

Decoding the Future: Harnessing Product Carbon Footprints for Sustainable Progress



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Chapter 1

Visualization of Industrial Emissions

Harnessing Top-down and Bottom-up Methods to Reduce Industrial Emissions

Reducing global greenhouse gas (GHG) emissions is one of the most critical and urgent challenges humanity faces today. Since the late 1970s, global temperatures have consistently risen above average due to human activities, with 2024 becoming the warmest year in recorded history [1]. This alarming trend has prompted society—including regulators, businesses, consumers, and investors—to rapidly shift toward more sustainable practices to maintain the integrity of our planetary boundaries.

The Paris Agreement, established in 2015, marked a significant milestone in global efforts to combat climate change. Countries around the world have since set ambitious targets for reducing GHG emissions. With the industrial sector accounting for approximately 24% of global GHG emissions, it is evident that industry-wide efforts are essential to achieving both global and national emission reduction targets [2]. To incentivize companies to reduce their industrial GHG emissions, governments are introducing regulations that reward sustainable actions and penalize those who do not comply. As more countries follow the lead of the front-running sustainable countries/regions, we can expect a proliferation of legislation that will increase the impact on businesses and individuals, driving them toward achieving GHG emission reduction goals.

The journey toward decarbonization begins with a precise understanding, or visualization, of GHG emissions. There are two primary types of visualization related to a company's GHG emissions: Corporate Carbon Footprint (CCF) and Product Carbon Footprint (PCF).

CCF encompasses GHG emissions directly and indirectly generated by business activities and energy use (Scope 1 and 2), as well as emissions from other parties of the value chain (Scope 3), based on the GHG Protocol Corporate Standard. This standard is the most widely

used CCF accounting framework globally. CCF is instrumental in top-down decarbonization strategies, as it highlights the sources of the most significant emissions. For many organizations, the majority of emissions are generated outside of their direct operations, within the value chain (Scope 3). Understanding Scope 3 emissions, which constitute the bulk of GHG emissions, is crucial for effective emission reduction. However, compared to Scope 1 and 2, which are under a company's direct control, accurately assessing and managing indirect emissions from the value chain presents a significant challenge.

PCF measures the GHG emissions throughout the entire life cycle of a product or service (*1). PCF is calculated by summing the emissions from each stage of the product's life cycle, including raw material extraction, manufacturing, transportation, usage, and end-of-life disposal or recycling. This comprehensive approach enables emissions reduction from a bottom-up perspective by examining and optimizing each stage of the product's life cycle.

One of the key reasons PCF is suitable for a bottom-up approach is its granularity. By breaking down emissions at each life cycle stage, companies can identify specific areas where improvements can be made. For example, they can choose more sustainable raw materials, implement energy-efficient manufacturing processes, optimize logistics to reduce transportation emissions, and design products for easier recycling. This detailed analysis allows for targeted interventions that can significantly reduce the overall carbon footprint of a product.

Moreover, PCF encourages innovation and eco-design. Companies are motivated to develop new products and processes that minimize environmental impact. This can lead to the adoption of cutting-edge technologies, such as renewable energy sources, biodegradable materials, and advanced recycling techniques. By fostering a culture of

[1]: <https://wmo.int/news/media-centre/wmo-confirms-2024-warmest-year-record-about-155degc-above-pre-industrial-level>
[2]: https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_Chapter02.pdf

Collaborative Data Sharing for Better Scope 3 Insights

innovation, PCF helps companies to enhance competitiveness in a market that increasingly values sustainability.

PCF is also valuable for understanding upstream GHG emissions under Scope 3 of the CCF. A conceptual relationship between CCF and PCF is shown in Figure 1. Since Scope 3 emissions often constitute the majority of a company's total emissions, gaining insights into the emissions associated with the products they use and produce is crucial. By addressing these upstream emissions, companies can make more informed decisions about their value chains and collaborate with suppliers to reduce emissions collectively.

Calculating and disclosing PCFs has become a recent

trend, driven by the growing recognition of the importance of detailed emissions data. The standardization of PCF calculation methodologies and the development of related technologies have seen significant advancements in recent years. Standards like PACT (Partnership for Carbon Transparency) Methodology, Catena-X PCF Rulebook, and the PCF Guideline by Together for Sustainability (TFS) are setting new benchmarks for accurate and consistent PCF calculations [3] [4] [5]. As a result, more companies are looking into PCF to better understand and manage their environmental impact. This trend is not only helping companies comply with emerging regulations but also enabling them to identify opportunities for innovation and efficiency improvements within their value chains.

