.

School bus electrification has the potential to create multiple tangible benefits for every community in the United States, including cleaner air, lower greenhouse gas emissions, reduced school operating expenses, more jobs in green manufacturing, and a more resilient grid powered by greater amounts of renewable energy. This transformation will also help spur substantial electrification across the medium-and heavy-duty vehicle sector, support the development of electric vehicle charging infrastructure, and help create electrified transportation as the standard way of movement for the next generation.

But this transition is not without risk. Well-resourced, often predominately white, higher-income communities have the capacity to leverage a faster and easier transition. Because of the way school boundaries and school budgets are determined (EdBuild 2019), long-standing structural barriers that foster inequities in education and school bus transport may limit the benefits of electrification for some communities or students, particularly underserved communities and Black, Indigenous, People of Color (BIPOC) students. The history of structural racism and discrimination in the United States, including the legacy of redlining, exclusionary zoning, and other discriminatory housing policies, has led to significant disparities in access and mobility for these populations, touching every aspect of the ESB transition including the following:

- Bus and route modifications that result from budget changes or adjustments to commute schedules in local school districts
- Electric utility infrastructure and access to supportive grid technology
- Funding and financing
- Federal and state policies that support the transition
- New manufacturing job quality and availability

Further, the ESB transition will increase demand for the critical minerals needed for batteries, and risks increasing the exportation of used diesel school buses to lower-income nations in Central America, potentially shifting pollution and socioeconomic burdens to these communities.

To ensure underserved communities are not further burdened, WRI is committed to centering equity in the ESB Initiative. This commitment helps ensure that WRI, through the ESB Initiative, fosters a participatory and inclusive electric school bus transition that equitably distributes the anticipated benefits and burdens resulting from this project and contributes to correcting inequities across the transportation system and broader society.

1.2 Conceptual Development

There are many dimensions and definitions of equity, and the term may mean different things to different stakeholders. A shared vision among ESB Initiative staff and clear and common definitions of equity and other terms are critical for project coherence.

Box 1 | The ESB Initiative Structure

To achieve our objectives, we have divided staff and project focus areas into five work teams, or pillars:

- Pillar 1: Aggregate school district and private school bus operator demand and drive technical assistance for purchasing ESBs
- Pillar 2: Work with bus manufacturers (original equipment manufacturers, or OEMs) to reduce the cost of unit production and repower existing diesel buses
- Pillar 3: Reduce utility barriers to ESB adoption and develop financing solutions for school districts to purchase charging infrastructure
- Pillar 4: Influence local, state, and federal policy that enables widespread adoption of ESBs
- Pillar 5: Engage stakeholders and develop a project-wide "equity-first" approach to deploying ESBs

To create this vision across the entire project, the ESB Initiative equity pillar hosted a retreat and conducted an extensive literature review on a range of equity concepts, terms, and projects related to environmental justice, mobility justice, just transitions, and historic inequities in the United States. This included reviewing case studies, glossaries, and supporting documents from many organizations and institutions.

Our review attempted to capture the variability in equity definitions and framework approaches to develop a comprehensive view of how equity principles are used in practice. In addition, the ESB Initiative equity team has created recommendations for terminology that staff can use to describe equity conditions and stakeholders for the ESB Initiative. Please note that we will also update our vision and definitions as needed as the project evolves, including adapting lessons we learn from reviewing new research or case studies.

To translate our vision into an integrated and implementable framework, the equity team conducted a best practice review of notable and credible case studies, equity frameworks, and action plans.[1]

We also shared early drafts with key stakeholders and partners to ensure that our approach aligned with their perceptions and concerns. The insights gathered highlighted the importance of beginning the project with a clear equity mandate and commitment from project leaders.

The review also documented that best practice should include an evaluation of current inequities and their drivers as well as a mapping of community and stakeholder experiences, needs, and knowledge to inform framework development. Only with this foundational research in hand should projects develop a comprehensive action plan with fully informed equity outputs, activities and tasks, performance measures, and staff roles and responsibilities, along with a timeline and budget.

Unfortunately, the ESB Initiative did not initially follow this sequence as staffing delays and changing project development processes resulted in project activities moving forward before the equity research could be completed. To mitigate this challenge, the ESB Initiative is currently undertaking the recommended research, outlined in the document below, which should be completed by the end of 2022. We will also continue to investigate new case studies and research on projects that use an equity-first approach. Once this comprehensive evaluation has been completed, we will revise and publish a knowledge product that includes the results of this in-depth research. These insights will also be used to evaluate and revise our equity framework as needed.

1.3 Purpose of This Working Paper

This working paper introduces the ESB Initiative's equity framework and the process we are using to develop and implement it. As a working paper, it contains preliminary research and analysis still under development.

The equity framework outlines the equity-first approach that the ESB Initiative will use to accomplish the goal of equitably transitioning all U.S. school buses to electric by 2030. The framework outlines why equity matters to the ESB transition and provides the preliminary foundation for transforming our equity goals and principles into concrete actions and activities. The framework is designed to normalize, operationalize, and institutionalize equity within the project. We hope it will also set an example for WRI's other work, especially projects or programs focused on technological transitions needed to address climate change.

Our goal in sharing this document is to ensure that key stakeholders interested in the electrification of school buses understand how the ESB Initiative has centered equity in its approach, why equity is important for the ESB transition, and how WRI and its partners are supporting this priority. We hope our transparent and inclusive approach provides an opportunity for partners to offer feedback and engage in a conversation about opportunities to advance equity through joint efforts.

The paper is organized around several key sections:

- Section 2, the **ESB Initiative Vision of Equity**, introduces the framework's key equity concepts and why equity is needed for the ESB transition. It explains our overarching project vision of leading with equity and centering intersectionality.
- Section 3, **Creating the Equity Framework**, summarizes the leadership approach, foundational research, and partnership values we are using to develop and revise our framework for an equitable ESB transition based on best practice.
- Section 4, **ESB Initiative Equity Framework in Action**, presents the initial strategy we are using to leverage leadership and guidance, research and analysis, a public website, direct staff support, and internal learning and external dialogue forums to translate our equity vision into action.
    - It includes overarching goals and strategies that guide project decision-making by ensuring justice and fairness in project activities such as school district selection

for technical assistance, support for equitable vehicle-to-grid energy strategies, and federal and state policy development and advocacy.

- It also outlines how the framework will evolve along with the project to reinforce a culture of accountability within each pillar work team and across the ESB Initiative.

- Section 5 outlines our conclusions and recommended next steps.
- Appendix A includes a summary of the potential ESB Initiative equity risks and opportunities based on our preliminary review of the literature and Appendix B presents a glossary of related terms.

2. ESB INITIATIVE VISION OF EQUITY

2.1 What Is Equity?

The ESB Initiative defines equity as the *guarantee of fair treatment, access, opportunity, and advancement while striving to identify and eliminate barriers that have prevented the full participation of some groups*. The principle of equity acknowledges that there are historically underserved and underrepresented populations (APA 2019). Because some groups won't be able to take advantage of opportunities without additional barriers being broken down, equity also means taking conscious steps to address these unbalanced conditions to ensure that opportunities are provided fairly to all groups. It includes the presence of justice and fairness within the procedures, processes, and distribution of resources by institutions or systems.

Equity is both a process and an outcome for the ESB Initiative. It is incorporated into the conceptualization, design, monitoring, and evaluation of the project and shapes the way activities are implemented and partners are selected and engaged. Outcomes and outputs reflect the needs and access barriers of the different groups experiencing discrimination and address the different, relevant types of equity. A summary of additional concepts and terms relevant to the ESB Initiative is provided in Appendix B.

Equity Dimensions

Equity involves trying to understand and give all people, especially those underserved, what they need to enjoy full, healthy lives. It requires an understanding of the underlying or root causes of inequalities and oppression within the institutional and systemic rules or procedures to explain current gaps in power and access (Martín and Lewis 2019, 56). Different types of equity delineate how specific groups or populations experience different disparities and discrimination. Box 2 illustrates some of the types, or dimensions, of equity.

