The background of the slide is a lush, green landscape. A river flows through the center, surrounded by dense vegetation and tall grasses. Large, leafy trees frame the scene, with their branches extending over the water. The lighting is soft and warm, suggesting a sunrise or sunset, with a misty or hazy atmosphere in the distance.

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WHITEpaper

# Decarbonization through digitization

Solutions for simple recording of CO<sub>2</sub> hotspots in complex supply chains.

# Solutions for simple recording of CO<sub>2</sub> hotspots in complex supply chains.

In this whitepaper we present a methodical analysis of CO<sub>2</sub> hotspots in complex production conditions, which allows an uncomplicated recording of energy-intensive processes in the product life cycle using common standard software solutions. The presented process can be implemented step by step and can be transferred to many different applications.



## Decarbonization: the right way to deal with a complex problem

The term decarbonization means the reduction of carbon emissions within economic - often energy-intensive - processes. The emissions of carbon dioxide (CO<sub>2</sub>) generated by human activities are one of the largest and most critical influencing factors of global warming - decarbonization in a business context should therefore contribute to the global reduction of CO<sub>2</sub>, but without negatively affecting the core business of the individual company.

Climate justice can be achieved in various ways: as far as possible, energy-intensive processes should **be avoided** - a video conference instead of a business trip, switching to CO<sub>2</sub>-neutral energy sources or the use of more climate-friendly auxiliary & operating materials are examples of how climate-damaging emissions can be avoided (in a simple way). Where complete avoidance is not possible, there are adjustments within most of the processes that have a positive impact on the CO<sub>2</sub> balance: in the example of a business trip, this would be a more climate-friendly onward journey by public transport, a way of **reducing** energy consumption. The emissions that occur can be reduced in in-house logistics by reducing empty runs and in production by optimizing the manufacturing process.

There is the possibility of **compensation** for all process-related emissions that can neither be avoided nor reduced - a form of CO<sub>2</sub>-based indulgence trade helps through social projects, renaturation, or reforestation in order to counteract the consequences of the climate crisis. Such measures can be located independently or with numerous compensation partners locally or internationally and are part of the effort to balance the global CO<sub>2</sub> balance.

### Three steps to a decarbonized economy



#### Avoid

- Identification of unnecessary emissions
- Replacement by emission-neutral alternatives



#### Reduce

- Identification of improvement potentials
- Optimization of process flows



#### Compensate

- Recording of unavoidable emissions
- Selection of compensation measures

However, decarbonization is not a switch that can be set to „on“ so that we can continue to operate without great effort. Approaches to the topic are numerous and range from solutions in the field of **energy efficiency** or **sufficiency** to the well-known principle: **avoid - reduce - compensate**. However, numerous references or Best Practices from various industrial areas show a variety of possible solutions. So where should you start?