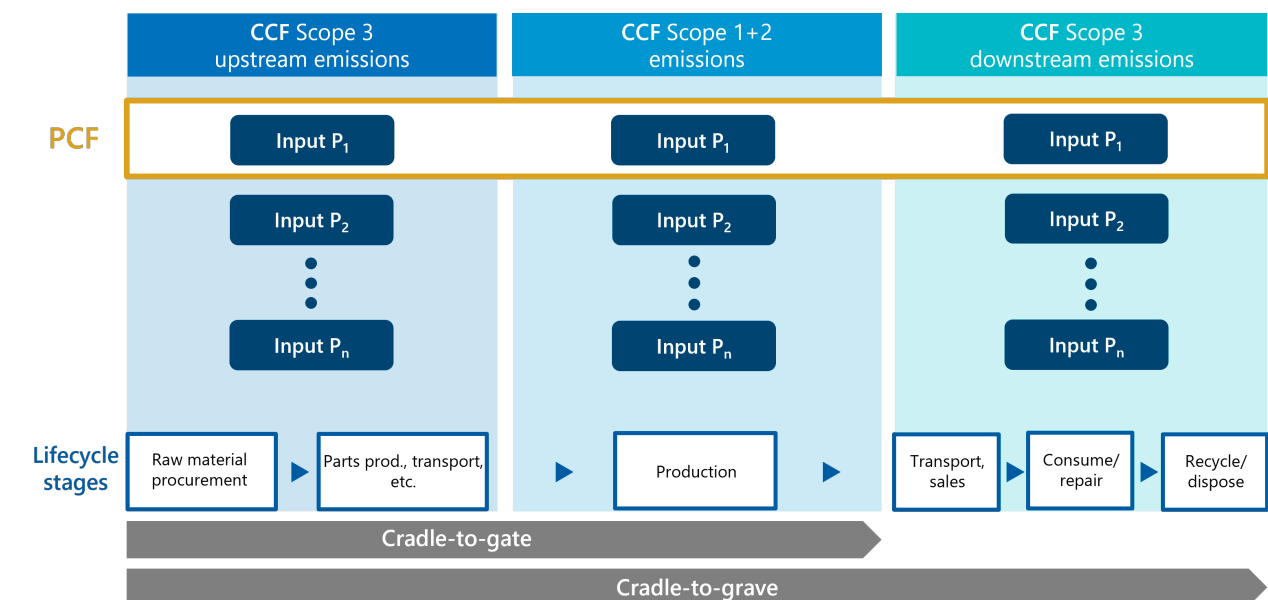


Figure 1: Conceptual Relationship between CCF and PCF

In summary, PCF plays a pivotal role in industrial decarbonization as it quantifies the environmental impact of a product. Its suitability for a bottom-up approach lies in its detailed, stage-by-stage analysis, which enables targeted emissions reduction, fosters innovation, and provides valuable insights into upstream emissions. Standardization activities for PCF calculation and methodologies are actively being developed and refined. This white paper envisions a future where PCF is widely utilized and outlines the initial steps companies should take to embrace this future.

*1: PCF is defined as the total generated throughout the entire life cycle of a product, from raw material extraction to disposal or recycling. Since emissions during the use, disposal, or recycling stages can vary significantly depending on specific conditions, the PCF is often expressed as the total emissions from raw material extraction to product manufacturing, also known as "cradle-to-gate."

[3]: <https://www.carbon-transparency.org/pact-methodology>

[4]: https://catenax-ev.github.io/assets/files/CX-NFR-PCF-Rulebook_v.3.0-04874a80a6d27511df06e07ae3049278.pdf

[5]: <https://www.tfs-initiative.com/pcf-guideline>

Chapter 2

Contemporary Uses of Product Carbon Footprints



PCF Driving Sustainability and Economic Benefits Amid Rising Climate Awareness

PCF is an important indicator of environmental awareness, which has reached unprecedented levels due to growing concerns about climate change. This chapter explains how industry and government agencies currently utilize PCF.

Moreover, some companies leverage PCF data in their marketing campaigns to highlight the environmental advantages of their products. Emphasizing a product's low PCF can attract environmentally conscious consumers and businesses, enhancing the company's brand reputation.

Industry Initiatives

Companies are increasingly incorporating PCFs into their sustainability activities and regulatory compliance efforts. By assessing, managing, and reducing emissions at every stage of their business and value chain, companies can achieve significant environmental and economic benefits. For instance, sustainable material sourcing, waste minimization, and transportation route optimization can lead to cost savings in addition to emissions reductions.