2.2 Why Equity for ESBs?

School buses provide an essential link to educational opportunities by providing daily rides for more than 20 million children in the United States (*SBF* 2020a). This happens throughout the school week and during weekends when children are transported for field trips; musical, theatrical, and sporting events; academic competitions; and other extracurricular local and regional events.

Electric school buses offer a safe, clean way to bring students to and from school—all with zero harmful tailpipe emissions. But several challenges to accessing ESBs could negatively impact schools and their surrounding communities or prevent all communities from realizing the benefits of ESBs if the transition is not timely, targeted, and well-managed. These challenges include high procurement costs, an uncertain jobs outlook for maintenance and manufacturing workers, changes to school routes and bus availability, sustainable and equitable disposal of decommissioned buses, electricity grid impacts and changes to utility rates that burden customers, and the social and environmental impacts of critical mineral extraction and battery waste.

Without a purposeful focus on the multiple and overlapping dimensions of equity, the transition to ESBs could perpetuate ingrained systems of inequity and further burden BIPOC communities and many underserved student populations and their families already facing disproportionate impacts under the current school transport system. An equity lens is also needed to recognize and assess how people with different identities, cultures, and languages (e.g., race/ethnicity, gender, age, religion, ability, income) may experience ESB policies, programs, and initiatives and to ensure that all people benefit from the ESB transition.

2.2.1 Examples of types of equity that intersect with the ESB transition process

Some illustrative examples of the types of equity that intersect with the ESB transition are provided below. A summary of equity opportunities and risks, based on our preliminary literature review, is presented in Appendix A.

MOBILITY EQUITY

Students with disabilities are disproportionately impacted by dirty school bus engines, as special education students are more likely to ride buses to school and more likely to travel long distances on a school bus (Ross et al. 2020). Furthermore,

Box 2 | **Illustrative Types of Equity (Including Transportation-Related Contexts)**

- **Ability equity**: Concerning issues and inequalities affecting persons physically disabled
- **Education equity**: Concerning issues related to access to, quality of, and funding of education, especially from kindergarten to 12th grade
- **Environmental/green equity**: Equal protection from environmental hazards for individuals, groups, or communities regardless of race, ethnicity, or economic status
- **Gender transport equity**: A less-recognized equity issue concerning the behavior and differences across male, female, and nonbinary genders using different transport systems (e.g., one study finds that women value travel-time reliability more than twice as highly as men; other studies document limited use of public transport by women due to harassment)
- **Generational equity**: A subset of vertical equity (see below) concerning the burdens placed on future generations from policies made by and for the current generation; for example, borrowing capital to build long-lived facilities is fair because it spreads the cost across generations of users, as opposed to current users paying for future generations
- **Geographic access equity**: A subset of vertical equity (see below) that focuses on how the location where people work and live influences the way that transportation investment decisions impact them (e.g., state versus state, urban versus rural)
- **Health equity**: Ensuring everyone has a fair and just opportunity to be as healthy as possible; this requires removing obstacles to health such as poverty, discrimination, and their consequences, including powerlessness and lack of access to good jobs with fair pay, quality education and housing, safe environments, and health care; for the purposes of measurement, health equity means reducing and ultimately eliminating disparities in health and its determinants that adversely affect excluded or marginalized groups
- **Horizontal equity**: A fair distribution of public resources so that unfair costs that travel activities impose on other people, such as the delay, risk, and pollution, are minimized or compensated
- **Income equity**: Sometimes called redistributive equity, this equity type includes the effects on economically disadvantaged communities and low-income people (e.g., do improvements negatively impact disadvantaged communities?)
- **Language equity**: Concerns and inequalities faced by users not native to the standard language
- **Life-stage equity**: Concerning issues and inequalities faced by users of various life stages in comparison to other users such as retirees, people with families, and single users
- **Mobility equity**: A transportation system that increases access to high-quality mobility options, reduces air pollution, and enhances economic opportunity in low-income or BIPOC communities
- **Opportunity equity**: Costs/benefits that are proportional to the size of the receiving group without regard to any other distinguishing characteristics among groups
- **Participation equity**: Sometimes called process or procedural equity, the ability to participate in the decision-making related to a project by responding to a public solicitation, attending a public meeting, or rallying neighbors to support or oppose a measure
- **Race/ethnicity equity**: Considering whether different racial and ethnic groups, particularly minorities, are burdened disproportionately, taking into account fees paid, benefits received, and impacts experienced
- **Spatial equity**: A geographic application of the horizontal and vertical equity concepts
- **Vertical equity**: How members of groups (e.g., low-income versus high-income groups, drivers versus non-drivers, or inner-city versus rural residents) fare relative to one another

Sources: Adapted from FHA (2013); Braveman et al. (2017); Litman (2022, 77); and Greenlining Institute (2018).

wheelchair lifts, often located in the rear of the school bus, tend to concentrate tailpipe toxic emission exposure since vehicles must idle while lifts operate for several minutes (Mudd 2019). For these students, the need for accessible buses could also be impacted by route, bus access, or scheduling changes caused by the ESB transition.

RACIAL/ETHNIC EQUITY

Although the statistics show great regional variability, a number of studies have documented that Black/African American students tend to have longer rides (on average 45 minutes to an hour) to school than their white and Hispanic counterparts (Cordes et al. 2021, 46; FHA 2017). A Government Accountability Office report found school attendance for American Indian students is impacted by road conditions that influence school bus routes and the ability of students to get to bus stops (GAO 2017). The report found that road conditions also impact the frequency and cost of school bus maintenance. Currently, Black Americans represent a somewhat higher portion of workers in the automotive manufacturing sector when compared with the labor market as a whole, making this an important source of comparatively well-paying jobs for Black workers (Coffin and Lawrence 2020). However, without policy interventions, the

transition to electric vehicles could result in job losses in manufacturing due to offshoring since much of the value chain does not yet exist in the United States (Barrett and Bivens 2021).

ENVIRONMENTAL AND HEALTH EQUITY

Toxic school bus exhaust disproportionately harms communities of color (Liu et al. 2021). Air pollution exposure from on-road sources can be 75 percent higher for Latinos, 73 percent higher for Asian Americans, and 61 percent higher for African Americans (Pinto de Moura et al. 2019), creating added health challenges to already overburdened communities (Grineski and Collins 2018). School bus depots are often a significant source of pollution, disproportionately impacting school bus employees and the surrounding community (Elder 2021). School buses idle when parked at schools, which can also concentrate exhaust emissions during drop-off and pick-up periods or entry into schools (EPA 2017).

In addition, exhaust from traditional diesel school buses is unsafe. With proven links to serious physical health issues such as cancer, asthma and other respiratory illnesses like pneumonia and bronchitis, and cognitive development impacts, diesel bus pollution puts students' health and academic achievement at risk (Beatty and Shimshack 2011; Austin et al. 2019; EPA 2015).

GENDER EQUITY

Often the primary family caregivers, women are more likely to be responsible for accompanying children to school or coordinating school transport, including before and after care, as part of "trip chaining" errands (Hung 2013). Changes to route or bus schedules could aggravate the juggling of household responsibilities. Discrimination against female bus drivers such as the lack of respect for basic maternity rights and lack of pay equity could be exacerbated by transition changes (ITWF 2016). Women have also faced discrimination and increased levels of sexual harassment in the vehicle/automotive industry as well as limited access to manufacturing jobs (LAEA 2020; Veeder 2019).

GEOGRAPHIC EQUITY

Residential segregation, income inequality, and school quality are all reflected geographically. They have been found to be major factors in a child's likeliness to reach a higher income bracket than their parents, and all three of those factors are dependent on access to transportation (Fleming 2018). Given the historical use of busing to address patterns of racial segregation, transportation has often played a major but controversial role in integration and school choice policies (Burgoyne-Allen et al. 2019). Students in low-performing schools still often spend more time and money on transportation and face unequal access to schools due to inefficient transportation services (Zhang 2021).

