MHP
A PORSCHE COMPANY

WHITEPAPER

Zero Impact Products

Are products without negative environmental impact really possible?

Introduction

Industrial companies and products are responsible for a considerable chunk of global CO2 emissions and other related negative environmental effects. This area of the economy in particular offers huge potential and opportunities as part of a transformation to net zero, or a business practice in which the emissions of greenhouse gases and negative environmental effects are eliminated as far as possible. Businesses' net zero ambitions are based on the 1.5-degree target set out in the Paris Agreement. Over 3,400 companies worldwide have already pledged to meet this target in accordance with the Science Based Targets Initiative.[1]

For industrial companies, net zero targets constitute a challenge: due to complex and global supply chains, numerous value creation partners and all kinds of materials and resources, the approach known as "Scope 3 calculation" is associated with very high costs. For industrial companies, whose Scope 3 emissions quickly constitute over 80% of overall emissions, another approach to assessment is required: the Product Environmental Footprint (PEF) or the Product Carbon Footprint (PCF) in a specification. However, in the necessary transformation, sustainability and economic efficiency need not be mutually exclusive. Today, companies predict that over half their 2026 turnover will be generated from products, services and business models that do not yet exist. Over 90% of companies say that sustainability plays a key role in this.[2] Those who act now can reap many rewards in the long and short term.
A transition in the materials system – not just the energy system – is required to achieve the goal of global net zero. Studies show that transition of the materials system for steel, plastic, aluminum and cement alone, achieved through material efficiency and circular economy principles, may reduce emissions in the European Union by up to 56%.[3] It is evident that products currently on the market and how resources are handled to create them are key drivers of climate change. To achieve net zero, ambitious targets and root-and-branch transformation are necessary across a business's entire operating model, requiring a new understanding of products or product systems. The focus here is on a holistic approach and the entire product life cycle. Businesses need to pursue holistic solutions and work with their stakeholders across the company. Current market insights show that switching to sustainability pays off. The introduction of sustainable business practices not only helps improve a business's reputation – many consumers are already increasingly prepared to pay more for goods with a smaller environmental footprint. Businesses also boost their appeal to investors pursuing forward-looking and sustainable investment strategies.

One highly ambitious example of a holistically sustainable product is the "Polestar 0 Project" from Polestar.[4] The company's aim is to build a truly climate-neutral vehicle by 2030 that does not use low-carbon solutions or offsetting, but eliminates all emissions from raw material extraction, material production, product manufacturing and the end of the product life cycle. These future-forward products are more crucial than ever before.

In this whitepaper, we demonstrate how you can develop and sell products with no negative environmental impact and combine sustainability with economic efficiency. We call the results "**zero impact products**".

Today, emissions are mainly accounted for in business using the Greenhouse Gas Protocol. This divides emissions into direct emissions (Scope 1), indirect emissions (Scope 2) and emissions from the upstream and downstream value chain (Scope 3). CO2 equivalents (CO2-eq), the result of accounting in accordance with the GHG protocol, constitute an instrument of measurement enabling the comparison of different companies' emissions levels. The Corporate Carbon Footprint also forms the basis for decarbonization objectives in line with the Paris Climate Agreement's 1.5° target.

The PEF considers CO2 emissions alongside additional environmental effects of products across their entire life cycle. One PEF specification is the Product Carbon Footprint (PCF), which exclusively examines a product's emissions. Accordingly, an all-round decarbonization strategy for industrial companies includes the decarbonization of both processes and products.

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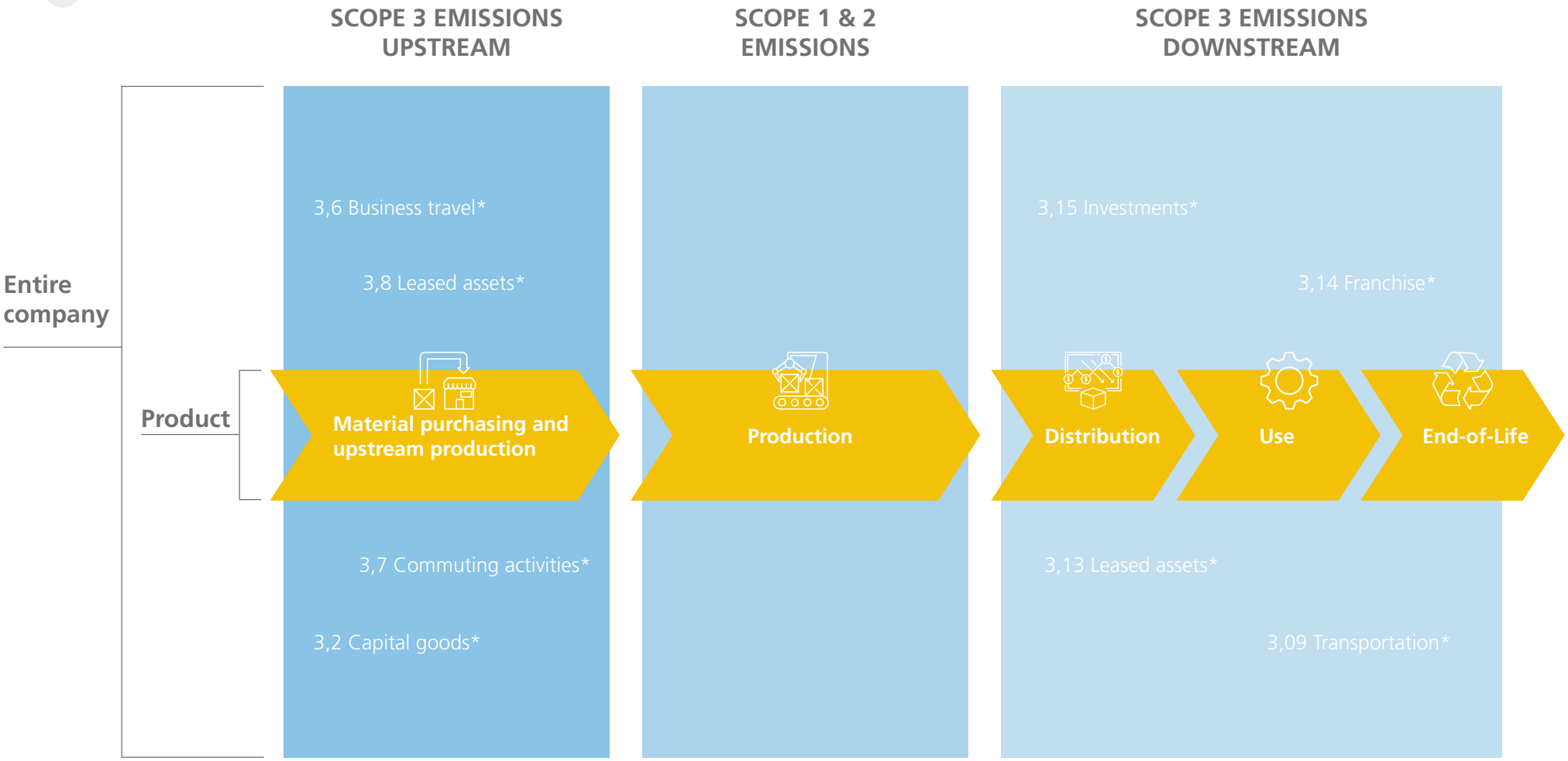
[1] Global Carbon Budget 2019, Berkeley Earth
[2] Companies taking action – Science Based Targets
[3] https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/2021-global-report-the-state-of-new-business-building
[4] https://www.polestar.com/global/sustainability/climate-neutrality/polestar-0-project/