According to the Ellen MacArthur Foundation, 80% of emissions over a product's life cycle are related to design phase decisions [6]. Consequently, some companies consider PCF a critical criterion in the product design phase, aiming to develop environmentally friendly products. Innovations in design phase such as new materials, energy-efficient manufacturing processes, and circular material procurement can significantly contribute to PCF reduction.

Efforts by Governments

Governments are introducing regulations to curb GHG emissions and meet their nationally declared targets. Some regulations require companies to report PCF transparently, encouraging responsible behavior and supporting industry innovation. Table 1 summarizes key PCF-related regulations, initially targeting a limited number of products and industries but expected to expand over time.

Governments are also implementing schemes like carbon taxes and cap-and-trade systems [7] [8]. These schemes provide financial incentives for companies to reduce emissions by assigning a monetary value to emissions. Additionally, governments use their vast market influence to promote PCF, requiring PCF disclosure and prioritizing low-emission products in procurement processes.

Regulation	Requirement	Date of enforcement
Buy Clean California Act, California, USA	Set a PCF ceiling value for specified materials in the procurement of public infrastructure development projects	July 2022
European Battery Regulation	Mandatory PCF labeling of electric vehicles, industrial, and light means of transport batteries	August 2023
European Carbon Border Adjustment Measure (CBAM)	Mandatory reporting of emissions from production processes for aluminum, cement, etc., and impose tax on imports with insufficient emission reductions	Scheduled for January 2026 (Transition period from October 2023)
European Eco-design Regulation	PCF labeling mandatory for clothing and construction supplies	Planned for 2030

Table 1: PCF-related legislations

[6]: <https://www.ellenmacarthurfoundation.org/news/an-introduction-to-circular-design>
 [7]: https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/what-eu-ets_en
 [8]: <https://www.env.go.jp/earth/ondanka/det/capandtrade.html>

Chapter 3

Product Carbon Footprints in a Sustainable Future



New Era of Carbon Footprints: Products Shaping a Sustainable Future

To achieve a carbon-neutral world, it is imperative to first envision such a future and then take decisive actions to realize it. These actions encompass technological advancements, innovations, and the establishment of regulations. This vision will not only expedite the global shift towards a sustainable society but will also guide individuals, businesses, and governments in making

informed decisions to mitigate climate change. In this future, decision-making will consider not only the PCF but also the overall Environmental Footprint (EFP) [9]. This chapter delves deeper into the world shaped by the widespread adoption of PCFs and examines the innovations that will arise from it.

