

CO₂e ACCOUNTING

for companies, municipalities,
products and buildings



CO₂e Accounting

A company's CO₂e balance or corporate carbon footprint is more than just a tool for measuring greenhouse gas emissions under the GHG Protocol; it is also the basis for a successful decarbonisation strategy.

Control mechanism for substantial decarbonisation progress

A detailed CO₂e balance enables companies and organisations to precisely identify their sources of emissions and quantify their CO₂e footprint. This allows them to implement targeted measures to reduce their emissions and, in the long term, achieve a low-carbon economy. A comprehensive decarbonisation strategy includes measures to reduce emissions in all areas, from procuring renewable energy to enhancing efficiency in production and transportation, as well as focusing on material-based decarbonisation. Thus, a CO₂e balance forms the foundation for developing and implementing the necessary measures to reduce emissions and achieve the goal of decarbonisation.

Diverse approaches to CO₂e accounting for businesses, municipalities, and organisations.

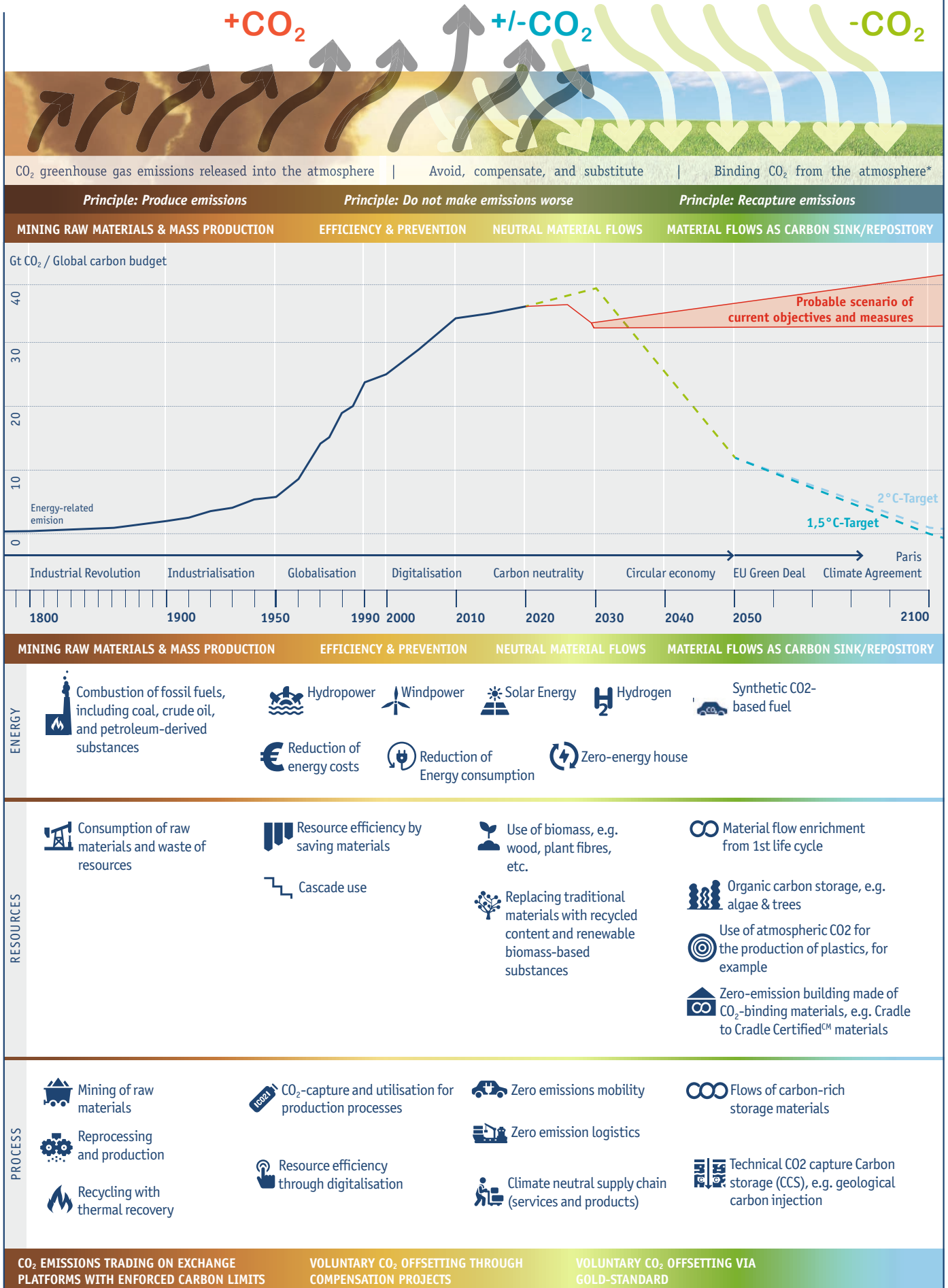
CO₂e accounting serves as both a foundational element and a tool for monitoring decarbonisation progress. It should be conducted regularly, such as on an annual basis, to track advancements towards a low-carbon future. Presently, there are varying standards for CO₂e accounting, with the chosen method for calculating a CO₂e footprint being dictated by these specific requirements.