Rural communities often face equity challenges. Not only do long bus rides extend the length of the school day for many rural children, so do long wait times at school (i.e., before the start of and after the conclusion of the instructional day). With limited access to public transportation, rural residents drive more frequently and longer distances and often have no choice but to do so for everyday trips such as work, school, medical visits, and shopping (Fleming 2018). This hinders their ability to adapt to any changes to school bus routes or timing changes that result from the electric bus transition.

Further, disposal of old diesel buses could reinforce trends of shipping polluting diesel vehicles to the global South and displacing the impacts of diesel pollution and waste to other communities (UNEP 2020). Careful attention to policies around scrappage as well as repowering are needed to strike the right balance between recycling old chassis and driving down costs of ESBs while ensuring old diesel buses are not contributing to global emissions or exacerbating global inequities.

INCOME EQUITY

Approximately 60 percent of students from families with low income ride the bus to school versus only 45 percent of students from families without low income (BTS 2021). School districts with limited resources, when compared with wealthier districts, tend to have lower property values, residents with lower income and wealth, lower overall spending and sales, and thus less tax revenue raised per student. In many cases, this wealth inequality impacts these districts' ability to afford ESBs, including the need to make trade-offs between upfront costs and other investments or expenditures at the school district level. The disparity also impacts the likelihood of applying or capacity to apply to an electric school bus funding program (Gao and Klein 2010). On the other hand, as referenced above, for Black manufacturing workers, the potential impact of electrification on incumbent workers through job loss, job relocation, or reduced wages could exacerbate income inequality without targeted interventions (Barrett and Bivens 2021).

Access to the electric grid is not equal. Electric utilities have historically underinvested in BIPOC communities, which affects the perception of "readiness" and "feasibility" for ESBs and other renewable energy investments. Researchers have documented that grid limits exacerbate existing inequities. For example, researchers have found that households in increasingly Black-identifying and disadvantaged census block groups have

disproportionately less access to new solar photovoltaic (PV) capacity, while adoption of PV systems perpetuates financial, racial, and cumulative inequities, bypassing access to benefits for many vulnerable populations (Brockway et al. 2021; Lukanov and Krieger 2019).

2.3 The ESB Initiative Equity Framework Approach

To set the structures, policies, and practices needed to maximize equity outcomes, the ESB Initiative has committed to "lead with equity and center intersectionality" as an overarching equity vision. The equity work of the project is led by a cross-cutting ESB Initiative equity team with input from additional staff at WRI and with input from external equity leaders such as the ESB Initiative Advisory Council.

What We Mean by "Leading with Equity"

The ESB Initiative is focused on proactively counteracting inequities. The ESB Initiative will lead with equity in the following ways:

- Ensuring all pillar activities and possible outcomes consider equity and not only scale pathways for electrification but help address the racial, cultural, educational, safety and health, and economic disparities impacted by or relevant to school bus transport
- Advancing a partner-driven, accountable approach that recognizes how existing systems of power grant privilege and access unequally and must be continuously addressed and changed; this includes recognizing WRI's financial resources and intention to direct funds to organizations that have laid the foundation for this work and to partner with and provide funding to equity organizations
- Supporting the development of transparent and inclusive processes and empowered partnerships where the voices, experiences, and needs of community-based stakeholders and partners are valued and reflected in project decision-making
- Using actionable monitoring, evaluation, and learning mechanisms that ensure that our own work or outcomes do not perpetuate injustices and that we are accountable to our partners and our vision of equity
- Setting an example for other projects focused on necessary technological transitions to combat climate change (e.g., rooftop solar, green buildings) that have not traditionally prioritized equity

What Is Intersectionality?

Originally coined by Kimberlé Crenshaw, a scholar and civil rights advocate, intersectionality is an analytical framework for understanding how aspects of a person's social and political identities combine to create different modes of discrimination and privilege (Crenshaw 1989). Intersectionality identifies multiple factors of advantage and disadvantage. These intersecting and overlapping social identities may be both empowering and oppressing.

What We Mean by "Centering Intersectionality"

Adopting an intersectional lens for our project allows us to recognize that equity interacts with our initiative across multiple and intersecting racial, cultural, educational, safety and health, and socioeconomic dimensions. We will ensure that our partner engagement, research, communication, and pillar work team activities systemically reflect these conditions. To center intersectionality, the ESB Initiative will do the following:

- Consider how equity elements are influenced by different identities including race, gender, income, geography, education, mobility, ability, occupation, ethnicity, and language
- Identify stakeholders and populations systematically affected by past injustices and/or who could be negatively affected by planned ESB Initiative interventions
- Assess and incorporate the needs, experiences, and knowledge of diverse stakeholders and current and historically adversely impacted groups into the ESB Initiative project objectives and activities including underlying disparities between groups' needs or constraints
- Disaggregate ESB Initiative data by these dimensions when relevant
- Monitor and address the unintended consequences of the ESB Initiative project

Our strategy for determining outreach and technical assistance to underserved school districts is an example of how we put this framework into action to incorporate equity. It is highlighted in Box 3.

Box 3 | **Equity in Action: Developing a Priority List of School Districts for Outreach Using Equity Criteria**

The ESB Initiative used a targeted selection method to prioritize school districts for outreach and to shape our future technical assistance support using data from the U.S. Environmental Protection Agency (EPA) and National Center for Education Statistics. After assembling a database of all school districts in the United States, we ranked school districts, including them on our priority school district (POD) list if they were

- in the top quartile for percent minority (all households, not just households with children);
- in the top quartile for percent low income (defined as below 200 percent of the federal poverty line, all households); and
- in the top quartile for either concentrations of particulate matter of 2.5 micrometers or less in diameter (PM2.5) OR ozone concentrations as an indicator of ambient air quality.

We also included all school districts located on Tribal lands.

Using this process, WRI identified a total of 1,007 PODs in 38 states. This methodology addressed potential disparate impacts and risk of harm by prioritizing Pillar 1 technical assistance to school districts that serve children and communities most impacted by vehicle air pollution and have the fewest resources to address it. WRI will offer PODs comprehensive technical assistance at no cost, including tailored guidance and support at every stage of the process, including road mapping, stakeholder engagement, procurement, coordination with utilities, training, deployment, and scaling.

To ensure accountability, this process and list of PODs was published and shared widely. More information can be found in the Project Update "Prioritizing Equity in Providing Technical Assistance to Underserved School Districts under WRI's Electric School Bus Initiative."[a]

Note: a Worker and Cousar 2022.

3. CREATING THE EQUITY FRAMEWORK

To align with best practice, the equity team developed a series of forums and processes for ESB Initiative staff designed to raise awareness, build capacity, and drive action. An overview of these components including how they fit together to form an implementation plan for leading with equity and centering intersectionality is presented in Figure 1 and discussed below.

3.1 Leadership and Guidance

Our equity-first ESB Initiative began with a clear vision set by WRI leadership on the need for and importance of equity and its impact on daily decision-making.

ESB Initiative Advisory Council

In addition to the clear mandate from WRI leaders, the project team recruited and formed an ESB Initiative Advisory Council made up of two dozen diverse and multidisciplinary leaders from around the country to provide high-level input on the project. A select number of the council members volunteered to participate in the formation of the Advisory Council's Equity Principles Working Group, which is helping to develop the equity principles and values.