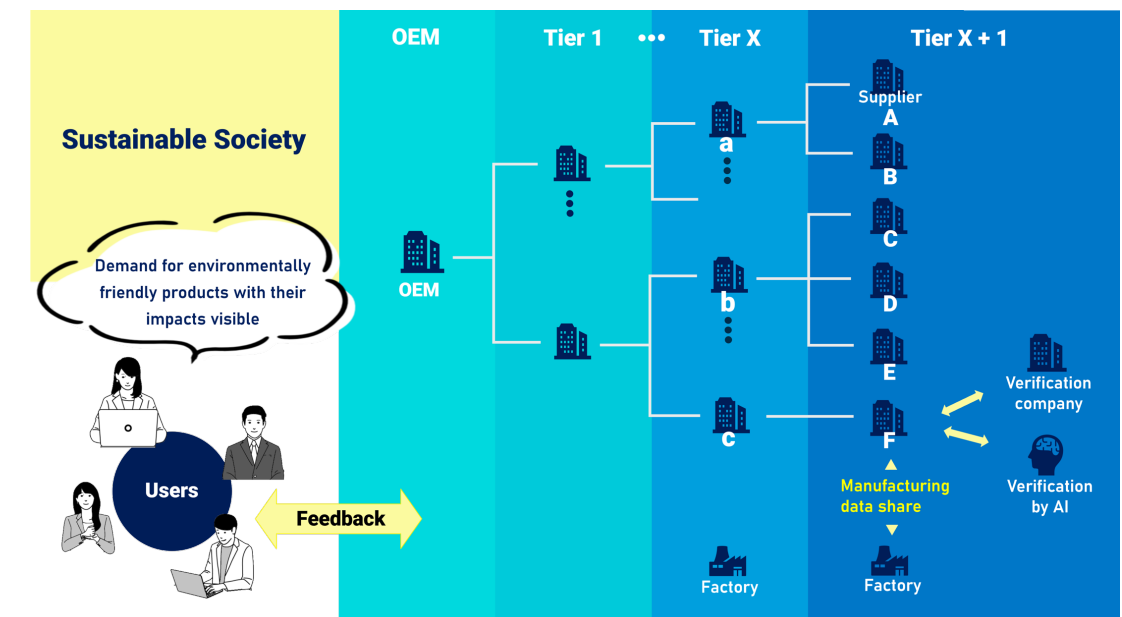


Figure 2:PCF in a sustainable future

Impact on Individual Consumers

In a future where PCFs are widely used, detailed environmental impact information could profoundly influence consumer choices and societal norms. Easy access to PCFs will empower consumers to make informed purchasing decisions based on the environmental impact of products. Products with low PCFs will become standard, and consumers will demand greater accountability for GHG emissions from companies. These shifts will drive business practices towards responsible product

development, waste management, and the adoption of more sustainable options. The increased transparency of PCFs and pressure from consumers and purchasing companies will compel many businesses to adopt sustainable models, ultimately contributing to a sustainable society.

Consumers will become more environmentally conscious, prioritizing products with lower PCFs. This shift in consumer behavior will encourage companies to compete on sustainability, leading to a wider availability of eco-

[9]: https://green-business.ec.europa.eu/environmental-footprint-methods_en

Active data sharing between companies leads to innovation in industry

- **Informed purchasing decisions**
Companies and consumers consider the environmental impact of their choices through PCFs, alongside price, brand, quality, and other factors that align with their values.
- **Consumer activity**
Encourage purchasing companies and consumers to hold manufacturers accountable for their GHG emissions by using PCFs. Advocate for transparency and accountability in business practice to ensure environmental responsibility.
- **Responsible disposal**
PCFs influence the disposal behavior of both businesses and consumers, encouraging practices such as recycling and waste reduction.
- **Changes in the lifestyle**
Increased awareness of environmental costs will lead to a minimalist lifestyle, focusing on durable, high-quality products and the benefits of repair and extended use.

friendly products. Additionally, consumers will benefit from clearer labeling and certifications, making it easier to identify and choose products that align with their environmental values. Educational campaigns and digital tools, such as apps that track and compare PCFs, will empower consumers to make greener choices in their daily lives. As a result, the collective impact of individual actions will contribute significantly to reducing global carbon emissions.

Consumers will play a pivotal role in encouraging companies to be transparent about their GHG emissions. By prioritizing products with lower PCFs, consumers can hold manufacturers accountable for their environmental impact. This demand for transparency and accountability will push businesses to adopt more sustainable practices, ensuring that their operations and value chains are environmentally responsible. Consumer advocacy and activism will become powerful tools in driving corporate change, as informed consumers use their purchasing power to support eco-friendly companies.





PCFs will also influence the disposal behavior of both businesses and consumers. Awareness of the carbon footprint associated with product disposal will encourage more responsible practices, such as recycling and waste reduction. Consumers will be more likely to choose products that are designed for easy recycling or that come with take-back programs. Businesses, in turn, will invest

in sustainable disposal methods and circular economy initiatives, reducing the overall environmental impact of their products from cradle-to-grave.

As awareness of environmental costs grows, there will be a significant shift from the current consumerism to a minimalist lifestyle. Consumers and businesses will focus on quality over quantity, opting for products that are durable and have a longer lifespan. This shift will promote the benefits of repair and extended use, reducing the need for frequent replacements and minimizing waste. The minimalist approach will not only reduce carbon footprints but also foster a culture of sustainability, where the value of products is measured by their longevity and environmental impact rather than their novelty.

Innovations in the Industrial World

In a world where PCFs are universally available, the entire industrial value chain will pursue decarbonization while considering environmental and economic sustainability as one integrated concept. Companies will be able to search and retrieve high-quality PCF data, calculated from actual measurements, to actively modify their value chains. The necessary measurement data will be collected from each production site along the value chain and shared securely with concerned parties. The corresponding PCFs will be automatically calculated using data from the value chain

- **Technological innovation and efficiency**
IT systems automatically calculate PCFs by collecting necessary data from shop floor and value chain, allocating based on production status, and converting between industry-specific calculation rules. Data required from the value chain can be securely discovered with a single click.
- **Data reliability assurance**
Data from the value chain, including the company itself, is verified by a third party for high reliability. AI and IT-based systems enable efficient verification, even for companies with numerous products.
- **Sustainable innovation**
Periodically evaluate the value chain to prioritize suppliers who adopt sustainable and innovative development methods, minimize waste, and use energy-efficient technologies.
- **International trade**
Countries impose tariffs and trade restrictions on products with high PCFs, which promote sustainable practices on a global scale. Countries that excel in low carbon footprint products will expand their export markets.

and internal systems. This seamless integration of data collection and analysis will enable companies to identify inefficiencies and areas for improvement, fostering a culture of continuous innovation and sustainability.

