



PACT

PARTNERSHIP FOR
CARBON TRANSPARENCY

Pathfinder Network

Enabling standardized
emissions data exchange

*In 2024, Pathfinder Network was rebranded to PACT Network.
Although the name changed, the vision remains the same.*



Powered by



Collaborators

The following organizations are core collaborators in the Partnership for Carbon Transparency (PACT) and the development of the Pathfinder Network.

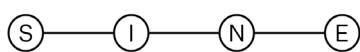


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Introduction

Current efforts to reduce Greenhouse Gas (GHG) emissions are insufficient to ensure the targets of the Paris Agreement can be met. Unsurprisingly, pressure on businesses to accelerate action is mounting – from consumers, customers, policy makers, regulators, standard setters, shareholders and investors alike.

The challenge

Accounting for and tracking GHG emissions is a key enabler for changing the global warming trajectory. A growing focus is being placed on tackling emissions from across the value chain (Scope 3), particularly those produced upstream. While Scope 3 emissions often constitute the lion's share of their overall carbon footprint, organizations are still struggling to adequately understand and address these.

Organizations share a common challenge: a lack of sufficiently granular, accurate and verified primary data. This is caused by issues with data accounting and data access as well as by the increasingly complex ecosystem of stakeholders emerging in this space.

Data accounting: Room for interpretation and inconsistency in existing methods and standards

Many organizations lack primary data to accurately account for emissions arising within a product's life cycle. General-purpose emission factor databases are used to fill this gap, though the average or typical data these provide are often not specific enough to meet the detailed data needs of organizations. High-quality product life cycle accounting is also inhibited by the inconsistent use of methodologies to account for product emissions. The existing standards and protocols (such as ISO standards and GHG Protocol standards) and sector guidelines (such as the Product Category Rules or Product Environmental Footprint method) further leave room for interpretation.

Accounting standards and guidelines which are not fully consistent create challenges for streamlined, scalable application. This results in inconsistent and insufficient accounting, reporting and exchange of emissions data.

Data access and exchange: Complex value chains and lack of interoperability between technology solutions

Product-level data is often competitively relevant and highly confidential. Organizations that strive for transparency therefore face a data-sharing dilemma. Furthermore, value chains often span multiple (international) stakeholders from different industries, with little visibility on suppliers beyond tier 1. Most

enterprise resource planning systems are not able to exchange GHG emissions data with other systems (and across company boundaries), resulting in high transaction costs for manual efforts, in the form of surveys or spreadsheets.

Some organizations are seeking to resolve this by using new GHG accounting technology and data exchange platforms. While this constitutes an important step in the right direction, these solutions lack one essential feature: interoperability, i.e., the ability to connect to one another, exchange information and understand the information exchanged (or "speak the same language"). In practice, this means organizations can only access each other's data if they use the same technology solution. This would be akin to only being able to send emails to people with the same email provider – unimaginable.

Ecosystem alignment: Growing number of stakeholders seeking to tackle the transparency challenge

There has been significant uptake of activity designed to resolve the challenges around Scope 3 emissions. Organizations are searching for and developing individual approaches, industry-focused associations are addressing their members' most pressing concerns and the broader ecosystem has also started identifying the role it can play. What these efforts are lacking, however, is integration and harmonization—a huge risk, given that no single company, association or ecosystem stakeholder can create transparency without the others.

Addressing the challenge

As a result, organizations are lacking a core piece of the puzzle that would allow them to accelerate Scope 3 emissions reduction and hence supercharge decarbonization activities. It is impossible to track and reduce GHG emissions at the scale needed without being able to determine and understand the full extent of the task at hand.

The solution: an infrastructure which enables the consistent calculation and simple exchange of accurate, primary and verified GHG emissions data

across all value chains and industries, developed by core stakeholders in close collaboration. The Partnership for Carbon Transparency (PACT) was created to deliver on this.