Guiding Principles

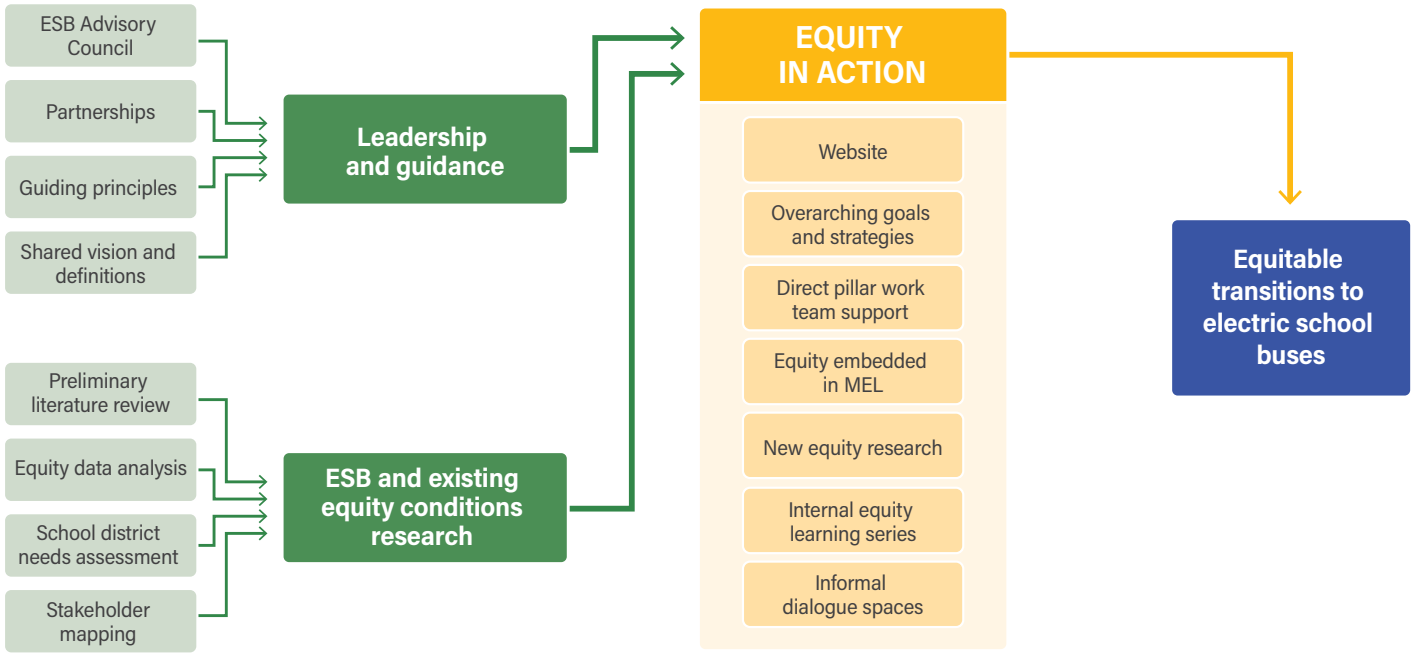
The ESB Initiative has developed four guiding equity principles. They serve as a compass for directing decision-making, driving project culture, creating a sense of purpose for the project team, and shaping how we deliver on the overall mission. As stated above, these principles were developed in collaboration with an Equity Principles Working Group comprised of members of the ESB Initiative Advisory Council. The principles are to

1. address historical and structural injustices;
2. build trust, listen, learn, and adapt;
3. be transparent, accountable, and collaborative; and
4. prioritize people over vehicles, profit, property, or placemaking.

Partnerships

The ESB Initiative team is also developing an *Engagement and Partnership Guide* to direct strategies to identify and cultivate productive relationships with external stakeholders.

Figure 1 | **Process for Leading with Equity in the Electric School Bus Initiative**



Note: MEL = monitoring, evaluation, and learning.

Source: Authors.

Initial partnership strategies to support the project team include the following:

- **Inviting diverse input on our strategy**: We have developed mechanisms through which we systematically invite external input on our strategy from people with diverse perspectives. Their input shapes the long-term direction of the ESB Initiative, as well as short-term pillar workplans. Current platforms through which we invite strategy input and co-creation include the following:
  - ESB Initiative Advisory Council and Working Group meetings
  - Monthly meeting with the Alliance for Electric School Buses management team
  - Pillar 2's Manufacturer Steering Committee
  - Pillar 3's Utility Working Group
  - Opportunities to review publications, tools, plans, and draft products
  - A webinar series co-created with core ESB Initiative advocacy partners
- **Transparent and inclusive fiscal partner processes**: We recognize the need to be transparent about our sub-grant and contract opportunities and make them accessible to a wider set of organizations. Strategies implemented so far include an "open house" and survey process to advertise, solicit interest in, and award sub-grants to a cohort of organizations. Our sub-granting and contracting processes also ensure that potential partners align with the values of the project and each pillar work team's targeted equity objectives. These processes include strategies for the co-creation of activities, a transparent outreach process, and alignment with best practice for communicating with partners and building long-term relationships.
- **Partner taxonomy**: We have developed a taxonomy of partners to highlight the diversity of partners that the ESB Initiative project engages with as well as types of partners that are missing from the broader community of actors working on the ESB transition. The taxonomy will inform the thoughtful development of engagement and communication strategies. While still being finalized, it includes categories of partners we work with to
  - get electric buses on the road;
  - advocate for specific ESB-related policies;

- participate in pillar team working groups;
- assist with research, capacity building, and data collection; and
- specifically help the project center equity including through ties to underserved communities, environmental justice organizations, or other groups who could be impacted by the ESB transition.

3.2 ESB and Existing Equity Conditions Research

The ESB Initiative is conducting an equity data analysis, a school district needs assessment, and stakeholder analysis. This research will allow us to systematically evaluate the relevance of various types of equity to the electric school bus transition. These insights are critical to achieving data-driven and measurable equity goals and objectives.

Preliminary Literature Review

The equity team conducted a preliminary literature review of possible equity types, or intersections, that warrant greater investigation. A summary of our review findings is provided in Appendix A. This review will inform the forthcoming detailed equity analysis, outlined below, designed to understand past and ongoing policies and practices that have yielded the inequitable conditions that exist today. Mirroring the different types of equity outlined above, the possible equity types we considered include:

- Mobility access and ableism
- Race and ethnicity
- Income and wealth
- Gender
- Location and geography
- Education
- Safety and health
- Employment
- Electric utilities
- ESB costs and funding options
- ESB manufacturing and supply/value chain
- Nongovernmental organization culture

Equity Data Analysis

Building on the project's efforts to prioritize school district outreach based on equity criteria described in Box 3, WRI will be publishing a separate report to better understand how ESB adoption is playing out across social demographics including the socioeconomic characteristics of the populations that have been able to procure ESBs at a disproportionately higher or lower rate. It will specifically consider which populations are currently most negatively impacted by fossil fuel–powered school buses including the impact of school bus depots and nearby areas that represent hot spots of air pollution from school bus fleets. Using census track data, this analysis will highlight the impact of past and present policies (i.e., race and ethnicity, income, environmental health, historical discriminatory housing and transportation, and civic participation) that create and maintain inequitable access to healthier school bus and school environments and how they correlate to trends emerging in electric school bus adoption.

To be published in early 2023, this analysis will provide comprehensive and timely data and information for the background section of the ESB Initiative equity framework and to assist in ESB Initiative pillar-specific strategies and decision-making around technical assistance, federal and state policy efforts, marketing and communications, and community and partnership engagement efforts. The analysis will also aid in discussions and engagements with utilities and manufacturers, particularly as it relates to the importance of centering equity in their efforts.

United States School District Needs Assessment

The overall purpose of the U.S. school district needs assessment is to document existing challenges and opportunities related to school districts' commitment to the procurement, operation, and maintenance of electric school buses and to enhance and strengthen WRI's technical assistance delivery and relationships with school districts. The mixed-methodological approach to the needs assessment will include two key steps: an online/web survey of U.S.-based school districts; and a post-survey focus group of personnel within school districts throughout the country.

The online/web survey of U.S.-based school districts will strengthen WRI's technical assistance and relationships with school districts. The list of survey topics will include funding; infrastructure needs and costs, utility coordination, and maintenance; social, political, and environmental barriers; technical assistance needs; internal and external support; knowledge and awareness; and workforce development. The post-survey focus

group will allow the ESB Initiative team to explore and gather additional feedback and clarity around trends and findings from the survey.

