Westernacher
NONSTOP INNOVATION

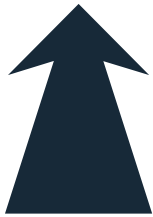# How to slash CO$_2$ emissions through supply chain innovations.

In today's fast-paced world of supply chains, the production and delivery of products have reached unprecedented levels. However, this rapid movement comes at a cost to our environment, posing a significant threat to sustainability goals and initiatives. At every stage of the supply chain, carbon emissions are generated. In this white paper, we aim to explore different types of emissions, discuss methods for calculating them, and highlight the benefits of tracking these emissions.

What are supply chain emissions?

As you might have read previously in our "Scaling Green: Elevating your supply chain sustainability through SAP TM" white paper, carbon emissions can be categorized into three distinct scopes:
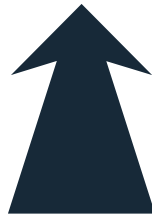
Scope 1 Emissions

These are direct emissions stemming from assets owned and controlled by the company, such as different facilities. Examples include emissions from chemical processing and on-site
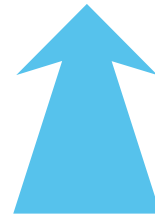
SCOPE 1

DIRECT EMMISSIONS
stemming from assets owned and controlled by the company, such as different facilities.

SCOPE 2

INDIRECT EMMISSIONS
arise from the consumption of purchased resources, such as energy or utilities.

SCOPE 3

INDIRECT EMMISSIONS
operational emissions that encompass a wide range of activities within the company.

fuel combustion from various equipment.

Scope 2 Emissions

Indirect emissions arise from the consumption of purchased resources, such as energy or utilities. These emissions are the result of using services like heat and electricity provided by third-party sources.

Scope 3 Emissions

Scope 3 emissions can be seen as operational emissions that encompass a wide range of activities within the company. This scope extends to purchased goods and services, as well as essential business travel, which involves both upstream and downstream partners throughout the entire supply chain. Scope 3 emissions often have the most significant impact on a company's carbon footprint and represent a significant portion of global emissions. It is essential for organizations to understand and address them in order to make meaningful progress towards sustainability. However, the main challenge lies in the accuracy and accessibility of measurement data, which can hinder effective mitigation strategies.

Many organizations focus on reducing their scope 1 emissions, which originate from their own operations. However, they often overlook the fact that up to 90% of their overall emissions come from their supply chain and essential business operations. In order to address these scope 3 emissions effectively, organizations require advanced capabilities for tracking CO$_2$ emissions and improving transparency in their supply chain.

SAP TM plays a crucial role in this endeavor by categorizing transportation activities into different modes such as ocean, rail, and road. Users can define specific sustainability factors for each mode of transport, enabling them to access instant estimates of CO$_2$ emissions for every transportation decision. This feature empowers organizations to make informed choices that align with their environmental goals.