Relationship between Corporate Carbon Footprint and Product Carbon Footprint



* Exemplary mentions of the Greenhouse Gas Protocol categories. The sum of all product emissions and the other GHG categories corresponds to the total corporate carbon footprint.

Lifecycle Assessments

1. Goal and scope definition

2. Inventory analysis

3. Impact assessment

4. Interpretation

The basis for quantitative evaluation of products' environmental impact and the calculation of the Product Environmental Footprint is the Lifecycle Assessment method. There are a few procedural models and standards for the method, such as ISO 14040/14044, the Product Environmental Footprint Category Rules (PEFCR) from the European Commission or simplified forms of the Product Carbon Footprint – which is limited exclusively to CO2-equivalent emissions – according to ISO 14067 or the Pathfinder Framework of the World Business Council for Sustainable Development (WBCSD). In this white paper, we focus on the ISO standards 14040 and 14067. A life cycle assessment takes place over four phases:

1) goal and scope definition,
2) inventory analysis,
3) impact assessment and
4) interpretation.[5]

The goal and scope definition determines the system boundaries and the level of detail of the study in accordance with its purpose. The inventory analysis takes an inventory of the system that combines input and output data and allocates it to a functional unit of the product under assessment. In the impact assessment phase, environmental data (e.g. from LCA databases) is used to assess the environmental impact in each life cycle phase. In the final phase, the results are interpreted and used to draw conclusions on the objective and scope of the LCA study.

Overall, LCAs and the calculation of PEFs and PCFs helps detect environmental impact hotspots and find specific measures to optimize or eliminate the negative environmental effects. This allows major levers for optimization to be identified quickly and measures for achieving quick wins to be introduced.

Building the LCA method into a business's mindset is the first step towards creating zero impact products. LCAs examine the entire product life cycle and analyze products and their environmental impact in various ecosystems – from the perspective of both environmental and social sustainability. The focus on the product life cycle and a "product first" mentality (similar to the "customer first" mentality when developing business models) promotes understanding and awareness that every area of a company can help optimize products' sustainability numbers.

To make zero impact products a future reality, we assess the four key areas of the product life cycle below:

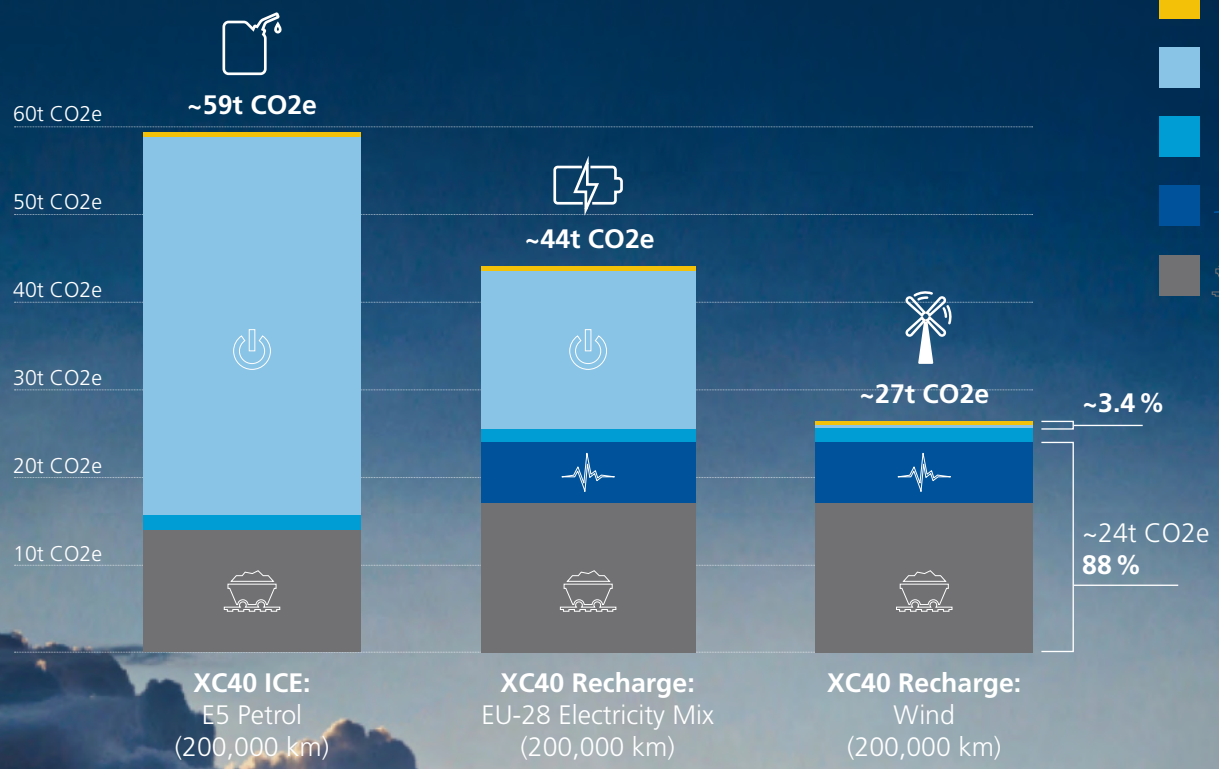
- **Product development**
- **Product manufacturing**
- **Product use and**
- **Product end of life**

In doing so, we will analyze the potential and impact of each area of the system and offer recommendations for future implementation and achievement of a zero impact product approach.