Advanced systems will be in place to automatically calculate PCFs by collecting necessary data from the shop floor and value chain, allocating according to production status, and converting between calculation rules for each industry. Data required from the value chain can be discovered securely with a single click. IT systems necessary for smooth PCF data sharing, search, and retrieval, including value chain evaluation and modification, will enable companies to make data-driven decisions. These systems will leverage cutting-edge technologies such as the Internet of Things (IoT), blockchain, and big data analytics to ensure accuracy and transparency in PCF calculations. By automating these processes, companies can reduce administrative burdens and focus on strategic initiatives to lower their carbon footprints.

The PCF data automatically calculated from actual measurements will be verified by third parties for reliability through seamless and efficient IT systems. The importance of ensuring the reliability of PCF data is emphasized in the under-development PCF calculation methodologies. Upcoming regulations related to GHG emissions disclosure will also require emissions data to be verified. Therefore, audit firms and verification organizations are considering how verification should be conducted in a trustworthy and efficient manner. For

verification companies, it is unrealistic to verify individual PCFs of hundreds or thousands of products using conventional methods. In such cases, "Audi-Tech" (*2) systems, utilizing AI technology etc. will help verification companies to perform these tasks efficiently, ensuring high reliability of data from the value chain, including the company itself.

Companies will periodically evaluate their value chains to prioritize suppliers who actively adopt sustainable and innovative development methods. This includes minimizing waste in development and adopting energy-efficient technologies. As PCF becomes a key factor in corporate competitiveness, supplier companies will proactively innovate sustainable products and services, reducing GHG emissions. Companies with low PCF products will gain a competitive advantage and attract consumer preferences, especially as sustainable investment trends pick up. This shift will drive a wave of green innovation, with companies investing in research and development to create eco-friendly materials and processes. Collaboration between companies and research institutions will accelerate the development of breakthrough technologies that further reduce environmental impact.

There will be a major shift in global trade, with countries imposing tariffs and trade restrictions on products with high PCFs. This will promote sustainable practices on a global scale, creating a market that favors goods with low PCFs. Countries that excel in producing low carbon

footprint products or with credible carbon tax systems will expand their export markets, driving global sustainability efforts. International trade agreements will increasingly incorporate environmental clauses, incentivizing countries to adopt greener practices. This will lead to a more equitable and sustainable global economy, where environmental stewardship is rewarded, and polluting practices are penalized.

Efforts to decarbonize the entire industrial value chain are already starting to take off globally. In Europe, initiatives such as Catena-X in the automotive industry and Together for Sustainability (TfS) in the chemical industry have begun exchanging data, including PCF data, across the value chain [10] [11]. In Japan, the Ouranos Ecosystem has been established to realize cross-industry data collaboration [12]. In the future, this

trend will accelerate, enabling secure data sharing among cross-border value chains. Initiatives such as Manufacturing-X and Factory-X have also been launched to efficiently collect data from factories and manufacturing sites, realizing an industrial data-sharing economy [13] [14]. The results of such initiatives will become standards, paving the way for active data sharing in the manufacturing industry [15]. These collaborative efforts will create a more transparent and interconnected industrial landscape, where companies can benchmark their performance against peers and adopt best practices from around the world.

*2: This article introduces 'Audi-Tech,' a term referring to the use of IT to efficiently perform audits and verifications.

PCFs provide real insights into the carbon impacts of different industries, sectors, and products. This information will be crucial for implementing and monitoring policies more effectively. By focusing on sectors and industries with high emissions, policymakers can prioritize efforts where they will have the most significant impact. This data-driven approach ensures that resources are allocated efficiently and that policies are based on accurate and up-to-date information.

To encourage PCF reduction, policies should provide financial incentives such as tax rebates, subsidies, and grants to motivate industries to develop innovative technologies. These incentives will lower the financial barriers to adopting sustainable practices and technologies, making it easier for companies to invest in green innovations. Additionally, support programs can help small and medium-sized enterprises (SMEs) transition to more sustainable operations, ensuring that all businesses, regardless of size, can contribute to national and global emission reduction goals.