Given the CSRD (Corporate Sustainability Reporting Directive) reporting obligations and the assessment of Scope 3 in the supplier rating by EcoVadis, a strategic approach to data collection is necessary to avoid confusion and duplication of work.

Kategorie		2019	2020	2021	2020-2021
Scope	CO ₂ e	CO ₂ e	CO ₂ e	CO ₂ e	Entwicklung & Perspektive
KONVENTIONELLE WÄRME AUS FOSSILEN BRENNSTOFFEN					
Herstell.	1	9,377,11 kWh	4,161	1,040,579 kWh	2171 -23.4%
Handel	1	1,220	1,231	2,838,525 kWh	751 +18.2%
Logistik	1	2,405	4,078	29,451,074 kWh	5,616 +162.3%
Werkstoffe	1	5,138	25,229,864 kWh	4,078	3,850 +7.1%
Produktion	1	271	96,394 kWh	29,102,564 kWh	631 +169%
Werkstoffe	2	8971	3,801,770 kWh	231	311 0%
Produktion	2	271	96,394 kWh	178,195 kWh	311 +17.0%
Werkstoffe	3	271	96,394 kWh	4,075,778 kWh	1,684 +100%
Produktion	3	271	96,394 kWh	787,834 kWh	01 -100%
Werkstoffe	4	271	96,394 kWh	279,296 kWh	01 -100%
Produktion	4	271	96,394 kWh	21	01 -100%
Werkstoffe	5	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	5	271	96,394 kWh	1,402,253 kWh	01 -100%
Werkstoffe	6	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	6	271	96,394 kWh	1,402,253 kWh	01 -100%
Werkstoffe	7	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	7	271	96,394 kWh	1,402,253 kWh	01 -100%
Werkstoffe	8	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	8	271	96,394 kWh	1,402,253 kWh	01 -100%
Werkstoffe	9	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	9	271	96,394 kWh	1,402,253 kWh	01 -100%
Werkstoffe	10	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	10	271	96,394 kWh	1,402,253 kWh	01 -100%
Werkstoffe	11	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	11	271	96,394 kWh	1,402,253 kWh	01 -100%
Werkstoffe	12	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	12	271	96,394 kWh	1,402,253 kWh	01 -100%
Werkstoffe	13	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	13	271	96,394 kWh	1,402,253 kWh	01 -100%
Werkstoffe	14	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	14	271	96,394 kWh	1,402,253 kWh	01 -100%
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Produktion	15	271	96,394 kWh	1,402,253 kWh	01 -100%
Werkstoffe	16	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	16	271	96,394 kWh	1,402,253 kWh	01 -100%
Werkstoffe	17	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	17	271	96,394 kWh	1,402,253 kWh	01 -100%
Werkstoffe	18	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	18	271	96,394 kWh	1,402,253 kWh	01 -100%
Werkstoffe	19	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	19	271	96,394 kWh	1,402,253 kWh	01 -100%
Werkstoffe	20	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	20	271	96,394 kWh	1,402,253 kWh	01 -100%
Werkstoffe	21	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	21	271	96,394 kWh	1,402,253 kWh	01 -100%
Werkstoffe	22	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	22	271	96,394 kWh	1,402,253 kWh	01 -100%
Werkstoffe	23	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	23	271	96,394 kWh	1,402,253 kWh	01 -100%
Werkstoffe	24	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	24	271	96,394 kWh	1,402,253 kWh	01 -100%
Werkstoffe	25	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	25	271	96,394 kWh	1,402,253 kWh	01 -100%
Werkstoffe	26	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	26	271	96,394 kWh	1,402,253 kWh	01 -100%
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Produktion	27	271	96,394 kWh	1,402,253 kWh	01 -100%
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Produktion	28	271	96,394 kWh	1,402,253 kWh	01 -100%
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Produktion	29	271	96,394 kWh	1,402,253 kWh	01 -100%
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Produktion	74	271	96,394 kWh	1,402,253 kWh	01 -100%
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Werkstoffe	76	271	96,394 kWh	1,402,253 kWh	01 -100%
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Produktion	81	271	96,394 kWh	1,402,253 kWh	01 -100%
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Werkstoffe	86	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	86	271	96,394 kWh	1,402,253 kWh	01 -100%
Werkstoffe	87	271	96,394 kWh	1,402,253 kWh	01 -100%
Produktion	87	271	96,394 kWh	1,402,253 kWh	01 -100%
Werkstoffe	88	271	96		

Model for industrial and economic decarbonization

Principle and classification according to stages of economic development



*Definition: German Federal Environmental Agency

RITTWEGER und TEAM offers the following procedures for CO₂e accounting:

1. Corporate Carbon Footprint (CCF): Calculation of the CO₂e footprint in Scope 1 and Scope 2 using actual organisational data.