As a basis and to illustrate our approach, we draw on a practical example: the Lifecycle Assessment for a Volvo XC40 Recharge[6], assuming use of renewable energy in the use phase.

[5] https://www.iso.org/obp/ui/#iso:std:iso:14040:ed-2:v1:en
[6] Volvo-C40-Recharge-LCA-report.pdf (volvocars.com)

Case study Volvo

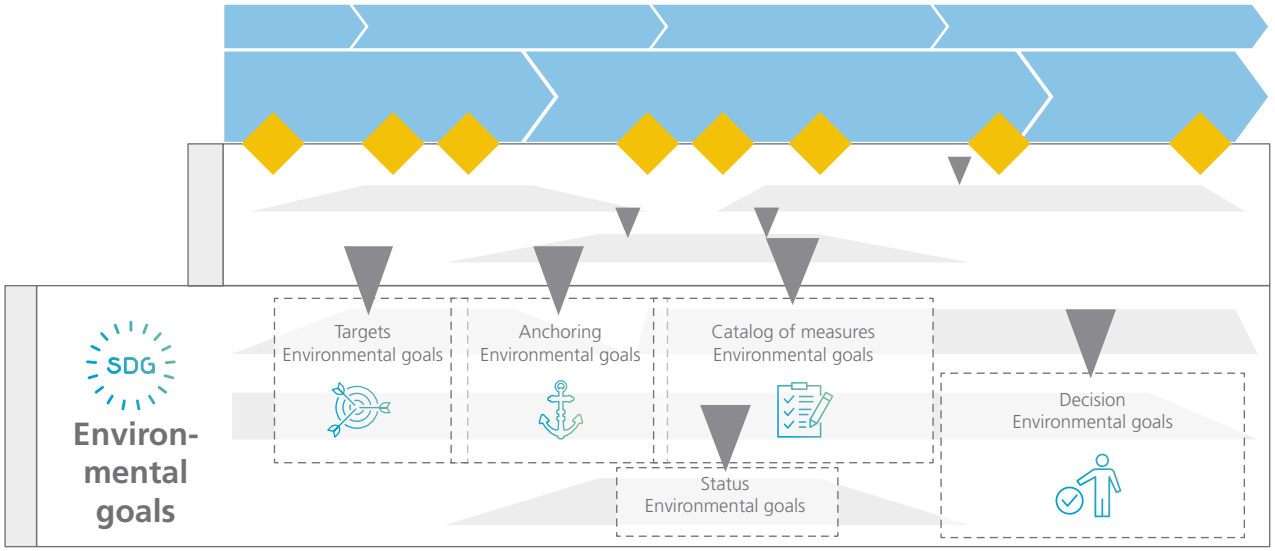


Product development

Product development plays a key role in creating zero impact products. From the example of LCA, we can see that around 88 % of emissions are determined by the upstream value chain and by materials used and battery production in particular. Decisions made in product development include which materials are used. The lever for decarbonization and the overall elimination of negative environmental impact is correspondingly large. If we assume, as shown above, that half of all businesses' turnover in 2026 will be generated by products and services that do not exist yet, the relevance of product development is even clearer. The aim must therefore be to integrate sustainability into product development as a core element from the outset.

Today, product development either involves efficient processes and affordable products, which are optimized for production in linear business models to reduce throughput times and production costs (bottom line), or innovations for new features, for instance (top line). In a circular system of the future, top and bottom line must be considered together and expertise in product development must be examined. In addition to the principle of circular design, or the Ecodesign Directive[7], according to which products should be designed to be as modular and reusable as possible, product developers must also acquire business expertise in the future. From a sustainability perspective, it's about developing higher-quality products for long product life cycles and higher product capacity and increasing the product lifetime value. This requires new expertise in business models, specific product use and the ecosystems where the products being developed will be used. Systems engineering offers an initial approach to this. This is a method that uses systems thinking and integrative procedural models to form the basis for particularly wide-ranging and accelerated development of technically complex products. Systems engineering is an approach that redefines the collaboration model in product development. To develop zero impact products, it is necessary to operationalize the elimination of negative environmental effects. This elimination must be expressed in measurable objectives and integrated into product development processes. We refer to these specifically as environmental objectives in the product development process (PEP).

Generic product development process



Virtually every company follows a standardized PEP in product development to handle the complexity of milestones, scheduling, stakeholders, materials and so on. The following illustration offers a generic example.

[7] Ecodesign Directive source

Environmental objectives in the PEP describe, for instance, quantified decarbonization ambitions, the percentage or absolute share of recycled materials in the product weight or the share of renewable materials in the product. Ideally, the focus is not simply on one environmental objective, but several combined, to eliminate all negative environmental effects – but we are focusing initially on decarbonizing products.

As part of an overall decarbonization strategy for businesses, decarbonization objectives should be set for individual products across the entire product life cycle. For zero impact products, this is relatively easy – 0 kg CO2-eq emissions across the entire product life cycle. A status quo calculation using an LCA study allows the target gap in decarbonization to be determined. In the above example of the Volvo XC40 Recharge, this constitutes around 24 metric tons of CO2-eq, produced by the upstream value chain. The overall decarbonization target for the end product must then be cascaded to the individual materials or components. In specific terms, this means each individual component is assigned a decarbonization goal and the person in charge of the component is responsible for ensuring it is met. Their role is to identify decarbonization measures such as using recycled or renewable materials. The measures must also be assessed with regard to CO2-eq savings and economic viability. This assessment should take place in dialog with suppliers. The decarbonization of products is a shared task across the entire value chain, in which data on product and material properties must be available in good time and cooperation between suppliers, OEMS and recycling companies must be guaranteed. Based on the target-setting process for products and individual components and the necessary models of cooperation in the value chain, these activities must be built into the PEP, through processes and with the relevant responsibilities, and operationalized to ensure targeted decarbonization in the product development process.[8]

For the creation of zero impact products, we offer the following recommendations for product development:

- View product development as a system and involve internal and external stakeholders more closely in the product development process.
- In the strategy phase, take note of new quality requirements, future business models and efficient recycling of products at the end of life.
- In the early stages of product development, gather and collect as much real material and process data as possible in order to estimate products' environmental impact.
- Promote designers' ability to make the right decisions on material use from a sustainability perspective.
- Together with the purchasing department, build environmental impact or CO2-eq values into purchasing processes as an award criterion.
- Work on decarbonization measures with value chain partners and help them implement them.
- Together with the finance department, provide budgets that absorb any additional costs for sustainable components – it will pay off.