Education plays a critical role in this long-term process by providing the basic knowledge of sustainability. Governments around the world are strengthening sustainability-related topics such as emission reduction, recycling, and PCF in compulsory education. By explaining the context and reasons behind policies and regulations to the public, governments can foster higher compliance rates and greater public support for environmental initiatives. Education is also key to meeting the human resource needs of industry and the job market, ensuring that future generations are equipped with the skills and knowledge necessary to drive sustainable development.

Some countries have already adopted sustainability and climate change-related subjects into their education policies [16]. For example, Italy, the United Kingdom, Argentina, and Cambodia teach sustainability in primary and secondary education. The United States, New Zealand, and the European Union have plans to introduce these subjects in the near future [17]. The United Nations' 2030 Sustainable Development Goals (SDGs) include strengthening education on sustainability and climate change, which is expected to lead more countries to take action to achieve these goals.


The necessary legislative arrangements are in place to ensure the transparency of PCF data, and efficient data

verification mechanisms are established. Third-party verification of PCF data ensures its reliability and builds trust among stakeholders. These verification results are mutually recognized among countries, allowing for universal use and comparability of PCF data. This harmonization of verification standards will facilitate international trade and cooperation, as countries can confidently rely on the accuracy of PCF data from their trading partners.


Efforts to promote PCFs through policy studies and implementation have already begun. Initially, these new policies often target a limited number of industries, and the scope will be expanded by confirming their effectiveness using data [18]. As summarized in Table 1, these initiatives are paving the way for broader adoption and integration of PCFs into national and international policy frameworks.

The widespread adoption of PCFs will profoundly impact society at large, transforming consumer behavior, industrial practices, and policy directions. Consumers will become more environmentally conscious, making informed purchasing decisions based on detailed PCF information. This shift will drive demand for low PCF products, encouraging companies to adopt sustainable practices and innovate in product development. Responsible disposal behaviors and a minimalist lifestyle will further contribute to reducing global carbon emissions, as consumers prioritize quality and durability over quantity.


In the industrial sector, advanced systems will enable the automatic calculation and sharing of PCF data, fostering data-driven decisions and continuous improvement in sustainability. Governments will leverage PCF data to develop targeted climate policies, focusing on high-emitting sectors to reduce overall carbon footprints. Financial incentives will encourage industries to adopt innovative technologies and sustainable practices. Strengthened education on sustainability will foster public understanding and compliance with environmental policies. Legislative arrangements will ensure the transparency and reliability of PCF data, with third-party verification results recognized internationally. These efforts will drive global sustainability, creating a more equitable and environmentally responsible economy.




Data-driven policy making
PCF provides insights into the carbon impacts of various industries, sectors, and products. This information will be used to implement and monitor policies more effectively, focusing on high-emission areas.



Incentives and support
To encourage PCF reduction, policies will offer financial incentives like tax rebates and subsidies to motivate industries to develop innovative technologies.



Education and Human Resources development
Education on sustainability is being strengthened to increase knowledge on PCF and emission reduction etc., and to understand their necessity. Explaining the context and reasons behind policies to the public fosters higher compliance rates.



Universal data verification
Legislative arrangements ensure the transparency of PCF data, with efficient verification mechanisms in place. Verification results are mutually recognized among countries and can be used universally.

Policy Direction

The widespread availability of PCFs enables data-driven policymaking on environmental sustainability. Governments are laying the groundwork for the universal use of PCFs by establishing clear incentives and penalties

for industry. Detailed information from PCFs will be used to develop targeted climate policies and regulations that focus on high-emitting sectors, aiming to reduce the country's overall carbon footprint. The effectiveness of these policies and regulations can be immediately confirmed by the data, allowing for the introduction of market-specific countermeasures.

[10]: <https://catena-x.net/en/news-dates/artikel/go-live>
 [11]: <https://www.tfs-initiative.com/how-we-do-it/scope-3-ghg-emissions>
 [12]: https://www.meti.go.jp/english/press/2023/0429_001.html
 [13]: <https://www.plattform-i40.de/IP/Navigation/EN/Manufacturing-X/Manufacturing-X.html>
 [14]: <https://www.isst.fraunhofer.de/en/departments/industrial-manufacturing/projects/factory-x.html>