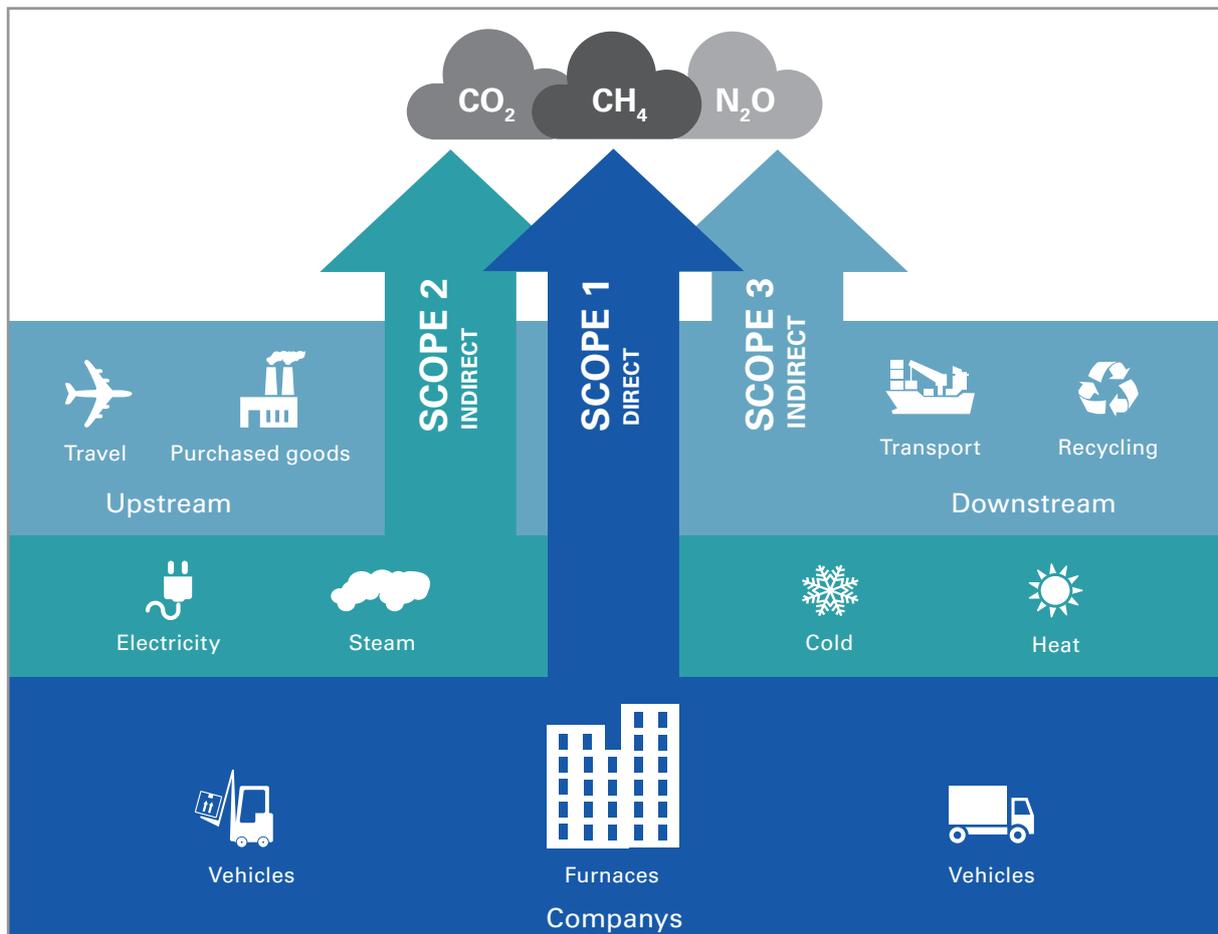
An important first step, which all of these cases have in common, is a precise recording of the respective energy-intensive processes inside and especially outside the company. Because only with an overview of the so-called „hotspots“ - sources of intensive CO<sub>2</sub> emissions - the decisive variables could be avoided, reduced, or compensated. The comparison with Best Practices can also help to assess relevant solutions. Provided that the information includes all relevant steps, both inside and outside the company.

So where should you start to get an accurate recording of the processes mentioned? And in what form should the data be collected?

With the Sustainable Development Goals (SDG), the United Nations offers a framework for global efforts and concrete goals, also and expressly to reduce greenhouse gas emissions as in SDG 13 - Climate Action. The Greenhouse Gas Protocol (GHG), which was created by the World Resource Institute (WRI) and the World Business Council for Sustainable Development (WBCSD), provides uniform guidelines for accounting and communication. Global goals and widespread standards provide a solid basis for approaching the collection of your own individual data. In addition, numerous other standards are based on these agreements.

The division of emissions into several areas, the so-called scopes in the case of the GHG Protocol, allows not only a first classification but also a division of the necessary steps:

- SCOPE 1** Direct greenhouse gas emissions - These are all emissions that are generated within the company: from plants, furnaces, vehicles, etc...
- SCOPE 2** Greenhouse gas emissions caused by the energy consumption - electricity, steam, cold or heat - the emissions that arise from the generation of such energy sources are termed "Scope 2".
- SCOPE 3** All other emissions attributable to the company - via the supply chain (production and transport of purchased goods), employee mobility (upstream emissions) to the use and disposal of products (downstream emissions).



Where processes can be effectively decarbonized within Scope 1 is relatively easy to assess. Also, in Scope 2, existing emissions can be reduced or eliminated, sometimes by simply changing the source of supply. However, it becomes more complex and unclear in the area of Scope 3 emissions. Unclear or volatile changes in the supply chain or a lack of control options in product use phases are typical examples of more serious challenges, especially for energy-intensive products.

A detailed preparation of the Scope 3 emissions is an elementary part of a serious discussion of the topic of decarbonization. Finally, it is believed that about 90% of total emissions are upstream emissions, and about one third arise from Tier 1 suppliers<sup>1</sup>. The metalworking industry in particular is held responsible for about a quarter of the total emissions along the value chain.