By understanding and addressing these different scopes of emissions and leveraging tools like SAP TM, organizations can proactively address their environmental impact and work towards achieving their sustainability objectives. To learn more about supply chain sustainability aside from carbon emission tracking, please refer to "Scaling Green: Elevating your supply chain sustainability through SAP TM".
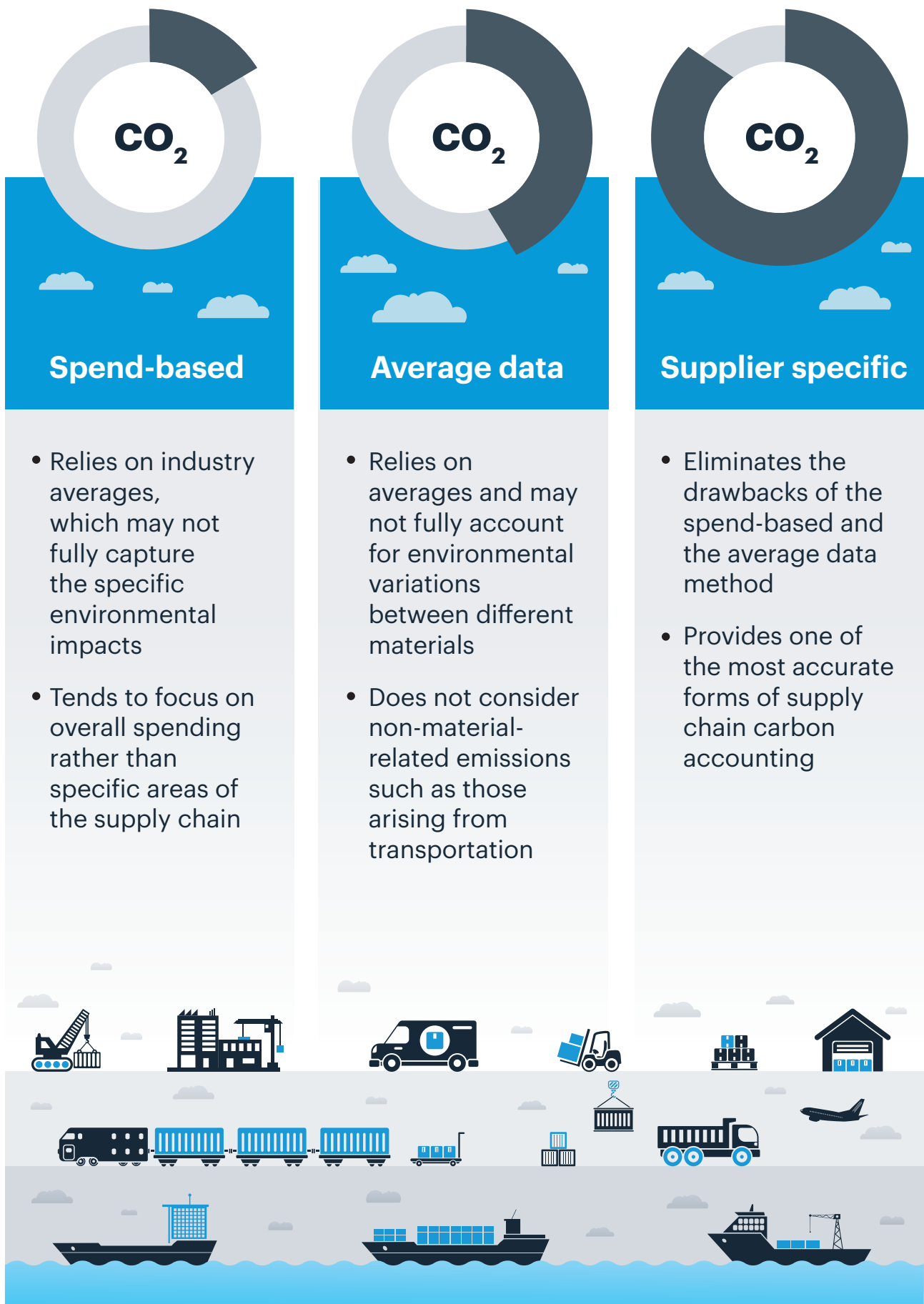
How to calculate supply chain emissions?

The impact technology and innovation have had on our lives in the last decade has been so staggering that it is hard to imagine going back to a world without it. With increasing economic growth, comes an increase in disruption to the environment. Therefore, measuring carbon footprint can be used as a strategic tool for structuring a solid environment strategy to help quantify the emissions and therefore, help define metrics for customers and investors who are now highly sensitive to environmental issues. Realizing the potential value proposition, Westernacher has partnered with project44 and shipzero to take the lead in creating a world-class supply chain sustainability and visibility solution platform. Not only does it provide transparency in measuring and tracking carbon footprint, but also provides a high-fidelity emissions workflow to reduce supply chain emissions. Below are some of the top approaches to measuring carbon footprint.

Spend-based

- Relies on industry averages, which may not fully capture the specific environmental impacts

- Tends to focus on overall spending rather than specific areas of the supply chain

Average data

- Relies on averages and may not fully account for environmental variations between different materials

- Does not consider non-material-related emissions such as those arising from transportation

Supplier specific

- Eliminates the drawbacks of the spend-based and the average data method

- Provides one of the most accurate forms of supply chain carbon accounting

a. Spend-based

Spend-based calculations provide a straightforward and relatively simple approach to estimating emissions by utilizing financial data and industry average emissions factors. However, it is important to acknowledge a few limitations. First, this method relies on industry averages, which may not fully capture the specific environmental impacts associated with different products or materials. Second, spend-based calculations tend to focus on overall spending rather than specific areas of the supply chain where emissions are more concentrated.