Stakeholder Analysis

The overall purpose of the stakeholder analysis of U.S.-based environmental, climate justice, health equity, Tribal, health, and disability organizations is to systemically gather and analyze qualitative information regarding their views and involvement, WRI's involvement, and the involvement of other groups including utilities and manufacturers in the equitable transition to electric school buses in the United States. The stakeholder analysis will allow the ESB Initiative team to identity key actors and to assess their knowledge, interests, positions, alliances, and importance related to school bus electrification.

For this effort, key informant interviews will take place with select representatives within U.S.-based organizations (i.e., incorporated and unincorporated, or "grassroots" versus "grass-top") at the national, state, and local levels. Equitable Cities, an ongoing ESB Initiative consultant, is developing a list of national and local organizations that will be used to select a diverse cross-section of organizations, with particular focus paid to their status, size, capacity, targeted issues/services, and location. The interviews may explore the following:

- Awareness and knowledge of existing school bus electrification efforts nationally and locally
- Degree to which they are involved or would like to be involved in these efforts
- Effective ways to center equity in the transition to electric school buses
- Competing local and national priorities particularly as they relate to school bus electrification in underserved communities
- Level of engagement and relationship with local school districts, parent-teacher organizations, and other similar advocacy groups
- Thoughts on the new Infrastructure Investment and Jobs Act and the EPA's charge to design and implement a Clean School Bus Program to disburse funds

4. ESB INITIATIVE EQUITY FRAMEWORK IN ACTION

The ESB Initiative has developed an overarching plan for implementing our equity framework, included in the project results framework, theory of change, and MEL indicators. Each pillar work team develops a yearly work plan that outlines outputs and activities. Equity is integrated throughout these documents to highlight our equity-centered approach. We have created specific equity goals and strategies that structure how equity is embedded in these larger pillar-specific plans. The equity team also utilizes a series of forums and processes to help shape pillar activities and support pillar staff. All of these elements are discussed below.

4.1 Overarching Equity Goals and Strategies

Building on the extensive literature review already undertaken, the findings from the research outlined above will be used to finalize these equity action plan elements. Five overarching goals and four strategies are outlined below. These goals and strategies are designed to shape pillar work team policies, practices, and activities and ensure that the pillar work team and project support provided by the equity team is aligned toward our common project goals.

Goals

1. **Center equity in pillar work team goals, objectives, and implementation approach**: As defined in this framework, this includes embedding equity into project outcomes and using fair and transparent processes and procedures for decision-making.
2. **Address potential disparate impacts and risk of harm**: The racial, cultural, educational, safety and health, and socioeconomic disparities associated with school bus transport will be identified and evaluated and responses to these findings, including the impact of historical disparities and discriminatory practices, will be incorporated into project activities.
3. **Engage all relevant stakeholders**: We will identify the full range of stakeholders and groups impacted by the transition. Their needs, experiences, and knowledge will inform project objectives and activities. We will join with others to communicate and amplify the work of transitioning to ESBs.

4. **Foster inclusion**: Advance a partner-driven, accountable approach that provides opportunities for shared leadership and decision-making in all phases of work and strengthens our internal capacity and commitment to an equity culture.
5. **Create a culture of accountability**: We will use monitoring, evaluation, and learning mechanisms to ensure that our own work or outcomes proactively address unintended consequences and do not perpetuate injustices.

Strategies

1. **Engagement/partnership**: We will use targeted mechanisms—such as stakeholder mapping, working groups, and joint coalition building—to identify and partner with stakeholder and key equity groups.
2. **Research**: We will use both quantitative and qualitative methods to understand and address equity barriers and opportunities, collect feedback from key groups, and share these findings with the larger ESB community across all ESB Initiative teams.
3. **Technical assistance**: We will help key partners and stakeholders foster an equitable ESB transition as part of our collaboration with them.
4. **Institutionalize equity**: Our communications, monitoring, and evaluation indicators; advocacy; and internal policies and processes will mainstream and sustain equity within the ESB Initiative.

In addition to developing the PODs for technical assistance described in Box 3, other examples of ESB Initiative work team activities that incorporate these goals and strategies are as follows:

- The ESB Initiative communication team has created equity-first community and partner engagement plans that are reflected in core communications and targeted messaging materials.
- The research team is working to identify the location of school bus depots across the country; data have not been systematically collected or shared publicly to date. We will incorporate these data in the baseline equity study referenced above and report trends on how they overlap with environmental justice or underserved communities.
- The Pillar 2 work team has hosted discussions with ESB manufacturers around battery recycling programs, consideration of end-of-life vehicle plans, and responsible sourcing from suppliers. It has also engaged with nonprofits, technical colleges, and institutions serving lower-income or underrepresented communities to foster opportunities for job pipelines and workforce development.
- The Pillar 3 work team is engaging utilities in discussions on needed equity and resources and recommendations to support their role in equitable charging infrastructure and ESB deployment, including rates and tariffs.
- The Pillar 4 work team is collaborating with environmental justice and other state organizations to include equity priorities in proposed state legislation or policies that support the ESB transition.

4.2 Monitoring, Evaluation, and Learning

The project-wide results framework includes equity MEL indicators to measure outcomes, outputs, and activities. These include both specific indicators as well as markers for measuring how this equity framework has been incorporated into the ESB Initiative project workplans and implementation. For processes, we will use engagement activities and staff capacity-building tracking, perception surveys, and other qualitative information collection methods, including capturing feedback from partners or school districts to demonstrate success. We will also use this information and data to strengthen the equity framework as needed. Currently, the MEL framework includes over 75 indicators to be tracked either annually or quarterly depending on the indicator. Examples of some of the equity element include the following:

- Percentage of school districts in underserved communities with at least one ESB
- Number of policies mandating battery second-life use and/or recycling for ESBs
- Number of operating ESBs that are repowered to electric
- Number of public funding programs available for purchasing electric school buses and related infrastructure, by those that include an equity requirement or not
- Percent of financial industry actors with increased knowledge of the financial case for ESBs including the benefits for underserved communities
- Number of federal government entities that report incorporating ESBs into draft policy with a priority placed on the needs of underserved communities
- Number of completed research activities that center or integrate equity
- Percent of financially supported partners who are non-white

- Percent of environmental justice organizations and consultants, as well as BIPOC-led organizations, that rate project engagement as inclusive through a perception survey

4.3 Internal Support and Informal Dialogues

To provide ongoing support to ESB Initiative staff, the equity team provides direct pillar work team guidance; forums for peer-to-peer learning; and informal opportunities to discuss equity-related opportunities, challenges, and questions. Each of these elements is outlined below.

Direct Pillar Work Team Support

Each pillar group has a designated equity point of contact (EPOC) assigned from the Pillar 5 equity team. EPOCs raise and resolve equity issues as the broader ESB Initiative work is implemented and ensure that equity is incorporated into pillar activities. The EPOC also acts as a liaison to the entire equity team to help strengthen overall communication and coordination to ensure that equity goals and objectives are accomplished.

Internal Equity Learning

To foster a culture of accountability and build staff knowledge, the equity team facilitates a "Let's Break to Educate" learning series featuring environmental justice, mobility, and equity experts who share their knowledge and expertise with WRI and ESB Initiative staff. These events provide multiple opportunities for all ESB Initiative staff to engage around equity goals and vision. The ESB Learning Series is not designed to be prescriptive but is intended to ensure a fundamental understanding of the history of key equity concepts and help make connections between those concepts and electric school bus deployment.

Informal Dialogue Spaces

The equity team facilitates an informal equity happy hour series as an unstructured space, open to all ESB Initiative staff, to raise questions and concerns around equity. These meetings are scheduled twice a month and offer an opportunity to discuss shared resources, learning series content, or any relevant news of the day with equity team members.

4.4 External Communications and Outreach

WRI plans to ensure that our project communications and engagement highlight our equity approach and activities.