With our approach we want to face this challenge and take one of the first essential steps towards decarbonization in Scope 3: the identification of and communication with energy-intensive parts of the production and transport of purchased goods. Only with the knowledge of possible sources and the respective causes decisions on an effective decarbonisation can be made cooperatively. In addition to megatrends such as digital transformation, which can achieve enormous emission savings through virtualization alone if the process is appropriately designed, there is also the proven possibility of turning existing fossil process steps to electric powered processes. Combined with a simultaneous shift of emissions to regenerative sources, this can also represent a clear step towards processes with lower CO<sub>2</sub> emissions. An additional positive „side effect“ is that the data basis used for decision can also help to maintain transparency in the so-called **“rebound effect”** cases.

#### **Rebound effect – well-meant is not always well done.**

If the planned effect occurs only partially due to efficiency measures or if consumption changes due to higher usage than before the measure, this is called a rebound effect. For the calculation of the actual effect, both the respective reference area and the entire balance sheet must be considered. Common examples are the increased use of new „environmentally friendly“ solutions, which in total can have a higher energy consumption than the original variant (electromobility, digital services.)

There are also other incentives for companies to deal with the issue of decarbonization. In addition to numerous scientific principles (Science Based Targets, GHG), there are also socio-political and market-economy trends that can have a positive influence on the company's success in the medium to long term.

## Why companies should deal with the topic now

The cross-social debate that has arisen from the #fridaysforfuture protests or the current discussions about the type of upcoming CO<sub>2</sub> tax make it clear how intensively consumers or business partners will be concerned in the future with the key figure of CO<sub>2</sub> emissions of companies or their products. The consideration of a possible decarbonization also helps to secure the existence of the company in the medium and long term.

<sup>1</sup> <https://www.bmu.de/publikation/schritt-fuer-schritt-zum-nachhaltigen-lieferkettenmanagement-praxisleitfaden-fuer-unternehmen/>

## Market economy limitation: is the CO<sub>2</sub> tax coming?

Basically, the scope for action that a company currently has for decarbonization is still very extensive. However, both global and national targets for reducing greenhouse gas emissions are a strategic government control element for markets in the medium term. The Federal Government's voluntary commitment to be climate neutral by 2050 and to undercut the comparative value of 1990 by 55% by 2030 can only be met if, in addition to the public sector, private individuals and companies are also "motivated" to reduce emissions significantly and quickly. Regardless of whether these regulations apply through expanded CO<sub>2</sub> levies, more extensive energy taxes or an independent CO<sub>2</sub> tax, diverse processes will be influenced in the future. Current considerations set the cost of CO<sub>2</sub> emissions at around 20 to 40 euros per tonne of greenhouse gas emissions. These costs are also planned to increase over the years. An early assessment of energy- and emission-intensive processes is therefore a useful safeguard against possible financial effects.

## Civil society requirements: Fridays for Future and the consequences

The climate crisis appears to be unstoppable in public perception. Young people worldwide, but above all in European countries, are taking to the streets to achieve scientific climate targets. As a result, discussions about the implementation of a CO<sub>2</sub> tax are intensifying in several countries. The Fridays for Future movement was launched in August 2018 by the Swedish climate activist Greta Thunberg. Since the start of their campaign, several thousand schoolchildren in Europe have regularly taken to the streets to make their voices heard.

In a few years, these politically active children will no longer be children, but conscious consumers and potential employees. Purchasing decisions by parents and grandparents are already influenced with a view to the choice of more environmentally friendly products and services. This critical action can also be seen in the questioning and reviewing of climate targets, so that a scientifically supported and verifiable decarbonization process is appropriate.