A simple example to illustrate spend-based calculations: Imagine a company that purchases a wide range of materials from various suppliers. To estimate the emissions within their supply chain, they apply the industry average emissions factor for each material type. While this estimation method provides a general understanding, it fails to account for emission variations across different types of materials and neglects emissions generated during the production process.

It is important to keep these limitations in mind when utilizing spend-based calculations as they may not capture the full complexity and nuances of emissions within a specific supply chain.

b. Average data

The average data method offers a solution to address the limitations of the spend-based approach by incorporating material weight data instead of relying solely on financial information. Focusing on such hard constraints can be a more reliable way to improve sustainability. By multiplying the weight of materials used in a company's products with specific emissions factors assigned to those materials, it becomes possible to estimate the emissions associated with the supply chain. However, it is important to note that, similar to the spend-based method, this approach still relies on averages and may not fully account for environmental variations between different materials. Additionally, it does not consider non-material-related emissions such as those arising from transportation.

To illustrate this further, let us consider the example of a consumer goods company that utilizes different packaging materials. In estimating emissions, they multiply the weight of each

packaging material by the average emissions factor assigned to that specific material. While this result may provide a more representative estimation compared to the spend-based approach, it still fails to consider the emission intensity and emissions stemming from other sources during the production process.

c. Supplier specific (most accurate)

The supplier-specific method collects supplier emissions data from each supplier using sustainability surveys and data collection workflows. Since this data is a form of activity-based estimation and some of the suppliers may not know this data in depth, the data collection can be very time-consuming and there could be potential gaps in information. To combat these gaps, we could use a hybrid emissions calculation approach that not only uses supplier-specific and activity-based data wherever possible but also fills the gaps by using industry averages. Hence, the hybrid method eliminates the drawbacks of the spend-based and the average data method and is considered to be one of the most accurate forms of supply chain carbon accounting.

Consider a simple example of a product company that requires multiple raw materials from seven different suppliers. There are three main steps to this approach: gathering supplier activity data, identifying the right emission factor, and converting the activities to carbon emissions. Each of the seven suppliers has their own utility bills such as electricity, water usage, transportation vehicles, shipping and all the other relevant activities in the supply chain. Having gathered all these operational data from the suppliers, we must identify an emission factor. An emissions factor is a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. Lastly, to convert the activities to carbon emissions, we must use the following formula:

Supplier-specific emissions = Supplier Activity x Emission Factor
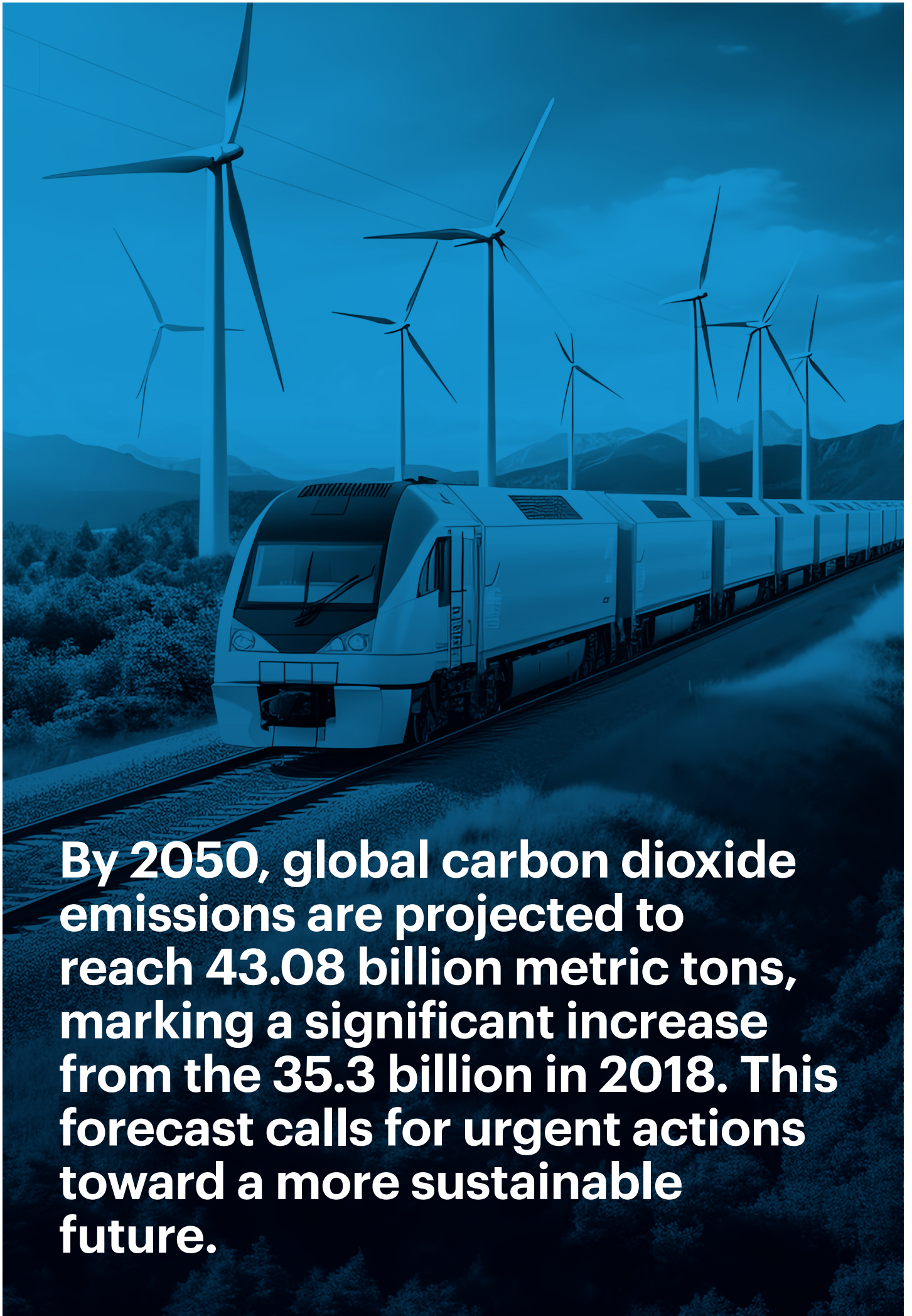
By 2050, global carbon dioxide emissions are projected to reach 43.08 billion metric tons, marking a significant increase from the 35.3 billion in 2018. This forecast calls for urgent actions toward a more sustainable future.

Why do we need to track supply chain emissions?

With increasing demands and mandatory regulations, leading companies must now take responsibility for their indirect or direct impact on sustainability. This is not only an opportunity for companies to grow and survive but also an opportunity to significantly influence the direction of the industry. Some of the top benefits of measuring carbon footprint are as follows:

a. Reduce your cost and environmental impact to meet clients' and investor's expectations:

Having transparency in the measurement of carbon footprint allows you to determine carbon reduction opportunities, usually linked to energy and transportation. High levels of supply chain emissions are usually the result of inefficiencies related to excessive energy use. Hence, lowering these emissions means increasing your efficiency and cost-effectiveness.

It has been increasingly common for clients to attach a great deal of importance to a company's environmental commitment, and it has become one of the most important criteria that influences their purchasing decisions. On the other hand, investors have been consistently requesting companies to disclose their carbon footprint and reduction strategies, leading for this to be a key factor for their investment or partnerships. Having clarity on the carbon footprint within the company can meet the growing expectations and demands of the stakeholders.