A Public Website

The ESB Initiative has created a public website to share resources; relevant electric bus transformation policy, procurement, and operational information; and WRI's ESB Initiative project plans and progress with stakeholders. This public-facing platform, electricschoolbusinitiative.org, which launched in October 2022, is a centralized space to highlight our equity-first approach, our research, and the work of our partners and other stakeholders.

Equity Review Process for Future Research

WRI's strategy for tackling the world's most pressing problems is rooted in our "count it, change it, scale it" approach, making peer-reviewed research part of our institutional DNA. This ensures that we test approaches on the ground and track and monitor impact. Building on this method, the ESB Initiative's research strategy defines and determines the research the project should undertake and provides a decision-making tool for the ESB Initiative to determine what proposed research is within the scope of the project.

The ESB Initiative research strategy includes an equity review to evaluate the research question and methodology for equity implications and to ensure that it aligns with our overall equity vision and goals. The equity research team is developing a guidance document for incorporating equity into ESB Initiative research, including the draft evaluation criteria provided in Table 1 that the equity team will use to determine if equity should be or has been appropriately considered or planned.

Project team researchers will review the guidance document and evaluation criteria when developing ESB Initiative research proposals to help them consider appropriate equity intersections and processes and shape research proposal design, methods, and analysis. Given the wide range of possible ESB research, not all criteria or aspects of the guidance will be relevant for every research proposal.

Once completed and implemented, the equity team will review research proposals or publication plans based on the relevant criteria and provide recommendations if needed. For cases where the review team considers an equity component to be essential, the team will engage the researcher, pillar lead, and ESB Initiative management team to outline specific requirements that must be included. Further, our MEL results framework also tracks the number of completed research activities that center or integrate equity.

Table 1 | **Draft Guidance and Evaluation Review Criteria**

PARAMETER	CRITERIA CONSIDERATION
Research proposal preparation	Does the research proposal include a clear and adequate equity problem statement that indicates researchers have thought through equity intersections? Were specific equity types explicitly mentioned?
	Was an effort made or planned to understand and document historic drivers and equity conditions and inclusion in analysis (both access to services, benefits, or policy output and disparate impacts)?
Target population Consider if the proposal includes a target population, or group of stakeholders impacted by topic	Does the proposal plan to use relevant stakeholder mapping or some form of distributional impact analysis to adequately capture impacted/target populations?
	Did the researcher consider or plan to consider the different needs, conditions, capacities, and vulnerabilities of target populations based on race, income, gender, or other relevant identities such as disability or geography?
	Does the proposal plan to use relevant power mapping when considering recommendations around actions that target populations should take to influence decision-making or outcomes?
Partnerships Consider if the proposal includes consultation or co-research plans with partners	Does the proposal include a plan to engage with outside partners or target population representatives in the design, execution, or analysis? If it doesn't, should it?
	Is the level of engagement—inform, consult, or joint decision-making—appropriate?
	Were appropriate efforts included or planned to actively and successfully create opportunities for historically excluded or underserved communities to engage in and co-create plan outcomes?
Analysis	What sources of data are being considered and collected? Does the proposal adequately include sources that capture equity intersections or relevant underserved stakeholders? Did the researcher include a review of the literature (including gray literature) and policy reviews as a form of analysis and consider the extent to which their proposed methodology is done equitably?
	Does the data collection method include a plan to evaluate existing disparities within communities and among stakeholder groups and/or disaggregate data by identity factors or equity dimensions? If not, why not?
	How are interview, survey, or focus group questions developed? Do they attempt to address unintended consequences and historical or current discriminatory practices?
Outcomes	Are equity intersections or considerations adequately addressed in the stated desired outcomes or planned uses of the research? Does the proposal consider how to capture long-term outcomes or impacts?
	What does the proposal seek to accomplish? Does it attempt to support the reduction of disparities or discrimination or advance equity impacts?

Source: Authors.

5. CONCLUSION AND NEXT STEPS

This working paper outlines how the ESB Initiative equity framework will guide the project to lead with equity while centering intersectionality. It presents why an equity-first vision is essential for the ESB transition; the definitions and types of equity important to the project; the foundational guidance and knowledge needed to center equity throughout the project; and an equity action plan that specifically outlines the processes, forums, and accountability mechanisms needed to achieve our equity vision.

The paper also outlines our plan for more robust equity analysis, our school district needs assessment, and our stakeholder mapping research to ground the ESB Initiative in a data-driven approach. Once this research has been completed, a final version of the framework that reflects these new insights will be published.

The ESB Initiative equity framework will be finalized after the completion of three phases.

Phase 1 is this initial document. Phase 2 includes the completion of the equity data analysis, school district needs assessment, and stakeholder analysis outlined above. These analyses, to be completed in 2023, will guide any changes to the framework and equity action plan including the project's MEL approach, including strategies for building a culture of accountability within each pillar and across the ESB Initiative. Phase 3 will include refinement of the ESB Initiative partnership and research strategies, and future (year four and five) pillar work plans based on the framework. It will also include a final version of this document. As these elements operationalize the concepts and principles, we expect these activities to highlight the strengths and weaknesses, and challenges and opportunities, of our equity approach. Thus, we expect to revise the framework accordingly to ensure it evolves along with the project.

Leading with equity and maintaining accountability is not easy. It often reveals hidden biases and requires project leaders to redefine the problem and incorporate the viewpoints of underserved stakeholders, not typically reflected in organizational decision-making. Especially in large, established institutions like WRI, leading with equity often requires projects to use new, unfamiliar processes that take time and resources and can feel in conflict to the sense of urgency we feel when addressing critical sustainable development challenges. But if the goal of an ESB transition is to help address the threat of climate change and galvanize systemic change that improves the lives of all communities, then the ESB Initiative must ensure that we don't just talk about equity but take the time and energy to transform our principles into practice. And we hope other WRI programs and projects can use the ESB Initiative's equity-first approach for other just transitions we wish to see.

APPENDIX A. OVERVIEW OF EQUITY OPPORTUNITIES AND RISKS

Table A-1 presents a preliminary list of possible equity types, or intersections, based on an initial macro-level analysis of ESB equity issues. A comprehensive evaluation will be conducted as part of the quantitative research outlined in this document.

Table A-1 | **Overview of Equity Opportunities and Risks**

EQUITY TYPE	INTERSECTION	ESB OPPORTUNITY	ESB RISK
Mobility access and ableism	Children with disabilities ride the bus more frequently and travel longer distances to school than students without disabilities. They are often separated from other students on different buses due to accessibility needs. Children with disabilities may have increased emissions exposure due to wheelchair lift locations and duration on buses.	Can help address disproportionate risks and strengthen educational opportunities by expanding mobility access and integration Expanded stakeholder engagement around disability rights and children's education access	Limited interest in procuring an adapted ESB could perpetuate harm and discrimination Changes to routes, scheduling, or bus access as a result of the ESB transition could result in or perpetuate inequities in the quality and availability of transport
Race and ethnicity	Automotive manufacturing is an important source of relatively well-paying jobs, including for BIPOC communities. Black workers represent a large proportion of school bus drivers, while Latino workers represent a large portion of diesel engine technicians. Historic barriers to employment for workers from BIPOC communities could threaten access to employment opportunities in changing or growing sectors of the ESB transition such as electrical infrastructure installation. Children of color ride the bus more frequently, often in poorly resourced school districts with less funds for procurement. BIPOC communities are disproportionately exposed to and impacted by air pollution.	Can help address disproportionate risks and strengthen educational opportunities for school-age students and continuing education for bus maintenance workers Can create new, high-quality job opportunities with a priority for workers from disadvantaged communities Can reduce exposure to toxic bus exhaust, especially in bus idling hot spots, and reduce cost of health care from associated health impacts	Changes to routes, scheduling, or bus access as a result of the ESB transition could result in inequities in the quality and availability of transport Significant job losses or job quality reductions among BIPOC workers, especially in ESB assembly and component manufacturing Perpetuate harm and discrimination and disproportionate impacts including health impacts from bus exhaust exposure