Our services:

1. Establishing a structured data collection framework for an organisation
2. Inventory analysis of the emitters to be recorded
3. Development of customised query templates for the respective organization
4. Real-time measurement and monitoring of consumption data as needed
5. Benchmark for the respective market sectors
6. Verification and confirmation of the calculations by an external service provider (separation of creation and verification)

Areas of application for this method:

- Basic data for determining materiality (materiality analysis)
- Basic data for complying with the CSRD Directive/Sustainability Reporting/Taxonomy Reports, ESG Reports
- Reporting basis for subsidiaries in holdings or corporate groups
- Basic data for transformation modeling and the development of transformation concepts
- Basic data for Lifecycle Assessment (LCA, ecological balance) based on real-time data
- Basic data for investment planning
- Basic data for future automated data transfer of CO₂ data
- Basic data for energy audit DIN 16247-1
- Basic data for EMAS
- Basic data for ISO 50001 and 50005
- Basic data for Cradle to Cradle Certified® certifications

Advantages:

- Creation of a database on the basis of real data
- Structural basis for visualising the transformation progress
- Complete overview for the management of consumption data for better control in crisis situations

Disadvantage:

Recording and reporting structures must be established within the company if they are not already in place.

2. Extended Corporate Carbon Footprint: Calculation of the CO₂e footprint in Scope 1 and Scope 2 based on actual data from the organisation, taking into account current standards and actual potentials

Our services such as 1. and

7. Incorporating net negative emissions, such as from producing more electricity than consumed and negative emissions through Carbon Capture and Storage (CCS). This also includes offsetting emissions via certified services, for example, from biochar or certificates related to material flows
8. Consolidating multiple verification partners

Areas of application for this method:

- Basic data for the determination of materiality (materiality analysis)
- Visualisation of strategies for negative emissions
- Basic data for Cradle to Cradle Certified® Certification

Advantages:

- Data and reporting structures are developed from the outset for the entire transformation path
- Improved transparency and greater clarity about the status of relevant emitters

Disadvantages:

- No direct verification possible (only via the auditor's verification)
- Absolute CO₂e equivalents cannot be used for market communication

3. Corporate Carbon Footprint: Calculation of the CO₂e footprint in Scope 3

Our services:

1. Analysis of relevant emitters in the supply chain
2. Creation of a data structure for capturing relevant emitters
3. Collection of basic data
4. Calculation based on real data or databases

Areas of application for this method:

- Basic data for the determination of materiality (materiality analysis)
- Basic data to fulfil the CSRD Directive/Sustainability reporting/taxonomy reports, ESG reports
- Component of an EcoVadis rating
- Reporting basis for subsidiaries in holdings or corporate groups
- Basic data for transformation modeling and development of transformation concepts
- Basic data for Lifecycle Assessment based on real-time data
- Basic data for investment planning
- Basic data for future automated data transfer of CO₂e data
- Basic data for material-focused decarbonisation in scope 3
- Basic data for Cradle to Cradle Certified® Certification
- Verification by an external service provider is possible with complete data availability (separation of creation and verification)

Advantages:

- Creating an overview of the most relevant emitters in the supply chain or within the entire corporate context
- Basis for the development of a CO₂e neutral supply chain
- Structural foundation for visualising the progress of the transformation

- Comprehensive overview for management of consumption data for improved control, forecast of material price increases due to higher CO₂e

Disadvantages:

- Recording and reporting structures must be established if they do not yet exist within the company
- The use of database-based data for calculation does not demonstrate the transformation progress of suppliers

4. Modeling of a fossil decarbonisation strategy for key areas such as electricity, heat, mobility, packaging, and products until 2045

Our services:

1. Definition of relevant categories and analysis of data from Scope 1, 2, or 3
2. Analysis of the respective focal points
3. Supporting the transformation paths of electricity, heat, and mobility with state-of-the-art technologies, methods, and processes
4. Supporting the transformation paths of products and packaging with non-fossil materials, raw materials, and material cycles according to the current state of technology
5. Supporting the transformation paths of electricity, heat, and mobility with experimental technologies, methods, and processes that are expected to reach market maturity in the next 10 years (new storage technologies)
6. Supporting the transformation paths for products and packaging with experimental material and raw material concepts (plastic from biochar or from CO₂ as well as returns from emerging material cycles)
7. Visualization and documentation of the modeling