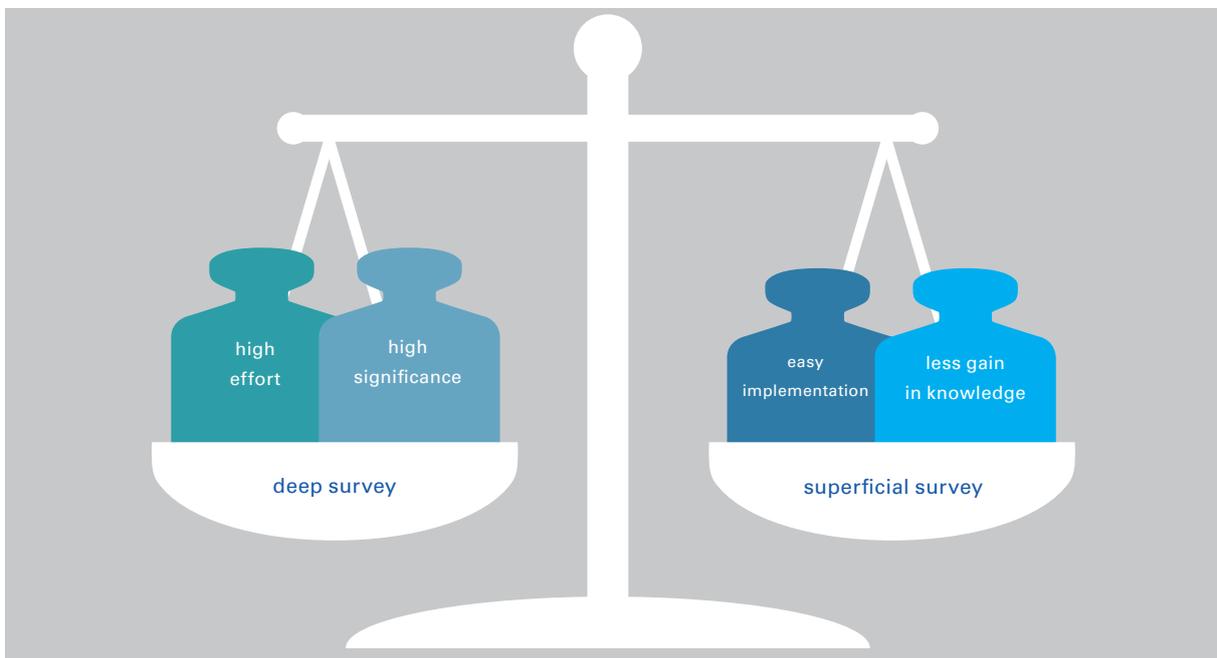


## Fact-based support: The Science Based Targets

Science-based targets (SBT) are the reduction targets that companies must comply with in order to meet the requirements of the 2015 Paris Agreement. These science-based targets enable companies to calculate what they can do and what they need to do to keep global warming below 2°Celsius. The initiative was launched jointly by the UN Global Compact, CDP, the World Resource Institute and the WWF. There are currently over 900 companies that have joined the initiative, including well-known companies such as Deutsche Telekom and SAP.

## Challenge: Overview of the supply chain

So far, many companies have shy away from decarbonization. Although there are numerous providers of software for the collection and provision of data today, there are still various hurdles and stumbling blocks in recording Scope 3 emissions. Differences in the definition of terms or the lack of standards that are tailored to the sustainability industry always pose difficulties for those responsible. Environmental or sustainability assessments from suppliers such as the NQC already exist today. They only focus more on querying regulations or management approaches and less on specific data on emissions or strategies for decarbonization. The use of empirical or generic data is not always useful. State-of-the-art technologies alone make reductions in the double-digit percentage range easily possible - however, these positive trends could be obscured by generic values.



There is also the question of the scope and depth of data collection. If too much data is collected, the clarity suffers, and the suppliers are unnecessarily burdened. Too little data has a negative impact on the informative value. Expertise in this field is essential when designing the right survey.



If individual data can be determined, further questions will inevitably arise.

#### Other questions:

##### ■ What are the data obtained from?

A uniform calculation of the data is essential for the success of the survey, otherwise the results will lose their significance. At the same time, unclear definitions and the lack of standards make exactly this difficult to achieve.

##### ■ Which standard should be used for the further processing of the data?

The 2015 **Corporate Value Chain Standard** from GHG is widespread. The CDP (Carbon Disclosure Project) also deals intensively with the topic of decarbonization.

##### ■ Which data is relevant to my request?

The **Corporate Value Chain Standard** divides the Scope 3 emissions into 15 different categories. However, it contains itself, that not all categories are relevant for every company. So, it is important to make a choice.

##### ■ Should I determine emissions for the entire company or limit myself to single products?

Recording emissions at the product level is more meaningful because companies can take measures based on their product portfolio. However, such an approach is much more costly.