What is needed are standardized approaches and common guidelines across both methodology (data accounting) and technology (data access). On the methodology side, this is to ensure emissions are calculated in a comparable and consistent manner, resulting in accurate, high-quality data. On the technology side, there is a need for common guidelines for data exchange and interoperability to enable data exchange across global organizations and complex value chains.

In light of this, PACT is establishing the following:

- **Methodological guidelines for product-level emissions data accounting and exchange**—realized through the Pathfinder Framework (first version launched at COP26, second version in development)
- **Open network for the exchange of product carbon data** across technology solutions, based on common guidelines and interoperability—realized through the Pathfinder Network (in development).

Further, PACT has been set up with an **ecosystem approach** at its heart. Bringing together a growing number of stakeholders from across value chains and industries, industry-focused initiatives, standard-setting bodies, leading technology companies, reporting organizations and regulators, PACT is focused on creating exchange, alignment and integration between these stakeholders.

The opportunity

Access to more granular data can unlock a host of use cases that reinforce internal business decision making and support corporate accountability. Transparency can for example positively influence the bottom line, mitigate (climate-related) risk or drive competitive advantages. Transparency on carbon data can also set the foundations for greater transparency on other environmental factors. If organizations are ready to embark on this journey together, the rewards will be significant—not least of all for our climate. This work therefore has the potential to be a game changer.



Our Vision

To address the data access challenge, the Partnership for Carbon Transparency is setting up the Pathfinder Network. The Network brings together different solutions and platforms, with the objective of enabling all organizations to have access to the primary emissions data associated with their products.

The Pathfinder Network seeks to address the following technical and organizational hurdles that are preventing data access and exchange today:

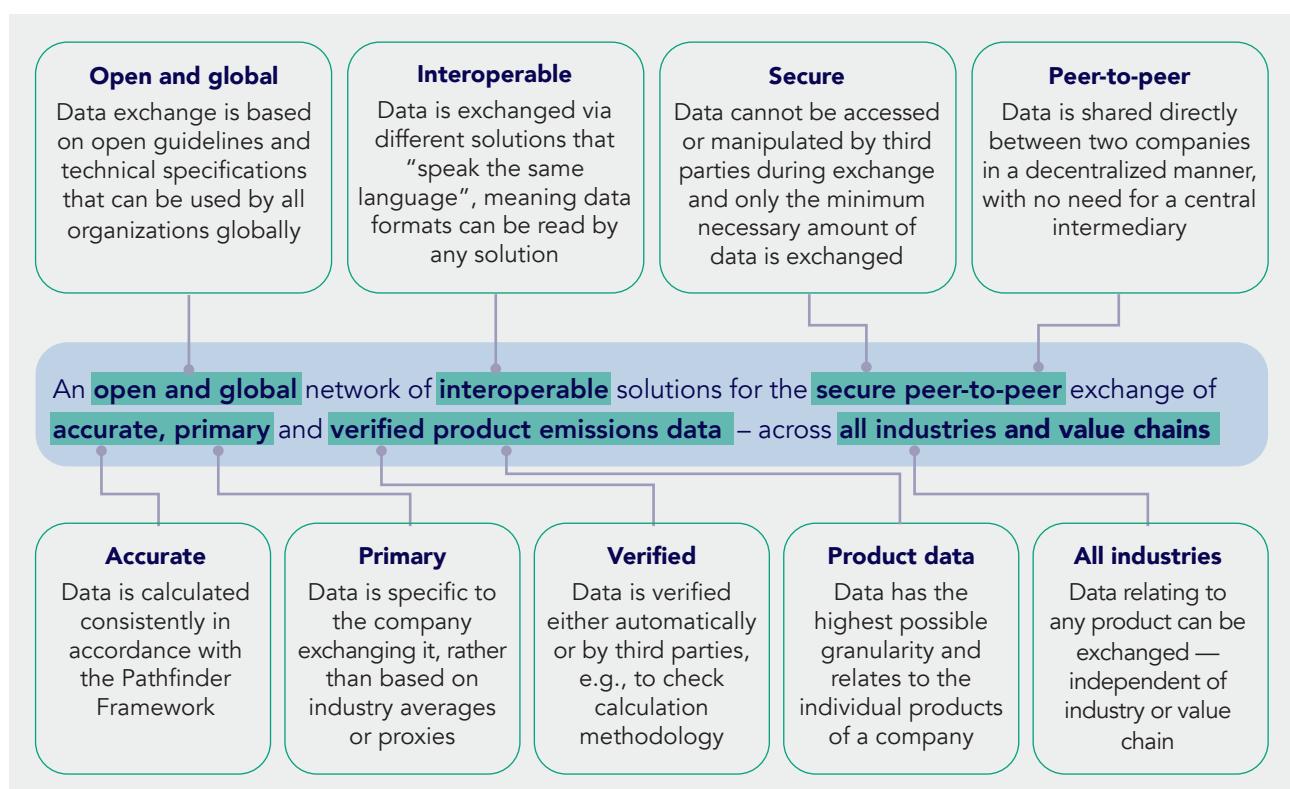
- Data sovereignty and confidentiality concerns (resulting in a data-sharing dilemma)
- Complex global value chains involving many stakeholders
- Lack of technical and semantic interoperability