The potentials of decarbonization in product development are clear. For instance, the carbon footprint per kilogram of aluminum can be reduced by up to 77 % by the use of secondary aluminum rather than primary.[9] Studies show that material optimization and simple decarbonization measures can reduce a vehicle's carbon footprint by up to 66 % – with costs remaining the same.[10] However, for further decarbonization all the way through to the elimination of all emissions, additional efforts are required. A cooperative approach from value creation partners is absolutely essential to ensure measures have a positive impact and to optimize costs.

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[8] Source from MHP-Festival Pecha Kucha
[9] Own MHP calculation
[10] https://www.mckinsey.com/business-functions/sustainability/our-insights/the-zero-carbon-car-abating-material-emissions-is-next-on-the-agenda

Product manufacturing

Product manufacturing, including the necessary material logistics in a globalized economic system, is the second cornerstone requiring transformation in order to make zero impact products a reality. Based on the example of the Volvo XC40 Recharge, although emissions in product manufacturing "only" constitute around 5.5 % of life cycle emissions, the challenges in this phase of the product life cycle are very significant. They are primarily in the areas of manufacturing and logistics. Logistics is absolutely crucial to transport goods from A to B and to ensure further processing. In the global economic system and with the timing of global production systems, air, ship and truck transportation are now indispensable. Upstream and downstream transportation and distribution before or after the actual production of goods constitute the biggest sources of emissions in logistics. We do not yet have the technology today to eliminate emissions from logistics as a whole and thus also the share of emissions attributed to a product. Promising solutions are alternative engine types, such as those using green hydrogen or synthetic fuels such as Sustainable Aviation Fuels (SAF), which are already used in aviation. Green hydrogen also plays another key role in product manufacturing: transforming the energy system. Incidentally, hydrogen is referred to as "green" when it has been produced by means of water electrolysis, i.e. breaking it down into H2 and O2 using renewable energy. Manufacturing of industrial base products such as steel, plastic, aluminum and cement is currently responsible for around 75 % of industrial emissions in the EU.[11] This is due to energy-intensive manufacturing processes where energy extraction is powered primarily by fossil fuels. Total industrial requirements for industry amounted to around 665 TWh in 2020. Around 66 % of this was required for process heat and around 25 % for mechanical energy.[12] In comparison to other low-carbon energy sources, green hydrogen can offer an alternative energy supply for industrial processes, particularly in steel manufacturing, thus contributing to decarbonization.

Although decarbonization poses challenges for product manufacturing, companies can still implement specific measures in their area of influence and eliminate emissions from this part of the product life cycle. The most relevant step in this regard is creating transparency regarding the status quo for production and logistics processes and collecting primary data on consumption (e.g. energy, fossil fuels, etc.) and logistics routes. At the same time, transparency is a basis for making investment decisions as it allows us to determine where the most emissions can be saved and by using how much capital. By using systematic prediction and calculation tools for modes of transport on individual logistics routes or by precisely calculating consumption factors and/or emissions data from logistics service providers, it is already possible to determine potential on the product level and calculate emissions generated.

Digitization helps identify real energy consumption in production processes: The implementation of sensor systems, integration of the Industrial Internet of Things (IIoT) and creation of digital twins makes it possible to collect real energy and environmental data in production on the machine level in a standardized way, to calculate the emissions produced using specific emissions factors and to illustrate them on suitable dashboards. This makes it possible to map entire production processes in a flowchart, for instance, and to calculate specific emissions from production processes for a specific product using the lifecycle assessment method. In the systems approach, this procedure is useful in terms of reporting obligations for the allocation of environmental impact and the internalization of external costs generated by negative environmental impact.

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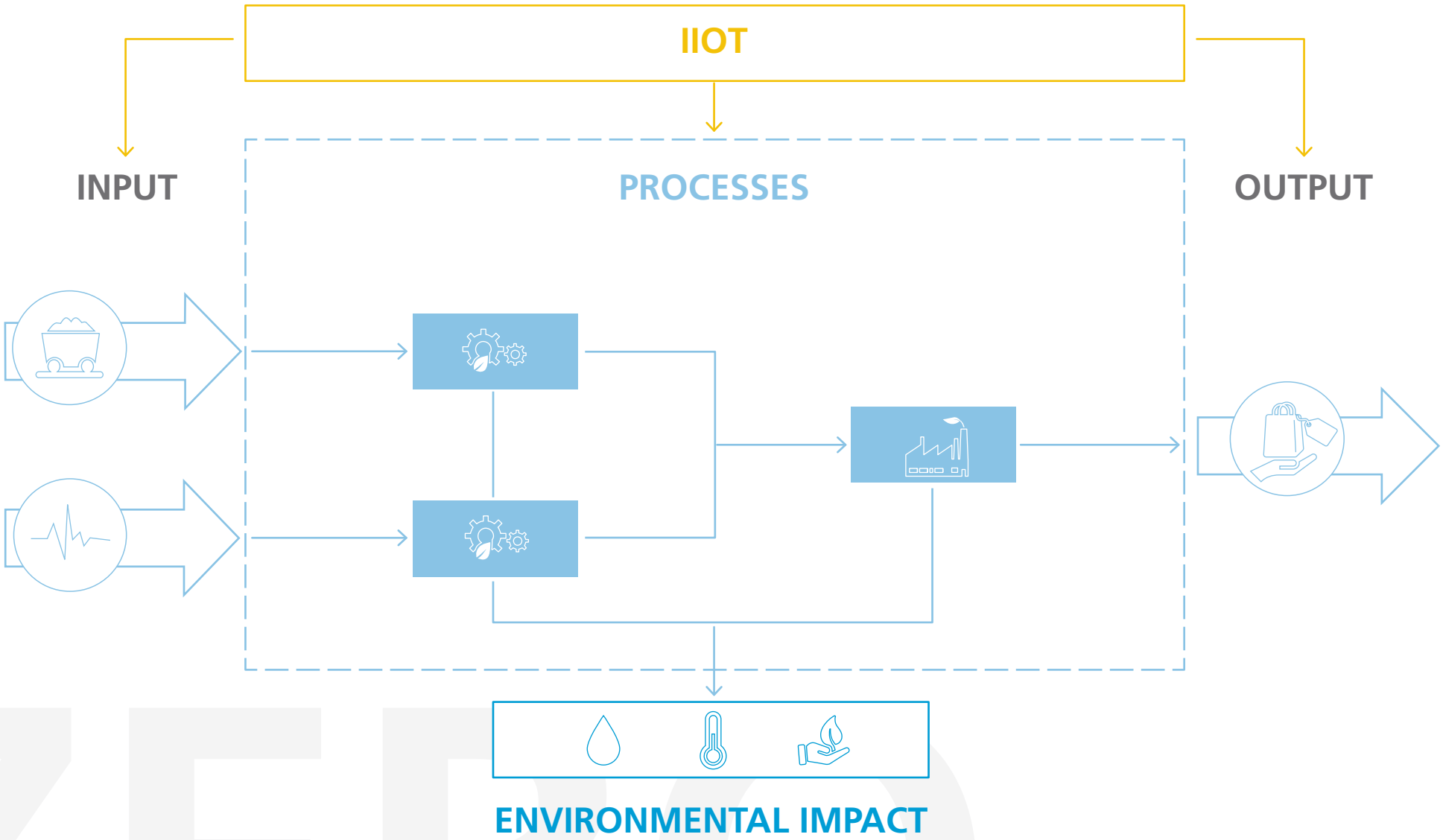
[11] How circular materials can support the net-zero agenda | McKinsey