Table A-1 | **Overview of Equity Opportunities and Risks (Cont.)**

EQUITY TYPE	INTERSECTION	ESB OPPORTUNITY	ESB RISK
Income and wealth	Children from low-income families ride the bus more frequently, often in poorly resourced school districts with less funds for procurement. Electrification may have impacts on job availability and quality for tens of thousands of workers. Under-resourced school districts could have challenges addressing trade-offs between upfront costs of ESBs and other investments or expenditures at the school district level.	Can help address disproportionate risks and strengthen educational opportunities Can help address historical and structural injustices including disproportionate exposure to air pollution and cost of associated health care Can provide a new source of economic support to underserved school districts Could create new, high-paying jobs Opportunity to create retraining programs for existing workforce	Given frequency of ridership, changes to routes, scheduling, or bus access as a result of the ESB transition could result in inequities in the quality and availability of transport Perpetuate harm and discrimination Could lead to job losses or reductions in job quality leading to greater income inequality
Gender	Women are more likely to be responsible for school transport or scheduling coordination. Female bus drivers face discrimination and harassment. Female-headed households, especially households of color, are disproportionately poorer than other families and face additional intersectional forms of discrimination. Women have faced discrimination and increased levels of sexual harassment in the vehicle/automotive industry as well as limited access to manufacturing jobs.	Support women typically denied access to jobs, including through inclusive recruitment, training, and advancement of women in male-dominated industries and trades Support resilience of women responsible for school transport	Exacerbate challenges facing women responsible for coordinating school transport Discrimination against female bus drivers and lack of pay equity could be exacerbated by these changes
Location and geography	Racial and income-based discrimination, access to basic services, economic mobility, and pollution exposure all have a spatial component. Children living in rural areas ride the bus longer distances and families have less access to alternative forms of transport. Rural school districts may have less funds for procurement and a unique set of bus and charging needs and challenges.	The location of ESB parking or EV charging stations and other EV programs could support economic and educational opportunities for low-income communities and communities of color and support ESB deployment Could support economic opportunities and jobs in rural communities	Reinforce existing inequalities and create charging deserts that perpetuate discrimination and harm Current school bus depots pollute surrounding communities especially in cities or high-volume school fleets
Education	School transport has been shown to impact access to educational opportunities especially for low-income children and children of color.	Strengthen access to educational opportunities for students Expand continuing education for bus maintenance workers or other job opportunities involving EVs and related careers Expand perspectives and change mindsets of children and communities to understand the long-term benefits and costs of ESBs and larger environmental challenges like pollution and climate change	Reduce the reliability of transportation, which can aggravate other forms of inequity Educational opportunities such as special magnet programs may be limited or harm and discrimination could be perpetuated by changes in school bus service as a result of the ESB transition

Table A-1 | **Overview of Equity Opportunities and Risks (Cont.)**

EQUITY TYPE	INTERSECTION	ESB OPPORTUNITY	ESB RISK
Safety and health	Diesel pollution is hazardous to children's health and may even impact academic performance. Diesel buses are a known source of residential pollution especially in overburdened communities and for those living near bus depots. School buses must also comply with multiple laws and regulations with a range of safety features—many of which are state specific.	Could help address the disproportionate risk and improve the environmental health of students and communities disproportionately exposed to air pollution Could improve safety features and engage stakeholders on holistic approaches to student transportation safety issues	Perpetuate harm, discrimination, and disproportionate exposure to pollution
Employment	Manufacturing jobs have historically excluded women, people of color, and people who were formerly incarcerated. Automotive manufacturing job quality has fallen as companies pursue anti-union and low-wage strategies. EV batteries and electronic components are more likely to be produced outside of the United States than diesel engine components, and are more likely to be produced by new, non-union companies. The transition to ESBs has job retention and appropriate training implications for current diesel bus mechanics. Electric vehicle supply equipment installation is a major growth area for electrical workers.	Could improve job security and quality and address historic job discrimination of women and people of color Could create good green jobs and help develop a high-road U.S. domestic supply chain for medium- and heavy-duty EVs Provide new ESB and EV skilled high-paying jobs to mitigate lower number of bus maintenance jobs needed Could create opportunities for upskilling of school bus technicians, manufacturing workers, and electrical workers	Could perpetuate historic discrimination and job insecurity and poor training Could lead to job losses and lower wages in school bus manufacturing and maintenance
Electric utilities	Utilities provide the source of charging energy for ESBs, while ESBs, in turn, can serve as an energy storage mechanism for electric utilities.	ESBs could provide services to vulnerable areas, including emergency services Could spur improved charging infrastructure in neglected areas A new source of finance for procurement, depot, and bus charging infrastructure	Perpetuate harm and discrimination if utilities don't support school districts that struggle to fund or finance buses or infrastructure, such as through rates/tariffs, charging infrastructure maintenance, or investment in grid capacity Extra cost burden on communities if increased rates due to ESB investments
ESB costs and funding options	High upfront costs can make ESBs less accessible for lower-income school districts or create difficult trade-offs between upfront costs and other investments at the school district level. Lower maintenance and fuel costs might not cover the difference in upfront costs for early adopters.	Creation of innovative financing through green banking Development of vehicle-to-grid infrastructure that helps offset costs and funding	May perpetuate the inequitable distribution of wealth Unequal access to lending due to different credit ratings may also impact financing

Table A-1 | **Overview of Equity Opportunities and Risks (Cont.)**

EQUITY TYPE	INTERSECTION	ESB OPPORTUNITY	ESB RISK
ESB manufacturing and supply/value chain	The scale of production must be increased to lower the cost of ESBs (economy-of-scale impacts).	Spur economic development from fossil fuels to electrification including opportunities to invest in environmental justice communities Creation of new battery end-of-life technologies/markets Spur reduction in cost and expansion of other EVs	Placement of ESB manufacturing factories in overburdened environmental justice communities could perpetuate discrimination and health and social impacts if environmental and labor laws are not better enforced or complied with Minerals used for ESB batteries cause upstream negative human rights, socioeconomic, environmental, and health impacts in lower-income countries and vulnerable communities where these are mined Could perpetuate battery waste problem Used diesel buses exported to lower-income countries shift toxic pollution and other impacts to those communities Could inadvertently keep ESB prices high if supply chain challenges are not mitigated Potential for factories to close and be replaced with factories in different locations impacting local economies
Nongovernmental organization culture	WRI is a "big green" organization with limited environmental justice experience in the United States.	Could strengthen WRI's relationships with new stakeholders	Perpetuate tensions with environmental justice groups and jeopardize WRI's reputation if we are perceived as "equity washing"

Note: EV = electric vehicle.

Source: Authors.

APPENDIX B. OTHER IMPORTANT TERMS AND CONCEPTS

The ESB Initiative is committed to using people-centered language, which reverses the customary practice in English grammar of placing an adjective in front of the noun. An example of people-centered language would be to describe a disabled child as "a child living with a disability." The switch takes the focus off the adjective, which can attach or negatively imply an inherent condition on a person, and instead presents that person's condition or situation as circumstantial. By using such a sentence structure, the speaker articulates the idea of the condition as a secondary attribute, not a characteristic of a person's or community's identity.

The project equity team has provided guidance to help ESB Initiative staff describe equity conditions and stakeholders in the project. The guidance is intended to clarify and align the use of equity-related terms with the project's values of equity and integrity by outlining how and where to use people-centered language throughout our communications. Examples for the ESB Initiative include the following:

- Using *underserved* and *under-resourced* as similar terms instead of *marginalized* when referring to communities or school districts that are provided with inadequate service and have insufficient resources to fully operate at their best capacity, given historical context from unjust policies or land-use planning
- Whenever possible, using precise language to describe historically disadvantaged communities, including, where applicable, referencing impacted groups by name

In addition, a few other key terms relevant to the ESB Initiative have multiple and overlapping dimensions to their definitions that make clarification important. These terms are highlighted below.