To resolve data sovereignty and confidentiality concerns, technological mechanisms and legal frameworks must be put in place that empower stakeholders to maintain control over their data and support them in building trust with their value chains.

To connect stakeholders and address the interoperability hurdle in turn, harmonization and integration based on common technical specifications must be developed. This preserves flexibility and individual choice for all organizations, allowing them to choose the technology solutions which fit their individual requirements and needs best when managing their carbon emissions. At the same time, this approach enables solution providers to extend their individual impact and reach beyond their existing user base.

What is needed is an open and global network of interoperable solutions for the secure, peer-to-peer exchange of accurate, primary and verified product emissions data — across all industries and value chains.

Figure 1: Key components of the Pathfinder Network vision

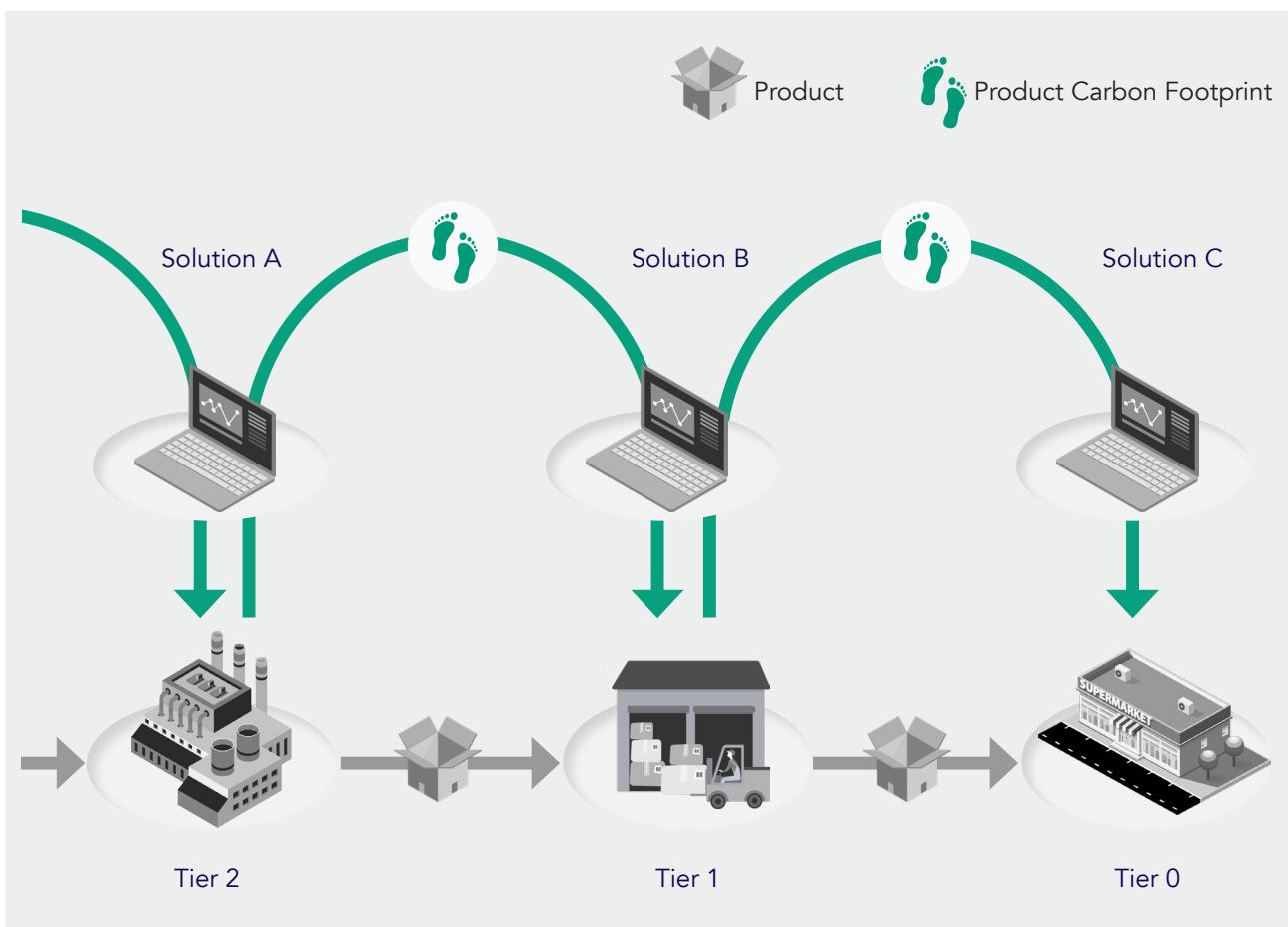


The Pathfinder Network should not be thought of as a technology solution, but rather as a necessary piece of infrastructure and a prerequisite for emissions transparency, which underpins the carbon accounting and data exchange system as a whole. In contrast to individual technology solutions or platforms—which, for example, can support organizations with their emissions data management, including storage, calculation, visualization and analysis – the Pathfinder

Network cannot be used to calculate a carbon footprint or to store any individual footprint data.