##### ■ How can the supplier data be allocated?

Suppliers often produce for several companies, so statements about the total emissions of the respective company are not very meaningful. From the Corporate Value Chain Standard, several approaches emerge on how the right share of a company or product can be recorded, for example via sales, size or weight of the product.

##### ■ How do I deal with gaps in the data set?

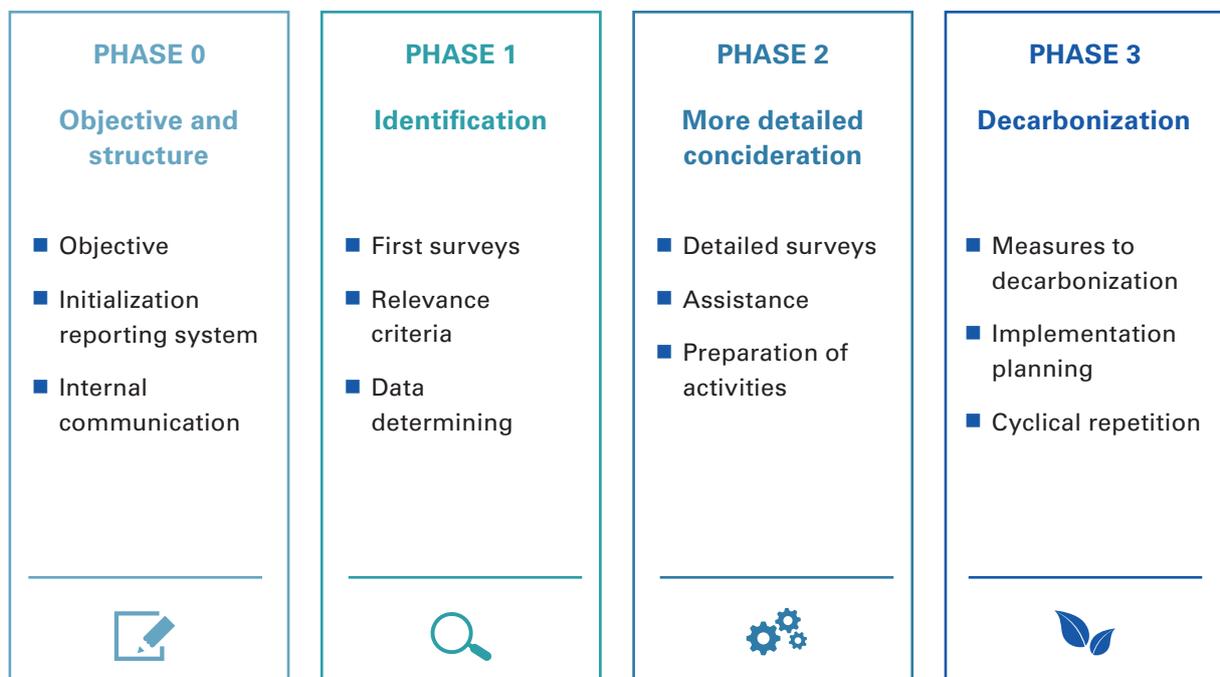
Where there is no Primary Data or it is unreliable, **Secondary Data** can be used, such as industry-standard data. At the same time, it must be ensured that the overall quality of the data is not affected too much.

These questions show how complex and distributed the individual tasks are for the collection and calculation of reliable factors in Scope 3. The aim here is to combine expertise from the areas of data management / data science and sustainability. A too comprehensive approach fails due to the effort and lack of willingness or participation of the insolvency, too general a query about the pure existence of measures / standards does not allow qualitative consideration and no identification of hotspots.

For this reason, we have opted for a modular, multi-stage approach that can be adapted to the individual requirements of individual companies, but also enables quantitative analyses. Identification and then an exact determination of the primary hotspots should be achieved. A complete collection and presentation of all possible data is initially not necessary and is also not carried out.

## Solution: Communication and transparency - prioritize understandably for everyone

In order not to overwhelm everyone involved with this large amount of data, we therefore propose a multi-stage and universal process. The implementation is easier if you can build on an existing reporting process from the subject area of sustainability or Corporate Social Responsibility. Existing energy management or environmental reports can also be of great help. If such a process does not yet exist, this would also be a suitable occasion to think about creating a report in parallel. Modern reports are also a good opportunity for exchange and dialogue with stakeholders across the supply chain.