Areas of application for this method:

- Creating a common understanding within the management or the entire company about the areas of responsibility, solution approaches, and timelines of the transformation until 2045
- Basis for an internal strategy paper
- Detailed elaboration of the process for determining materiality (materiality analysis)

- Preliminary stage for a transformation strategy to be published
- Component of a Cradle to Cradle Certified® Certification

Advantages:

- Creation of innovation spaces for product development
- Basis for integrating the Circular Economy into the corporate strategy
- Optimisation of internal resources and processes for transformation
- Identification of market niches and competitive advantages within the transformation
- Cultivating a long-term perspective within the corporate culture
- Integration and accounting of second and third life cycles from the Circular Economy into long-term modeling

Disadvantage:

Requires a high level of understanding for the transformation.

5. Public (reporting) fossil transformation strategy for decarbonisation in key areas such as electricity, heat, mobility, packaging, products

Our services:

1. Definition of relevant categories and analysis of data from Scope 1, 2 oder 3
2. Consideration of materiality (materiality analysis)
3. Analysis of the respective focal points, alignment with market and competition requirements, as well as demands from banks, investors, and other stakeholder groups
4. Measurement, data collection and monitoring of the largest single emitters in Scope 1 und 2
5. Inventory of building data and identification of potential areas, e.g. for photovoltaics
6. Supporting the transformation paths of electricity, heat, and mobility with state of the art technologies, methods, and processes
7. Supporting the transformation pathways of products and packaging with non-fossil materials, raw materials and material cycles according to state of the art technology

8. Alignment of the transformation path with the 1.5-degree target
9. Determination of transformation costs and preparation of an investment forecast
10. Visualization and documentation of modeling
11. Development of communication statements for brand communication
12. Verification of communication statements and verification of the transformation strategy by an external service provider (separation of creation and verification)

Areas of application for this method:

- Component of the materiality analysis
- Basis for credible and robust stakeholder dialogues
- Reporting basis for subsidiary companies in holdings or corporate groups
- Basis for developing the transformation progress within the sustainability reporting CSRD
- Basis for applying for funding or participating in funding projects
- Supporting transformation opportunities for high-risk sectors within the taxonomy and in financing rounds
- Component of sustainability ratings for financing rounds
- Component of supplier ratings such as Ecovadis
- Component of a Cradle to Cradle Certified® Certification
- Basis for communication measures on sustainability performance based on the Green Claim Directive (mandatory in addition to an LCA for products or when using compensation models)

Advantages:

- Creation of a common understanding in the entire company about the areas of responsibility, solutions and time frames for the transformation until 2045
- Basis for external communication on the sustainability performance of products
- Optimisation of internal resources and processes for the transformation
- Recognising market niches and competitive advantages within the transformation
- Cultivating a forward-looking perspective within the corporate culture

- Visualisation of the company's future viability

Disadvantage:

Requires a high level of understanding of the transformation.

6. Product Carbon Footprint (PCF) – Classical, product-specific life cycle analysis for CO₂e footprint according to ISO 14067

Our services:

1. Determination of the CO₂e footprint in the life cycle per product
2. Database- or real-time-based data acquisition
3. Benchmark with similar products
4. Basis for calculation and integration of product innovations
5. Benchmark of the product in different innovation cycles
6. Auditing by an external service provider
7. Certification by environmental verifier or certification body

Areas of application for this method:

- Product information within the product declaration
- Data analyses for product innovations
- Fulfilment of requirements when applying for funding and funding projects
- Supply chain management
- Basic data for ISO 14001
- Basic data for BIM
- Component of a Cradle to Cradle Certified® Certification

Advantages:

- Quick and easy balance sheet with informative value
- Standardised procedure

Disadvantages:

- Significance based on outdated database data
- Complex determination and integration of the transformation progress (e.g. switch to 100% green electricity)
- High workload with a large number of items or a large number of products
- Prone to errors when updating

- High costs

- Complex integration of innovations from the circular economy - system limit of the first life cycle - potential from the second and third life cycle cannot be integrated

7. Optimization of Scope 3 within procurement and the supply chain, optimization of product design

Our services:

1. Setting priorities on the basis of current technological possibilities
2. Material-focused decarbonisation by identifying material alternatives
3. Optimisation of the supply chain
4. Integration of product innovations
5. Visualising approaches to innovation

Areas of application for this method:

- When there is high pressure for innovation in the respective industry
- In the context of general product innovation approaches
- For answering strategic questions

Advantages:

- Quick overview of the current situation
- Creation of non-technological solutions
- Creative impulse through other perspectives

Disadvantage:

For highly complex products, precise data on the raw materials/ingredients (BOM) must be available.



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CIRCULAR
MATERIAL
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