In the simplest of terms, our aim is to create the “internet for emissions data” – the common nexus for all organizations to seamlessly connect, exchange and derive insights from emissions data, setting them up to decarbonize at the scale needed.

Figure 2: Exemplary network value chain showing flow of data



Putting our Vision into Practice

United by this common vision, the Partnership for Carbon Transparency is putting in place the necessary building blocks to make this vision a reality. As a first step on the journey, this document sets out (i) the key design principles underpinning our vision, (ii) the core network functionalities necessary to achieve it, and (iii) the approach we are taking to develop these.

Network design principles

Five core principles guide the development and design of the Pathfinder Network. The aim is to ensure the Network aligns with our vision for transparency.

Data confidentiality and sovereignty

Each organization is the sole owner of and exercises sovereignty over its data, with full data control over who has access to any data point. The granularity of the data exchanged is chosen flexibly in line with the Pathfinder Framework. The technology is accompanied and supported by a governance framework that further strengthens the data sovereignty of each stakeholder.

Data quality and integrity

The exchanged data is consistent, validated, cannot be manipulated by third parties and protects organizations from any possible back-tracing of product-specific information. Agreed rules and fraud prevention measures, on a technical as well as on a governance level, are put in place to guide the operation of the Network. The overarching goal of exchanging high-quality, trustworthy, reliable data is ensured by the selection, definition and use of sound methodological foundations, technical standards and definitions.