[12] https://www.destatis.de/DE/Presse/Pressemitteilungen/2021/12/PD21_551_435.html

Flowchart of a production process as a basis for the determination of environmental impacts



This approach enables detection and tracking of emissions hotspots in a company's production and logistics processes. At the same time, energy and environmental data can help detect production issues and eliminate them at an early stage. In the full knowledge that technological innovations are still required across the entire industry ecosystem to fully create zero impact products in manufacturing, we nevertheless offer the following specific recommendations:

- Create transparency about logistics routes, modes of transportation and consumption data from logistics service providers, avoid empty journeys and optimize your transportation carriers' capacity. Digital tools can help.
- Work with logistics service providers to create sustainable concepts such as the use of synthetic fuels or green hydrogen, and promote sustainable fleet initiatives.
- Analyze your production facilities and use sensor systems and the Industrial Internet of Things to collect and monitor energy and environmental data and make decisions about optimizations to boost process efficiency.
- Use process mapping options such as digital (production) twins to optimize production processes and avoid waste. Determine areas of potential for the circular economy where waste is the starting material for new processes and generates value.
- Identify potential areas for electrification and use renewable energies and green hydrogen. Necessary process heat can also be obtained from induction, radiant heating or heat pumps.
- Actively advance innovations with your ecosystem partners and benefit from sustainable alternatives in the long-term.

Even if the proportion of emissions from product manufacturing in relation to overall emissions is low, some opportunities arise here from the combination of sustainability and digitization. Studies show that simply creating transparency using digital twins and short-term optimization decisions through IIoT can reduce production emissions by 30–40 %. A further 5–10 % of potential reductions is created by medium-term process optimizations using digital platforms and artificial intelligence.[13] However, process optimizations and increasing energy efficiency don't just have the potential to reduce emissions – they can also save costs. In light of rising energy costs, this also offers an appropriately significant lever for the product manufacturing business case.