Other Forms and Definitions of Equity

Instead of using horizontal and vertical equity (defined in Box 2), other institutions and researchers have used alternative terms to capture the different procedural, distributional, generational, and structural accountability embedded in the definition of equity (Park 2014). These common terms include the following:

- **Procedural equity**: Inclusive, accessible, authentic engagement and representation in processes to develop or implement programs and policies
- **Distributional equity**: The result in the fair distribution of benefits and burdens across all segments of a community, prioritizing those with the highest need
- **Structural equity**: Decisions made in recognition of historical, cultural, and institutional dynamics and structures that have routinely advantaged privileged groups in society and resulted in chronic, cumulative disadvantage for subordinated groups
- **Transgenerational equity**: Recognizes generational impacts and tries to ensure that current decisions don't result in unfair burdens on future generations

Justice

Justice is one path to achieving an equitable outcome. Justice can be defined as the process required to move from an unfair, unequal, or inequitable state to one that is fair, equal, or equitable. Especially in the context of environmental justice, organizations and legal scholars typically recognize four types of justice (Kuehn 2000):

- **Procedural**: The right to treatment as an equal and the perceived fairness of the procedures leading to the outcome that encompasses inclusiveness, representation, parity, and communication
- **Distributive**: The right to equal treatment, that is, to the same distribution of goods and opportunities as anyone else has or is given; more specifically, in an environmental justice context, distributive justice most commonly involves addressing the disproportionate public health and environmental risks borne by people of color and with lower incomes
- **Compensatory, or corrective**: Involves fairness in the way punishments for lawbreaking are assigned and damages inflicted on individuals and communities are addressed; it also includes a duty to repair the losses for which one is responsible
- **Social**: Presents environmental justice as part of larger problems of racial, social, and economic justice and helps illustrate the influence of politics, race, and class on an area's quality of life; it highlights how the same underlying factors responsible for the environmental threats also likely play a significant role in why the area may suffer from other problems such as inadequate housing, a lack of employment opportunities, and poor schools

Representational Justice

Representational justice can be defined as how different groups are visually represented and the broader relationship between the work of representation—images, films—and the positive or negative narratives or stereotypes that such visuals create or reinforce (Gilmore 2019). Racial stereotypes can be harmful and perpetuate

racism or other forms of discrimination. True representational justice demands a shift in context, challenging the images used to represent different groups to reflect the world.

Interactional Justice

Interactional justice is fostered when decision-makers treat people with respect and sensitivity and explain the rationale for decisions thoroughly. It focuses on how individuals treat one another not only when resources are distributed but in everyday interactions as well.

Inclusion

Inclusion can be defined as the action or state of including or of being included within a group or structure (AECF 2014). More than simply diversity and numerical representation, inclusion involves authentic and empowered participation and a true sense of belonging and agency.

Engagement versus Empowerment versus Outreach

Although definitions can vary, there is a difference between stakeholder engagement, empowerment, and outreach. Engagement may simply involve providing input or limited participation. Similarly, outreach is typically a one-way form of engagement with limited interaction beyond awareness raising. Empowerment involves stakeholders taking leadership roles, making decisions, and designing solutions and strategies at every phase of social-change efforts. Understanding these terms as levels of participation can help unpack these differences (IAP2 IF 2014).

Underserved Communities

Our framework often refers to underserved communities. Although we recognize this may not completely align with our people-centered language commitment, we have decided it offers maximum flexibility in describing communities and school districts to convey what and who is being referred to specifically, intentionally, and respectfully. While there is no uniform definition, the United States defines underserved community in *Executive Order on Advancing Racial Equity and Support for Underserved Communities through the Federal Government* as "populations sharing a particular characteristic, as well as geographic communities, that have been systematically denied a full opportunity to participate in aspects of economic, social, and civic life" (White House 2021). As referenced in the executive order, individuals who may belong to underserved communities include Black, Latino, Indigenous, and Native American persons, Asian Americans and Pacific Islanders, and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality. This definition is used in the U.S. Department of Transportation's *Equity Action Plan* (DoT 2022) and referenced by the EPA when describing the prioritization of underserved communities in the development of the federal Clean School Bus Program (EPA 2022).

Other government statutes often include populations or criteria around barriers accessing the specific services under their purview. For example, U.S. Health and Human Services defines underserved communities in Statute 34 USC § 12291(a)(39) as populations who face barriers accessing and using victim services because of geographic location, religion, sexual orientation, and gender identity as well as underserved racial and ethnic populations and populations underserved because of special needs such as language barriers, disabilities, immigration status, or age.

Overburdened community is another term commonly used in environmental justice discussions. This term as defined by the EPA includes "minority, low-income, tribal, or indigenous populations or geographic locations in the United States that potentially experience disproportionate environmental harms and risks" (EPA 2016). The definition acknowledges that the disproportionality can be a result of greater vulnerability to environmental hazards or a lack of opportunity for public participation. It also can be attributed to the accumulation of negative or lack of positive environmental, health, economic, or social conditions within these populations or places where multiple factors contribute to persistent environmental health disparities.

ENDNOTES

1. Here are a few examples of the resources we reviewed and used as models for this framework: Curren et al. 2016; SCAG 2021; Creger et al. 2018, 26; Greenlining Institute 2018; EPA 2014.

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ABOUT THE AUTHORS

Elizabeth Moses is an environmental rights and justice associate II with the Environmental Democracy Practice in WRI's Center for Equitable Development. She is a natural resource governance expert and project manager with international and U.S.-based experience leading technical research, policy analysis, and civil society capacity building. With sector expertise in water management and service delivery, air quality, extractives, and procedural rights and open government, Elizabeth advances the integration of gender and social equity priorities and the rights of underrepresented and underserved people to engage in equitable, transparent, inclusive, and accountable decision-making.

Charles T. Brown is the founder and chief executive officer of Equitable Cities and an adjunct professor at the Edward J. Bloustein School of Planning and Public Policy at Rutgers University. An award-winning expert in urban planning, policy, and research, he is highly regarded as a keynote speaker and leads workshops on transportation, health, and equity for audiences worldwide. Charles previously served as a senior researcher with the Alan M. Voorhees Transportation Center at Rutgers University and, in 2020, was part of the inaugural class of the Public Voices Fellowship on the Climate Crisis, which is managed by the Yale School of the Environment.

ABOUT EQUITABLE CITIES

Equitable Cities is a U.S.-based urban planning, public policy, and research firm working at the intersection of transportation, health, and equity. Equitable Cities recenters the narrative of who moves, how people move, and where people move by conducting street-level research and collaborating with community partners and clients worldwide.

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World Resources Institute is a global research organization that turns big ideas into action at the nexus of environment, economic opportunity, and human well-being.

Our Challenge

Natural resources are at the foundation of economic opportunity and human well-being. But today, we are depleting Earth's resources at rates that are not sustainable, endangering economies and people's lives. People depend on clean water, fertile land, healthy forests, and a stable climate. Livable cities and clean energy are essential for a sustainable planet. We must address these urgent, global challenges this decade.

Our Vision

We envision an equitable and prosperous planet driven by the wise management of natural resources. We aspire to create a world where the actions of government, business, and communities combine to eliminate poverty and sustain the natural environment for all people.

Our Approach

COUNT IT

We start with data. We conduct independent research and draw on the latest technology to develop new insights and recommendations. Our rigorous analysis identifies risks, unveils opportunities, and informs smart strategies. We focus our efforts on influential and emerging economies where the future of sustainability will be determined.

CHANGE IT

We use our research to influence government policies, business strategies, and civil society action. We test projects with communities, companies, and government agencies to build a strong evidence base. Then, we work with partners to deliver change on the ground that alleviates poverty and strengthens society. We hold ourselves accountable to ensure our outcomes will be bold and enduring.

SCALE IT

We don't think small. Once tested, we work with partners to adopt and expand our efforts regionally and globally. We engage with decision-makers to carry out our ideas and elevate our impact. We measure success through government and business actions that improve people's lives and sustain a healthy environment.