Scalability and diversity

The Network scales globally to connect organizations of all sizes, supply chains and product categories across diverse technology solutions. Open-source technology

is provided to connect the separate technology solutions, significantly decreasing the transaction costs for new joiners.

Equality

The Pathfinder Network is a network of, by and for its users. All participating organizations have equal rights independent of size or type. Decision-making processes and governance structures are in place to reflect this notion.

Openness

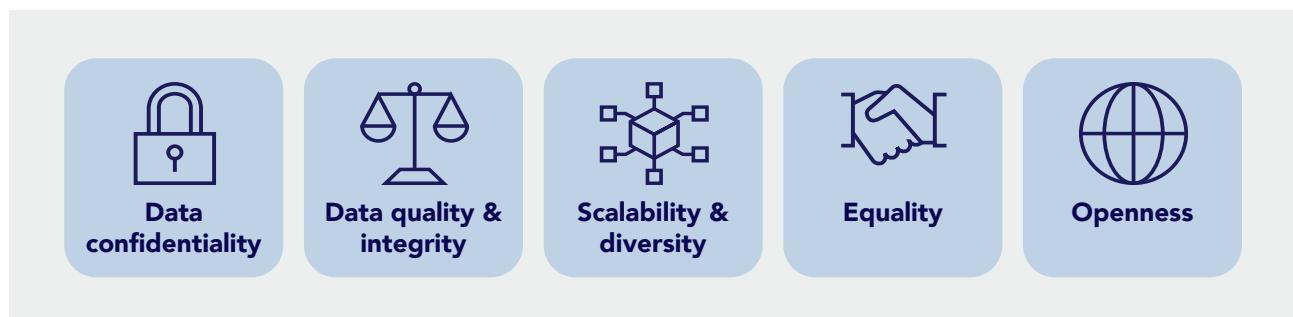
The Pathfinder Network is open to every business wishing to exchange or facilitate the exchange of data and that adheres to its standards and rules. Technological, financial, knowledge and other barriers are kept to a minimum. Relevant deliverables are made public (unless otherwise required for the preservation of the guiding principles stipulated in this document). Open-source software is the go-to where possible.

Core functionalities

To set the foundation for secure and interoperable data exchange, PACT is putting in place core pillars (which will be extended as the Network evolves). This includes:

- Identity management
- Authentication mechanism
- Plausibility and error-checking mechanism
- Auditing mechanism
- Security and fraud prevention mechanism.

Figure 3: Principles for Pathfinder Network development and design



Identity management. Standardized formats for the unique identification of companies, products, and product carbon footprints (PCFs) enable the end-to-end association of emissions to unique products and organizations along the value chain.

Authentication mechanism. A unique authentication system helps attribute PCFs to an issuing organization and provides the ability to trace, track and audit these and their underlying accounting methodologies.

Plausibility and error-checking mechanism. Any data submitted can be analyzed for correctness with the help of plausibility checks. Building on auditing and verification mechanisms, this reduces additional burden, such as manual checking or validation of alignment with the Pathfinder Framework, enabling full trust in the data once part of the Network.

Auditing mechanism. Open specifications and interoperable implementations enable data owners to store audit-relevant data in a sovereign, secure and confidential way. Based on this, ex ante and ex post verification processes can be performed through software or by accredited auditors in order to establish full transparency on and trust in the application of carbon accounting methodology and correctness of data.

Security and fraud prevention mechanism. The Network provides mechanisms for fraud prevention, such as double registration, detection and exclusion of bad actors and identity-related claim verification by users.