[15]: https://www.plattform-i40.de/IP/Redaktion/EN/Downloads/Publikation/Manufacturing-X_long.pdf?__blob=publicationFile&v=1
 [16]: <https://educationhub.blog.gov.uk/2023/12/21/climate-change-and-sustainability-in-education-5-steps-were-taking/>
 [17]: <https://www.weforum.org/agenda/2022/08/climate-change-schools-education/>
 [18]: https://single-market-economy.ec.europa.eu/industry/sustainability/sustainable-product-policy-ecodesign_en

Chapter 4

PCF Data Calculating, Aggregating and Integrating

Start your journey towards visibility into your value chain

The world is increasingly moving towards the frequent utilization of PCF data. A notable development in this area is the European Battery Regulation [19], which mandates the disclosure of PCF data, recycling efficiency, material recovery rates, and more for electric vehicle (EV), industrial, and light means of transport (LMT) batteries. This regulation also sets upper limits for these metrics. It applies to all EU and non-EU companies that place products with batteries on the EU market, requiring many companies in the value chain to prepare for compliance.

Calculating PCFs is not an out-of-the-box task. To calculate a PCF accurately, emission-relevant data from the value chain must be aggregate between a manufacturing company and its suppliers in order to provide informed responses to a customer.

Specifically, the PCF data aggregation along the value chain requires a comprehensive and dynamic approach in terms of functionality. PCFs are often still based on static averages that are collected separately and non-standardized between producers and suppliers within a value chain. What is needed instead is efficient data

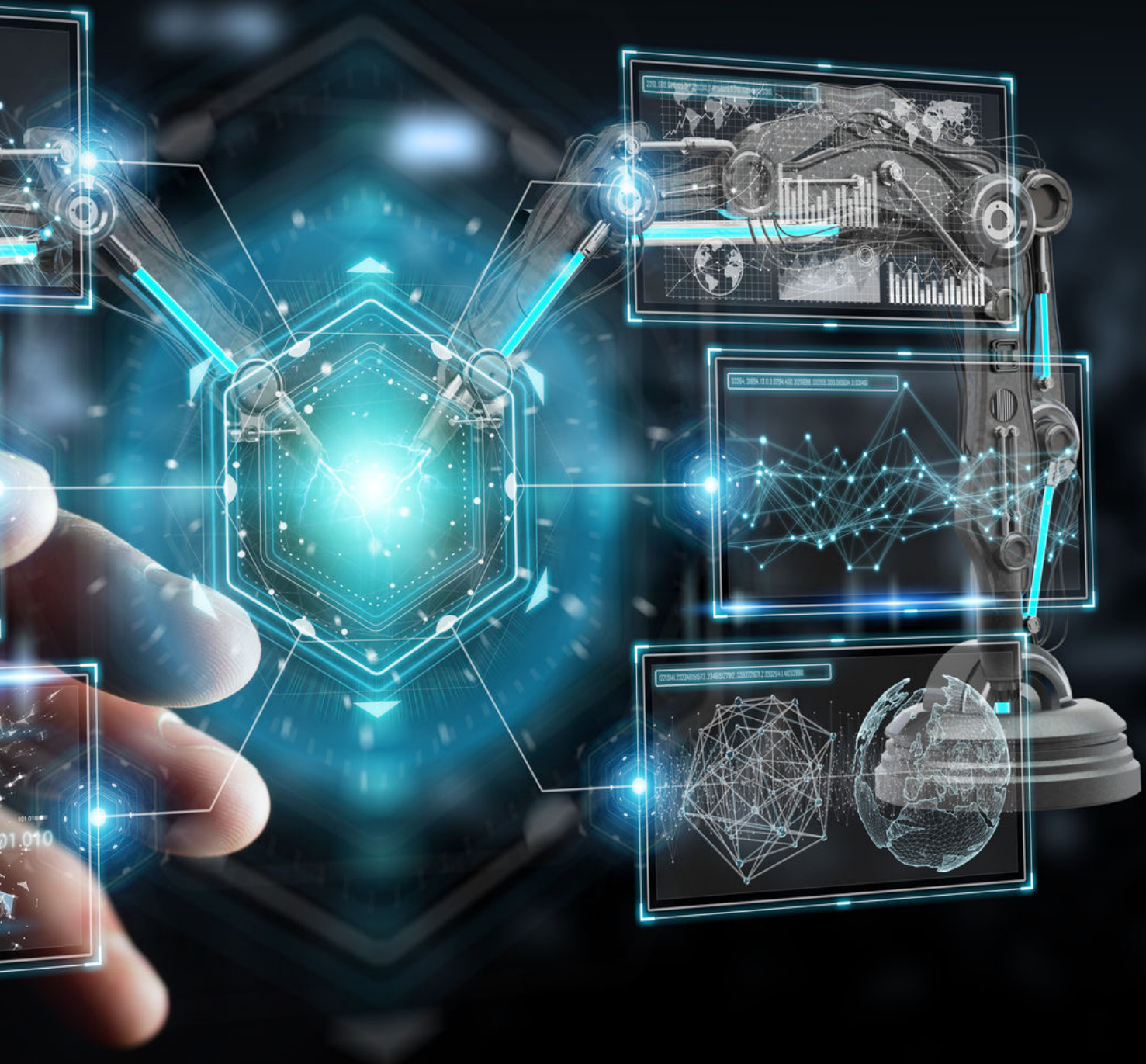
exchange between the respective stakeholder groups (producers, suppliers, customers), which also enables continuous improvements and updates in data collection along the value chain. Furthermore, a high degree of flexibility is necessary regarding the integration of standards to accommodate new developments in the standard landscape as well as related customer inquiries from various industries. Exactly this functionality of cross-system and cross-standard data exchange is provided by "SiGREEN," a platform solution developed by Siemens [20].