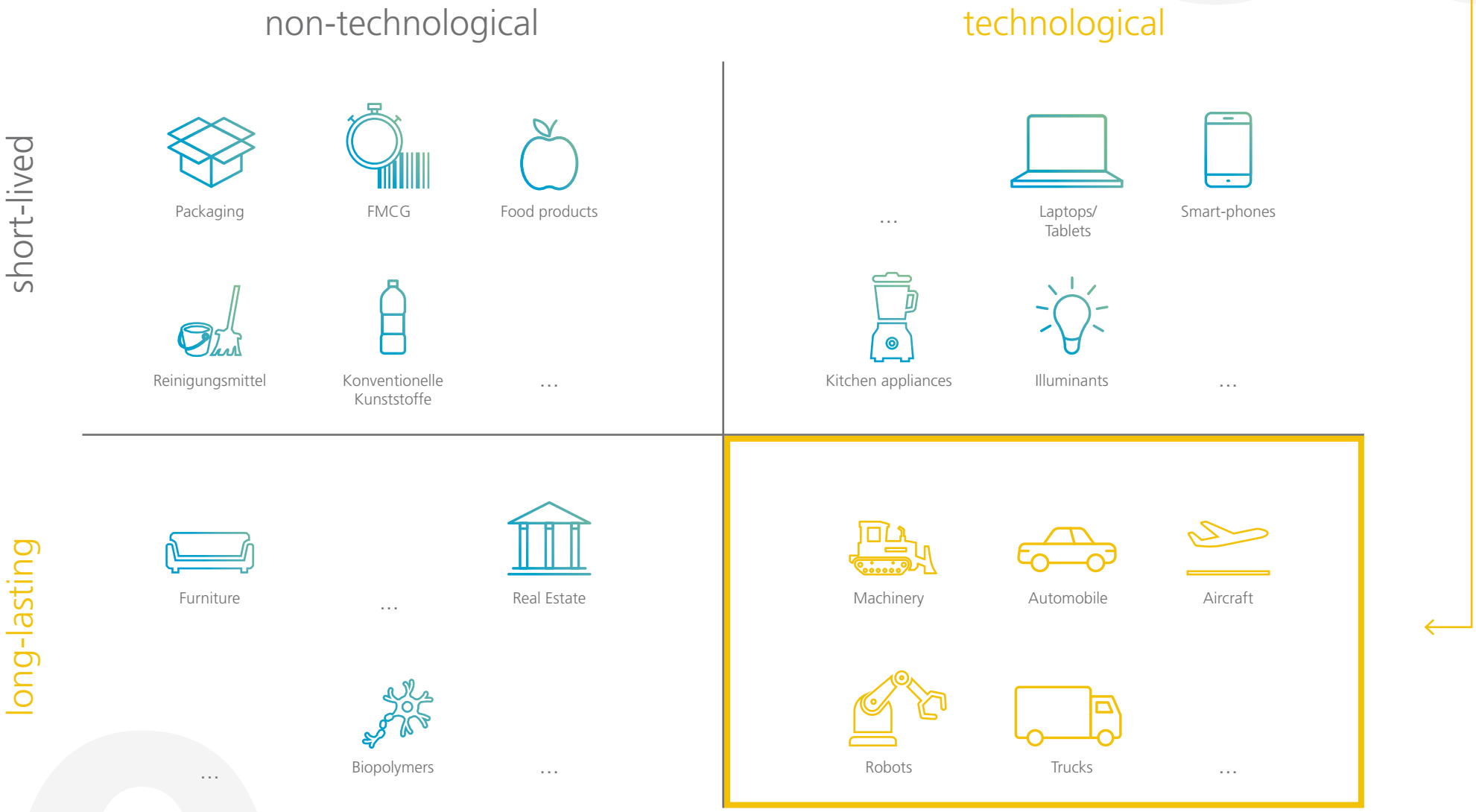
Use phase and end of life

The use phase of products is a key factor in favor of creating zero impact products from sustainability and commercial perspectives. In the example of the Volvo VC40 Recharge, although use and end of life emissions are responsible for only around 3.4 % of lifecycle emissions, this proportion rises to around 42 % if we do not assume the exclusive use of renewable energy, but use the EU 28 electricity mix for calculation purposes instead. From a sustainability perspective, products must be kept in use for as long as possible to ensure resource efficiency. From a commercial perspective this is equally relevant – particularly in circular business models – as a longer use phase and striving for higher product capacity increases the product lifetime value. The above example of the vehicle suggests that, in comparison to vehicles with combustion engines, switching to electric drives can reduce emissions in the use phase dramatically. However, this would be short-sighted, as emissions increase in the upstream chain. All products need to be considered. We distinguish between long-lived and short-lived and technological and non-technological products. In this white paper, we focus on long-lived and technological products.

A key aspect of a sustainable product use phase is as-a-service business models. This involves generating as much information as possible about products' use and capacity and optimizing their capacity and lifespan. The target figure is no longer the product margin but its lifetime value. Digitization makes this possible with sensors and digital platforms. Digitization and the ability it offers to identify products and materials is a key enabler of as-a-service business models. Industry leaders show that materials-as-a-service models are possible in addition to product-as-a-service models. Swedish company Sandvik[14] is already offering steel-as-a-service and ThyssenKrupp Materials is also getting in on the act.[15]

[13] How Technology Helps Sustainability Initiatives Thrive | BCG
[14] https://engineering-update.co.uk/2020/06/08/steel-the-new-material-as-a-service/
[15] https://www.thyssenkrupp-materials.ch/de/services

Flowchart of a production process as a basis for the determination of environmental impacts



For businesses, this involves analyzing product data over the life cycle and being able to determine the products' "state of health" at any time. This allows decisions for optimization to be made across the entire life cycle and a current residual value assessment of products to be performed. Accordingly, additional business potential emerges for products at their end of life: Rising raw material prices increase opportunity costs and the recycling or refurbishment of products can pay off from a financial perspective. Alternatively, the efficient recycling of products can help close materials cycles and make businesses less dependent on supplies of primary raw materials. From a sustainability perspective, this allows relative emissions per product to be reduced across the entire life cycle, and closed materials cycles to increase resource efficiency. But what you should you specifically do in your company to make zero impact products possible within the use phase and at end of life? We offer the following recommendations:

- First of all, alongside a customer journey, create a product or material journey and work out how products/materials affect the life cycle and how they are used.
- Digitize your products so you can collect and analyze data during the life cycle and make optimization decisions.
- Transform your business model into a business system with a focus on as-a-service business models – the new KPI for business success is the product lifetime value
- Set up cooperation across value chains within your company and actively drive partnerships with suppliers and recycling companies to close materials cycles and facilitate the circular economy.
- Monitor the decarbonization measures you take to sustain them in the long term; risk management and/or statistics systems have proven themselves as a way of obtaining indications of changes as quickly as possible.
- Communicate your sustainability efforts to your stakeholders, particularly your customers, create incentives for using your products and benefit from first-mover advantages on the market.

Studies show that the transformation to as-a-service business models offers positive economic and environmental effects alike. Accordingly, for instance, car-as-a-service business models have the potential to reduce emissions by around 25 % in a subscription model and up to 45 % in a free-floating car-sharing model.[16] Other studies assume that with circular business models, emissions per passenger kilometer can be reduced by up to 75 %, all while sales are increased by 15 to 20 times the vehicle price – making each vehicle 1.5 times more profitable.[17] The entire value chain also benefits from this and other effects of the circular economy.

[16] https://www.systemiq.earth/xaas/
[17] https://www.accenture.com/dk-en/insights/automotive/circular-economy-business-value

ZERO

Relevance of data and IIoT

Data and the Industrial Internet of Things are fundamental to the development of zero impact products and the implementation of decarbonization measures at every stage of the product life cycle. Today, the main challenge lies in the availability of data and its continuity across the life cycle. Although LCA models can make estimates on environmental impact at the beginning of product development and software tools now available can make an LCA calculation after product manufacture – at least from cradle-to-gate, an all-round cradle-to-cradle assessment is currently often impossible.

This is partly due to the availability of relevant (sustainability) data and to long product life cycles. In product development, data on materials, material properties and their environmental impact must be as specific and available as early as possible to ensure that effects of use can be estimated correctly and decarbonization measures can be built into the product development process. Specific information is also required for supplier selection or the purchase of production facilities. Cooperation and data sharing with suppliers across the entire upstream value chain is absolutely crucial. Only then can the potential and costs of decarbonization measures be calculated, such as the use of recycled materials. For businesses, this involves including the relevant environmental data in the master data of the bill of materials. The digital product passport allows the physical product to be digitally mapped and data on value chain partners to be shared. In product manufacturing, energy and logistics data and monitoring are relevant for detecting the environmental impact in production and emissions hotspots and developing short–and long-term decarbonization measures. Digital production platforms enable data collection and processing.