Figure 4: Application of core functionalities in basic Pathfinder Network user journey

Basic user journey		Core functionalities					
Logs into solution		Implemented in tech solutions – specification not in scope of Network					
Joins the Pathfinder Network		Identity management	Security and fraud prevention mechanism				
Requests and receives Product Carbon Footprint from suppliers		Data exchange mechanism	Identity management	Authentication mechanism			
Assesses quality of received Product Carbon Footprint		Plausibility and error-checking mechanism	Identity management				
Calculates own Product Carbon Footprint		Implemented in tech solutions – specification not in scope of Network					
Exchanges Product Carbon Footprint with customers		Data exchange mechanism	Identity management	Authentication mechanism			
Add-on features							
Identifies whether received Product Carbon Footprint was audited		Auditing mechanism					

Approach

PACT is working towards its objective using a community-led standardization process. In close collaboration, the community – consisting of users and technology solution providers – is defining the necessary profiles and technical specifications to enable semantic and technological interoperability.

To ensure alignment and ultimately prepare the broader ecosystem, e.g., for connection into the Network, PACT is also in close exchange with a broad range of global industry-specific initiatives, disclosure organizations, standard-setting bodies and regulators.

Deriving maximum benefit for the Network and its community lies at the heart of this process.

Figure 5: Network development approach and associated benefits

Approach	Benefit
Bottom-up The Network will grow in scope based on the definition and agile execution of specific use-cases with a clear business value for users.	Diversity of solutions and users The Network can accommodate the full diversity of users and technology solutions at very high speed .
User driven The Network is being designed and implemented with the continuous input and feedback of users.	Applicability and usability Applicability and usability for all relevant use-cases is ensured. Stakeholders have a clear incentive to participate .
Multi-stakeholder The Network leverages the demands and expertise of all relevant stakeholders from the beginning.	Synergies and buy-in Synergies are leveraged and duplication and redundancy are avoided. Buy-in can be created, serving as a basis to quickly scale the Network.
Open-source All knowledge and technical specifications will be publicly available.	Operationality Providers of technical solutions and users can operatively use relevant specifications and have access to the Network.
Iterative The Network will be developed in an iterative cycle of building, testing and refining.	Best-in-class Quick updates and improvements allow for a best-in-class standards approach.
Lean standardization The Network will develop standardized approaches with a focus on interoperability, creating viable solutions that can be scaled.	Speed The process can move fast and run in parallel to other regulatory standards.

Frequently Asked Questions

What does the term “Pathfinder” mean?

This term is designed to describe the fact that new paths are being taken to resolve the emissions transparency challenge. The key deliverables in the three focus areas of PACT are prefaced with the term “Pathfinder” to reflect this notion. Together the *Pathfinder Framework*, *Pathfinder Network* and *Pathfinder Ecosystem* provide the necessary foundations for the creation of emissions transparency.

What does the term “interoperability” mean?

Interoperability refers to the ability of different systems to connect seamlessly, exchange information and understand the information exchanged. In the context of the Pathfinder Network, the term includes both semantic and technological aspects. Technological interoperability means that technology solutions are able to connect to one another. Semantic interoperability means that the format and meaning of the exchanged data is understood by both systems and that they “speak the same language”.

Is PACT setting technological standards?

No. We are defining the specifications, guidelines and profiles necessary for the resolution of the transparency challenge. For example, we are defining APIs to help organizations connect to one another, which we will be publishing openly.

What makes the Pathfinder Network unique?

The Network is solution agnostic and focuses on creating interoperability to ensure all organizations and value chains can connect. The Network provides a strong link between methodology and technology – the two components key to creating emissions transparency as a whole (see below for more details on this link).

Outcomes are developed in a co-creation community-focused approach, driven by different stakeholders (including leading technology companies and start-ups as well as businesses from different industries) and perspectives. PACT is also working in close alignment with a broad range of global industry-specific initiatives, with a view to connecting not only technology solutions, but also industry platforms and networks which share the PACT principles. Further alignment is being created with disclosure organizations, standard setting bodies, and regulators, to ensure a joined-up ecosystem.