SiGREEN offers the necessary standardization of PCF data calculation in the value chain through its dynamic data exchange approach. For a manufacturing company, NTT DATA SAP integration with SiGREEN also enables a coordinated management of products, product components, and suppliers. This is the basis for decarbonization in product design as well as in the selection of suppliers. Based on this technical framework, PCF management and data aggregation becomes a relevant factor for process and cost optimization.



[19]: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32023R1542>

[20]: <https://www.siemens.com/global/en/company/sustainability/carbon-footprint-app-sigreen.html>



SiGREEN enables an efficient PCF data exchange along value chains

Multi-standard includes all relevant PCF standards



NTT DATA SAP integration with SiGREEN

Calculating PCF involves integrating data from both the value chain and internal systems such as Enterprise Resource Planning (ERP) and Manufacturing Execution Systems (MES). This integration presents several challenges that need to be addressed to ensure accurate and reliable PCF calculations.

One of the primary challenges is the seamless aggregation of data from diverse sources. The value chain data, which includes information from suppliers, logistics, and other external partners, must be combined with internal data from ERP and MES systems. These internal systems track various aspects of production, inventory, and operations within a company. Ensuring that data from these different sources is compatible and can be aggregated efficiently requires robust data management tools and processes. The PCF Management tool plays a crucial role in this process by standardizing data formats and facilitating the secure exchange of information across the value chain.

The NTT DATA integration solution, built on the SAP Business Technology Platform, facilitates bilateral communication between the ERP system and SiGREEN, enabling the automatic transfer of footprint-relevant data across both systems [21]. Existing master data from SAP such as materials, products, Bill of Material and suppliers is synchronized with PCF data from the supplier via SiGREEN and subsequently exported into the SAP system.

The NTT DATA integration solution enhances the effectiveness and efficiency of PCF data by utilizing master data information for precise assignment of PCF data, while enabling a seamless integration with SAP S/4HANA system. This integration enables automated data transfers while reducing compliance costs by creating a basis for meeting regulatory PCF-related requirements and other associated expenses.

Key enhancements of the ERP integration solution include process automation and adaptation to ensure efficient data exchange between the customized NTT DATA solution and SiGREEN, thereby minimizing manual activities. Additionally, improvements in data architecture and tailored PCF management consulting services could possibly contribute to the overall effectiveness of the integration process.

To support companies in efficiently calculating and sharing their PCFs, this ERP integration offers a seamless solution. This integration solution enables the aggregation of PCF-related data from the value chain, allowing businesses to accurately assess their carbon footprints. Companies aiming to streamline their PCF calculations and transparently share this information with their buyers can leverage this advanced integration solution to enhance their sustainability efforts.

[21]: <https://www.sap.com/products/technology-platform.html>

Closing Remarks

NTT DATA, driven by a commitment to accelerate client success and positively impact society through responsible innovation, has been dedicated to create value that benefits clients, society, and employees using IT. Currently, we are focused on fostering the innovations necessary to achieve a sustainable future through a foresight perspective.

This white paper explores a future where product carbon footprints (PCFs) are widely adopted and introduces an IT solution developed by NTT DATA to calculate PCFs. Achieving this vision requires engaging various stakeholders beyond corporate boundaries in discussions, rule-making, and technological development. NTT DATA is committed to pioneering this future alongside our clients, developing the necessary technologies and IT systems to make it a reality.