For instance, United Parcel Service (UPS) invested in a new project, ORION, which optimizes and shortens driver's routes, saving not only time and effort but also millions of dollars on fuel. ORION, which stands for On-Road Integrated Optimization and Navigation, will do that through a combination of connected car-

like telematics and a lot of data crunching of package information, user preferences and routes. UPS saved 3 million gallons of fuel during its testing phase alone between 2010 and 2012. Even though the idea behind this was from a transportation management perspective on being more efficient, there has been an environmental benefit to reducing fuel costs. 1.5 million gallons, about twice the volume of an Olympic-size swimming pool, were saved just in 2013, cutting 14,000 metric tons of carbon dioxide emissions. However, there are still challenges presented with some special circumstances. For example, in an outsourcing scenario, when the outsourced carrier is leading the transportation process, the carbon emissions tracking and optimization process can be overlooked.

b. Comply with geographical regulations:

Leading organizations' supply chains typically account for over 90% of their greenhouse gas (GHG) emissions, considering their overall impact. With the

Carbon footprint tracking isn't just a corporate responsibility, but rather a strategic move that helps organizations cut costs, ensure compliance, and enhance brand image.

increase in emissions, also comes an increase in awareness which has pressured the government to not only put regulations in place but also enforce them. Each country is responsible for setting their own policies to achieve a common goal. However, the delivery of these policies must take place locally. For example, cities and businesses need to develop plans to achieve net zero (a target of completely negating the amount of greenhouse gases produced by human activity). In Europe and some Asian countries, the emissions saved can be sold to another company, thereby generating revenue. This not only directly triggers the shareholder's interest but also motivates them to be compliant with the regulations.

c. Strengthen your reputation, raise awareness, and attract new talent:

Setting the right metrics to measure supply chain emissions and disclosing them along with reduction goals can be a competitive advantage. It shows potential stakeholders your involvement and commitment to preserving the environment. Raising awareness would also inspire others to measure their carbon footprint, hence highlighting that reduction measures do exist and can be implemented. Additionally, over the past decade, most successful professionals are not only aware of the impact of carbon emissions on the environment but also, favor companies that share their same environmental values.

Having accurately measured carbon footprint, companies can then identify the highest emission sources, which allows them to implement an emission reduction strategy and thus reduce their environmental impact.

# Demonstration of emission tracking capabilities.

shipzero, an emission tracking application developed by Westernacher partner project44, assists shippers, logistics service providers, and carriers in managing transportation emissions and progressing towards the net zero emissions goal. shipzero offers real-time data insights to help users optimize emission reduction strategies and promote transparency in transportation emissions tracking.