For the purposes of calculating LCAs, these can be used to create product-specific bills of processes and associated process mapping allowing individual products to be assessed via complex processes. In the use phase, data can help make new revenue and business model systems possible, increase product capacity and optimize use from a sustainability perspective. Specific digital twins for individual products help track and analyze products in the life cycle using unique serial numbers, as well determine their state of health and identify potential for optimization. Digital twins in the form of digital product passports can also increase communication and interaction with customers. At the end of life, digital product passports provide material data for recycling companies and enable efficient product recycling, material supply and closure of materials cycles. The creation of zero impact products is only possible if data can be collected, processed and passed on to value chain partners at every stage of the product life cycle. Aspects for consideration here include data security and sovereignty, but also eventual certification and therefore confirmation of true zero impact products, which is then used for customer communications and can be used to tap into first mover business opportunities.

“Data and digital technologies along the entire product life cycle are crucial for developing a sustainability strategy.”

Dr. Gunter Beitinger, Senior Vice President Manufacturing, Head of Factory Digitalization & Head of Product Carbon Footprint, Siemens AG

The business case for zero impact products

Many studies have shown that sustainability is linked to huge potential for business. In the MHP study "GreenTech: Made in Germany", business potential across sectors is calculated at an annual growth rate of 9.9 % and a total potential of EUR 9.38 billion in 2030.[18] In his annual statement to CEOs, BlackRock CEO Larry Fink highlighted the relevance of sustainability for companies and their business cases: "We focus on sustainability not because we're environmentalists, but because we are capitalists and fiduciaries to our clients.'[19] Some monetary effects can be valued directly, others only indirectly. As such, we use the model described by Visser (2021, "10 Rs of return on Thriving") to explain the business case for zero impact products.[20] These 10 Rs represent business opportunities in the areas of risk, resilience, resource efficiency, regulation, research and development, revenues, returns, reputation, recruitment and retention and reason for being.

The availability of resources and rising material prices are operating risks that businesses are tangibly facing at present. One of the most pressing examples in the automotive industry is the availability of semiconductors. In 2021 alone, production capability fell by 11 million vehicles – a loss of over USD 200 billion.[21] The circular economy and as-a-service business models can reduce these risks. Products should be understood as resource stores whose materials can be reused at the end of a product life cycle, reducing dependence on the primary raw materials market. Whether the manufacturing company or its value chain partners take advantage of these opportunities must be considered on a case-by-case basis for each product. The circular economy and transparency about products and their life cycles also help businesses increase their resilience to external shocks. Increasing resource efficiency, which means both extending product use and eliminating waste in the value chain and production, also offers potential for cost savings. Waste and resource efficiency initiatives show major cost savings – including scaling effects for industrial companies.[22] Establishing zero impact products also helps to predict and adhere to future regulations, or in other words: Regulatory requirements are anticipated and do not pose any further challenges for zero impact products. Penalties for non-compliance with fleet emissions limits, for instance, can therefore be avoided. The EU Green Deal, the EU Taxonomy, the CSR Directive and many other political initiatives demonstrate the growing regulatory pressure on businesses. Research and development in business is changing for the purposes of developing zero impact products, with new optimization parameters, skills requirements or simply the use of renewable raw materials, for instance. However, it is also clear that producing truly zero impact products requires further technological innovations, and that R&D therefore holds immense potential for innovation. The Business Commission for Sustainable Development estimates that innovations to achieve the Sustainable Development Goals by 2030 generate an addition USD 12 billion of market potential each year.[23] In addition to the more indirect business case effects, however, there are also direct opportunities to monetize the approach. The "Sustainable Market Share Index" (2021) shows that in the last six years, the annual growth rate for sustainable products has risen by an average of 7.3 %, in comparison

[18] GreenTech: Made in Germany, MHP (2022)
[19] Larry Fink's Annual 2022 Letter to CEOs | BlackRock
[20] Wayne Visser (2021), Thriving: The breakthrough movement to regenerate nature, society and the economy
[21] https://mitsloan.mit.edu/ideas-made-to-matter/how-auto-companies-are-adapting-to-global-chip-shortage
[22] Wayne Visser (2021), Thriving: The breakthrough movement to regenerate nature, society and the economy
[23] https://www.unep.org/news-and-stories/story/better-business-better-world