All relevant definitions, guidelines and specifications necessary for the creation of interoperability will be freely available and under open licensing terms.

Is PACT also developing operational software?

PACT may in the future operate minimal network infrastructure strictly necessary for and limited to fulfilling the essential objectives of our mission.

How does the Pathfinder Network link to the Pathfinder Framework?

The Pathfinder Framework provides the necessary guidelines to calculate emissions consistently. It also defines which data elements are exchanged within value chains. The Pathfinder Network builds on these guidelines, bringing the data exchange to life. It is therefore the technological counterpart of the Framework.

Bringing these two elements together leverages synergies and ensures interoperability as well as consistency and comparability of data from the first stages of the network development process.

How can potential users and providers of technology solutions become involved?

The Pathfinder Network is still under development, but in the meantime, you can take the following steps:

Interested users can elect to either (i) use one of the solutions under development by a tech provider already involved in PACT or (ii) implement the published technical specifications in their own IT systems in order to ultimately connect these to the Network.

Providers of technology solutions can implement the technical specifications in their solutions to ensure these will be able to link into the Network.

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CONTACT DETAILS

If you would like to find out more about PACT, please contact:

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ABOUT PACT

PACT is seeking to accelerate decarbonization through the creation of transparency on emissions in the value chain.

PACT provides a forum for stakeholders to jointly tackle this challenge, uniting businesses from across industries, technology players, industry-focused initiatives, standard-setting bodies, reporting organizations and regulators in their shared mission. Jointly, the PACT community defines and publishes the necessary methodological and technological basis for emissions data exchange, integrating existing standards and approaches and creating a trusted and holistic foundation.

PACT is hosted by WBCSD and supported by its knowledge partner, McKinsey Sustainability, as well as its technology partner, SINE Foundation.

www.carbon-transparency.com

ABOUT WBCSD

WBCSD is the premier global, CEO-led community of over 200 of the world's leading sustainable businesses working collectively to accelerate the system transformations needed for a net zero, nature positive, and more equitable future.

We do this by engaging executives and sustainability leaders from business and elsewhere to share practical insights on the obstacles and opportunities we currently face in tackling the integrated climate, nature and inequality sustainability challenge; by co-developing "how-to" CEO-guides from these insights; by providing science-based target guidance including standards and protocols; and by developing tools and platforms to help leading businesses in sustainability drive integrated actions to tackle climate, nature and inequality challenges across sectors and geographical regions.

Our member companies come from all business sectors and all major economies, representing a combined revenue of more than USD \$8.5 trillion and 19 million employees. Our global network of almost 70 national business councils gives our members unparalleled reach across the globe. Since 1995, WBCSD has been uniquely positioned to work with member companies along and across value chains to deliver impactful business solutions to the most challenging sustainability issues.

Together, we are the leading voice of business for sustainability, united by our vision of a world in which 9+ billion people are living well, within planetary boundaries, by mid-century.

www.wbcisd.org

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ABOUT SINE FOUNDATION

The SINE Foundation is a tech for good organization founded by progressive entrepreneurs, academic experts, and software engineers. SINE designs and implements the foundation for lasting data collaboration — delivered as ready-to-use governance tools and Open-Source software. The non-profit foundation supports global organizations to identify, initiate and maintain use cases for data collaboration within complex multi-stakeholder environments.

ABOUT MCKINSEY SUSTAINABILITY

McKinsey Sustainability is McKinsey's client-service platform with the goal of helping all industry sectors transform to get to net zero by 2050 and to cut carbon emissions by half by 2030. McKinsey Sustainability seeks to be the preeminent impact partner and adviser for their clients, from the board room to the engine room, on sustainability, climate resilience, energy transition, and environmental, social, and governance (ESG). It leverages thought leadership, innovative tools and solutions, top experts, and a vibrant ecosystem of industry associations and knowledge partnerships to lead a wave of innovation and economic growth that safeguards our planet and advances sustainability.

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