## Our method:

### 0 Objective and structure of the reporting system

At the beginning a coordinated objective should be set within the company and the reporting system should be structured. Which parties do I have to pick up to establish this process? In addition to purchasing/materials management or company management, industry associations, employee/employer associations or cooperation with science may also be necessary to successfully carry out the following phases. The great advantage of our model: The software guarantees high flexibility across all phases. Due to the possibility of parallel processing of several phases, a small part of the suppliers can be started „prototypically», and the circle can then be gradually expanded. The content of the following phases can thus be optimized and adjusted.

### 1 Identification of relevant partners for decarbonization

Our first phase is based on a few, but relevant, questions. The aim is to enable uncomplicated, quick feedback for every partner in the supply chain. For example, the following questions should be determined using the example questions contained in the figure: How relevant to emissions is the supplier in the supply chain? How strong is our share in these emissions? The questionnaire should also be passed on if the respective partner has to obtain information from his respective suppliers. If no primary data is available, in many cases secondary data can also be derived, for example about the electricity consumption or the turnover of a company in combination with information about the respective branch.

### 2 More detailed consideration of emission-intensive processes within the supply chain

This information provides an overview of the emission-intensive processes in the supply chain. Now these are studied in more detail with a second questionnaire. The choice of questions is adjusted to the respective company and closely based on the findings from the GHG Scope 3 Protocol. Help and questions about possible decarbonization can already be provided here in preparation for the following phases.

### 3 Decarbonization in the supply chain

The second questionnaire now provides detailed information about the emission-intensive processes. On the basis of these findings, it is now jointly determined in which fields we see the greatest potential for optimization, and a strategy for reducing emissions is developed together with the customer.

The analysis is not only limited to the supply chain but covers the entire product life cycle. There is also enormous potential for optimization in downstream emissions. Methods such as actual-target comparisons or a comparison of the individual products should also work out ways of decarbonization.

## ID-Report – Smart Online Reporting & Management

The technical and methodical implementation of our process is based on the standard software system ID-Report and extends this by an independent component. This universal platform for decentralized and manual data collection represents the ideal basis for extensive upstream analysis. The on-premise system enables the various questionnaires to be designed individually to suit the context of the company making the inquiry. Thanks to the modular key figure system, all common standards can be mapped and used in the system.



**ID-REPORT**  
Smart Online Reporting and Management

The allocation of the individual surveys can be dynamically adjusted at any time, both multi-stage processes and a dynamic increase or decrease in the number of participants surveyed can be carried out independently. This means that there is no additional effort in correcting or adapting the questionnaires after the first feedback rounds. The possibility of „inheriting“ questionnaires can also be used to address unknown suppliers, for example, and „blind spots“ can be identified. Based on our experience in collecting sustainability-related data in the supply chain, such a solution offers a solid middle ground between product-specific calculation of individual emissions or a general query about the existence of management approaches and systems. The ability to independently adjust the scope and accuracy of the surveys allows the user to collect the exact data that he needs, and in the form in which the respondents can provide him with valid and reliable data.