10 R's – The Business Case for Zero Impact Products

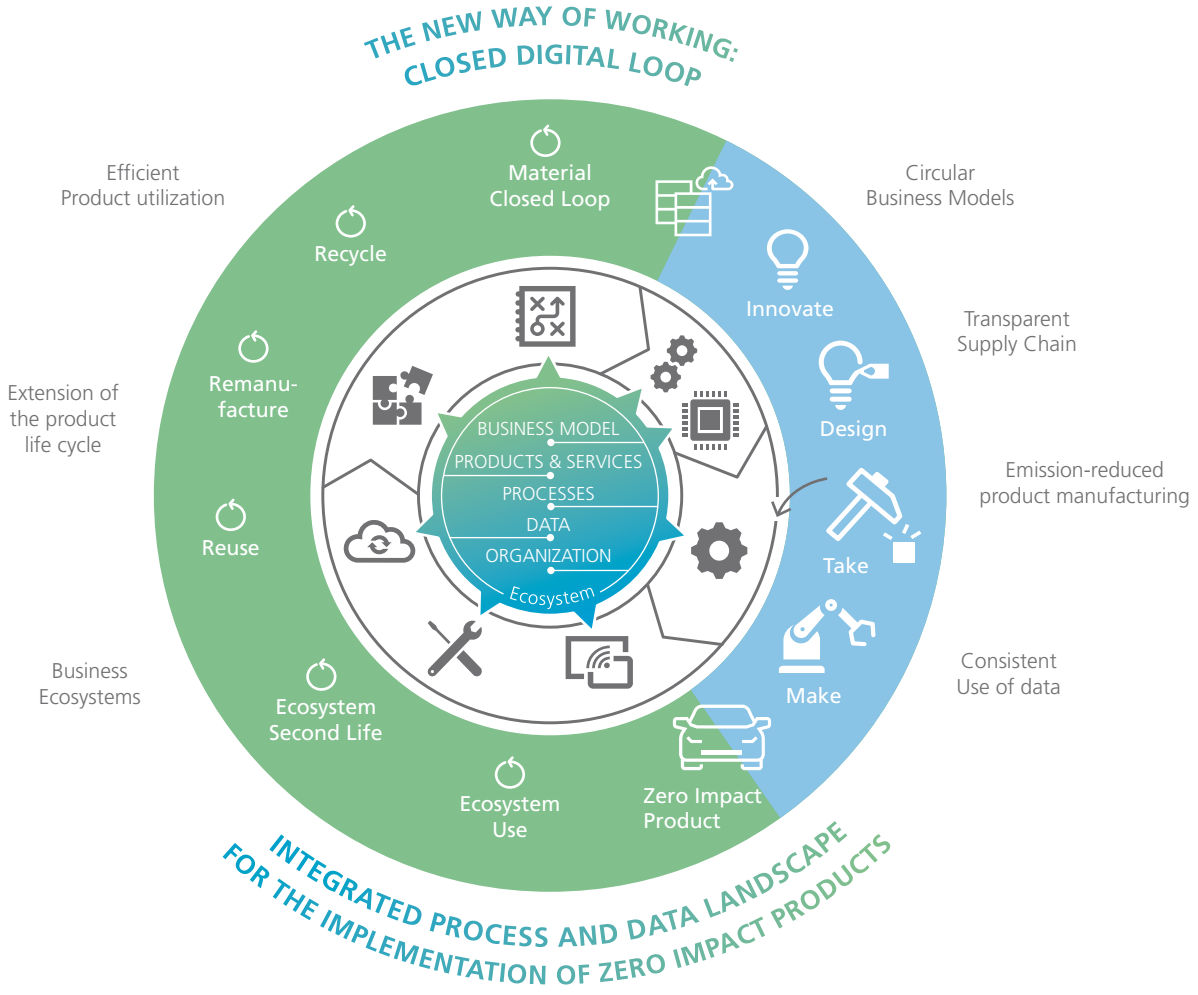
to an increase of 2.8 % for conventional comparison products.[24] Customers are willing to pay higher prices for sustainable products and to internalize costs which are now externalized via transparency. Sales figures for sustainable industrial products are rising 50 % faster than for conventional products.[25] New revenue streams also enhance existing business models and turn them into business ecosystems where the focus is on increasing product lifetime values and cooperating with partners in value creation. The first steps for businesses in this regard involve adapting product ranges to sustainability and reallocating capital flows within the company. The implementation of these measures has a direct positive impact on the company's ESG score. The financial return consists of easier and more convenient access to the capital market, thus securing the company's positive financial performance for the long term. Other soft factors such as reputation, recruiting and retention are also worth considering. Zero impact products can enhance a company's reputation and boost the brand's value, contributing to its "license to operate". This is beneficial to outward perceptions of a company – for customers, but also for staff. In the war of talents, sustainability – particularly in products – constitutes a key advantage. Climate change and its impact are the biggest future concern for more than a third of Millennials and Gen Z.[26] Creating zero impact products can win over future employees and constitute a major boost for employee motivation, productivity, loyalty and overall satisfaction. The transformation to zero impact products can therefore change the entire company's purpose and redefine its reason for being. This offers the opportunity to ensure long-term loyalty to the company on the part of all internal and external groups of stakeholders. It is clear that future-proofed companies must raise their ambitions in terms of sustainability and that zero impact products offer major commercial, environmental, social and sustainability potential for businesses. Once again, Larry Fink sums it up: **"Every company and every industry will be transformed by the transition to a net zero world. The question is, will you lead, or will you be led?"**[28]

[24] https://www.stern.nyu.edu/experience-stern/about/departments-centers-initiatives/centers-of-research/center-sustainable-business/research/csb-sustainable-market-share-index
[25] https://www.mckinsey.com/business-functions/sustainability/our-insights/playing-offense-to-create-value-in-the-net-zero-transition
[26] https://www2.deloitte.com/de/de/pages/presse/contents/deloitte-millennial-survey-2022.html
[28] Larry Fink's Annual 2022 Letter to CEOs | BlackRock

MHP Sustainable Operating Model: Our approach to the achievement of Zero Impact Products

The implementation of Zero Impact Products and the transformation towards corporate sustainability require a holistic approach, which considers the different phases of product life cycles and eliminates the individual negative environmental impacts in each phase of the product life cycle. The basis of the MHP Sustainable Operating Model approach is the continuous availability of relevant environmental data over the entire product life cycle and, thus, the data-based decision-making basis for the reduction and elimination of negative environmental impacts, considering relevant economic company key figures. Products are understood as part of one or more ecosystems, whose interactions are optimized within the business system.

The MHP Sustainable Operating Model focuses on a targeted implementation of Zero Impact Products and a holistic as well as profitable transformation towards sustainability of companies.



Looking ahead

Zero-impact products are the future. Companies must begin transforming their product ranges now. The direct and indirect potential for business is evident. The key to success is considering every aspect of the product life cycle and eliminating negative environmental effects of products and processes through a variety of approaches. Digitization and data use are crucial. In every dimension of the product life cycle, MHP has the necessary in-depth industrial expertise to help our customers develop and establish zero impact products and to sustain them in the long term. Together, we can create an all-round future-proof transformation of your product range. **Let's do it together!**

Contact

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Functioning as a technology and business partner, MHP digitalizes its customers' processes and products, and guides them through IT transformations along their entire value-creation chain. MHP is a digitalization pioneer for the mobility and manufacturing sectors with expertise that can be transferred to a wide range of industries. MHP is also a premium partner to thought leaders on the path to a better tomorrow.

MHP serves over 300 customers worldwide, including large corporations and innovative SMEs. MHP advises on both operational and strategic issues, offering proven IT and technology expertise as well as specific industry know-how. MHP operates internationally as OneTeam with headquarters in Germany and subsidiaries in the USA, UK, Romania, and China.

MHP has been shaping the future alongside its customers for 25 years. The MHP team of over 3,000 employees is united by the company's promise of excellence and sustainable success. This promise continues to drive MHP – today, tomorrow, and in the future.

ENABLING YOU TO SHAPE A BETTER TOMORROW

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