shipzero users will be able to benchmark carriers based on preselected preferences and settings and compare predicted carbon emissions related to each freight among different lanes and carriers. Additionally, users can also track the emissions path in such
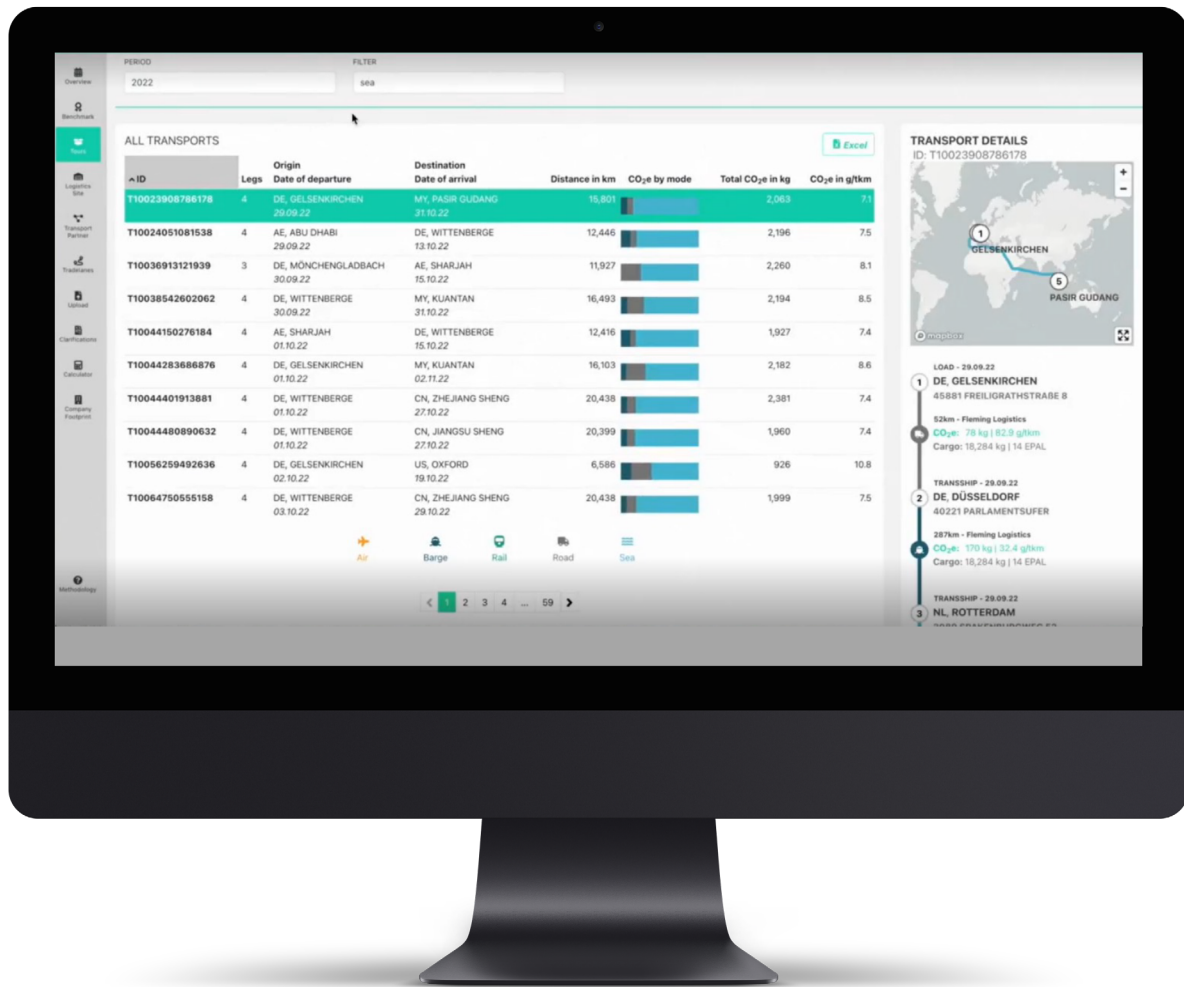
transportation lanes leveraging the transport details functionality.

Westernacher has leveraged the SAP Analytics Cloud (SAC) front end to develop an internal CO$_2$ monitor to track carbon neutrality. This dashboard uses all the data coming from SAP S/4HANA to create interactive charts with a detailed breakdown, including but not limited to company codes, employee headcount, utility bills, transportation and the like. This helps identify the major sources of emissions and allows users to dynamically filter certain dimensions like Scope or Category Group. SAC also allows the user to generate a report detailing Westernacher's sustainability journey, including past achievements and future goals. Additionally, this report contains links to different pages, such as Westernacher's sustainability policies, Carbon Offset Certificate, and Environment and Climate page.

Conclusion.

At Westernacher Consulting, we are proud to be at the forefront of sustainable practices. We have achieved a significant milestone: complete carbon neutrality since Q1 2022.

To help organizations reduce emissions while improving ROI on shareholders' interest and to support our sustainability efforts, we have been developing a cutting-edge tool called the Carbon Footprint Monitor. It seamlessly integrates with SAP through the SAP Analytics Cloud, allowing us to gather data on emission sources directly within the application. By leveraging the power of SAP's analytics capabilities, we gain intelligent insights that help us understand the key factors driving emissions.

What sets our Carbon Footprint Monitor apart is its ability to provide enhanced transparency. We meticulously record and analyze emissions data over time, using a time series model. This empowers us to track our carbon emissions performance and assess the impact of our sustainability initiatives. It is a valuable tool that enables us to make informed decisions and work towards our goal of achieving carbon neutrality.

While we recognize that there is still a long way to go in minimizing carbon footprints in the supply chain, we are optimistic about the transformative tools that are emerging in the industry. At Westernacher, we remain dedicated to driving sustainability and supporting businesses in adopting eco-friendly practices throughout their supply chains. Thank you for reading this paper. If you are interested in more information, please reach out to us.

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