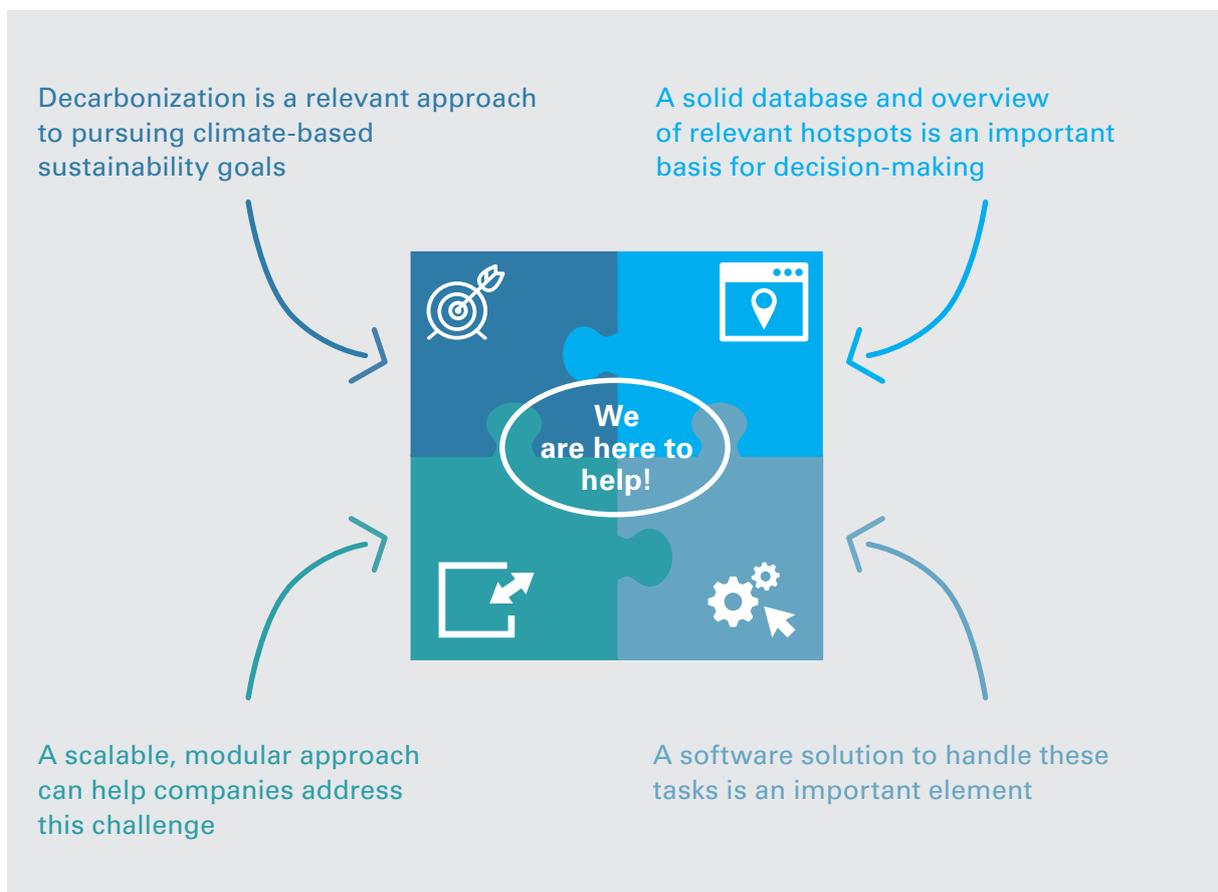
The technological basis enables numerous automatic validation and conversion options to convert different original data to a target size. Thanks to the integrated reporting functionality, both the status and the result can be prepared and published promptly, without having to involve external systems or processes. In addition, ID-Report, as a modern management system for the creation and publication of CSR and sustainability reports, offers numerous other functions that are also helpful in the collection and creation of climate-relevant data.

The solution has moderate hardware requirements and is based on standard technologies. All that is needed for the user is a common web browser; numerous import / export options allow the collected data to be used variably for other applications.

## How to proceed from here

At a time when CO<sub>2</sub> is a major social issue and measures to tax emissions are already being discussed at the political level, a proactive approach to the hotspots in the supply chain is of enormous importance. The advantages are by no means limited to reputational gains or the avoidance of a future tax burden. By methodically recording and optimizing CO<sub>2</sub>-intensive processes in the supply chain, resources can also be saved, and efficiency gains generated for the respective company.

abat AG is the ideal partner for this challenge. Abat has many years of expertise in both data management and sustainability. Both areas have already been successfully linked as part of the ID Report sustainability software, on which the decarbonization approach is based. Thus, abat combines the technical and methodological requirements to support your company in the future in decarbonization. If you want to face this challenge, please do not hesitate to contact us.



## Reasons for decarbonization using ID Report



Competitive advantages through proactive risk minimization



Use of standards (certifications?)



Cost savings



Valuable knowledge about the supply chain



Optimization of your reporting process through uniform software



Valuable conclusions about your own product range



Combination of methodological and content consulting



Opening up new opportunities for exploiting existing resources



Relief for those responsible for sustainability

## About us

abat

abat is one of the leading international SAP consulting for the automotive, discrete manufacturing and logistics sectors as well as a product house for MES solutions. As a consultancy and system integrator with in-depth industry know-how, we have been successfully supporting companies in the implementation of optimization and change processes for many years. Our customers include Audi, BMW, Daimler, MAN, VW, DHL, Hermes, Schnellecke Group and thyssenkrupp.

Do you have any questions about this whitepaper or specific questions about other innovative SAP topics? Please, feel free to contact us. As an innovation and technology scout, abat would like to continue to develop and present new topics in a transparent and understandable way.

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