



# Sustainable Supply Chain Transformation

How to master the green transition of industrial supply chains





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# Executive Summary

Sustainability challenges are the most disruptive forces that businesses face, but they also harbor opportunity. Forward-thinking chief supply-chain executives recognize the key role that supply chains will play in the transition to a clean and socially just economy. This paper presents Industry-leading approaches to greener supply chains.

- Sustainable supply chains reduce greenhouse gases: Supply chains are the primary source of CO<sub>2</sub> emissions – their footprint is 11.4 times greater than direct company operations<sup>1</sup>. Making supply chains sustainable is a prerequisite to limiting global warming.
- ESG is the holistic way to tackle sustainability: Sustainable transformation only works if all three dimensions (environmental, social, governmental – ESG) are considered. Social factors are important to help less developed countries overcome the effects of high population growth, child labor, and dirty energy use. Governmental factors refer to fair management and corporate leadership that respects human rights, environmental aspects, etc. So the “SG” in ESG is not only a humanitarian issue; it facilitates the “E” factor.
- Digitalization multiplies decarbonization efforts and makes them affordable: In many ways, digital transformation provides the critical means to efficient ESG improvement. Digital supply chain ecosystems significantly facilitate joint R&D, procurement, manufacturing, delivery, and aftersales, while keeping transparent ESG documentation as well as high degree of automation and cost efficiency.

In the sections below, we will draw on real-world experience from a range of industries to outline what makes supply chains a critical action area for sustainability, what key challenges companies face on their journey to a greener supply chain, and how leading companies are successfully leveraging sustainability to differentiate themselves. To summarize, we have compiled a list of pragmatic sustainability actions that companies can leverage to initiate their transition to a green supply chain.

“Sustainable and resilient supply chains are the backbone of our future wealth.”

**Dr. Jürgen Sandau**  
German Lead Partner Supply Chain and Network Operations

<sup>1</sup> CDP (2023). Supply Chain Report 2022. [Scoping out: Tracking nature across the supply chain – CDP](#)

# The need for sustainable supply chain transformation

## Supply chains start to feel the pressure to transform in accordance with ESG

Supply chains are all-important for sustainability: more than 70% of the carbon footprint of many businesses relates to scope 3 emissions<sup>2</sup>. Supply chains are thus the single most important field of action for a company to become sustainable. Implementing sustainability requires transparency as of the very first step of the product value chain – from cradle to grave – to actually have a holistic view on lifecycle emissions and resource usage.

A current example involving the electrification of mobility that illustrates the importance of taking the product usage period and scope 3 emissions into account, is the comparison of Electric Vehicles (EVs) with traditional internal-combustion engine vehicles (ICEs). If we leave out scope 3 emissions and compare electric vehicles with traditional petrol cars, ICEs may seem more environmentally friendly, since the battery makes EV production very emission-intensive, and the immense ICE emissions during vehicle usage are left out of the calculation.

In reality however, ICE emissions during usage time are more than three times higher than the emissions of a battery electric vehicle, resulting in double the total GHG lifecycle emissions<sup>3</sup>.

Moreover, moving towards circular economy approaches – sourcing secondary materials, extending product lifetimes through new business models like reuse or repurpose, and recovering materials through recycling, etc. – reduce lifecycle emissions and emphasize the significance of viewing and transforming supply chains end to end.

The time to act for a sustainable supply chain is now. As regulatory pressure increases, businesses are gearing up to reap the benefits of greening out their supply chain operations.

This involves appealing to young talents and green investors, creating business opportunities and resilience, both in public tenders and as part of ESG-oriented value chains, and identifying savings opportunities in raw material and energy costs. For decades, sustainability was somewhat unpopular and championed only by a minority. This has changed and the sooner companies figure out how to transition to a green supply chain, the faster they can win in the marketplace.

<sup>2</sup> Greenhouse Gas Protocol (2019). You, too, can master value chain emissions. [You, too, can master value chain emissions | GHG Protocol](#)

<sup>3</sup> IEA (2022). Comparative life-cycle greenhouse gas emissions of a mid-size BEV and ICE vehicle. [Comparative life-cycle greenhouse gas emissions of a mid-size BEV and ICE vehicle – Charts – Data & Statistics – IEA](#)

# New sustainability regulations increase the pressure to act

Regulatory pressure to foster sustainability in corporate supply chains is rising as Governments implement ESG legislation.

The January 2023 adopted German “Lieferkettengesetz” (LkSG, Supply Chain Act SCDDA) is a first step toward stronger supply chain due diligence policy, and will be followed by EU legislation (CSDDD) which sets out obligations that go beyond the German Supply Chain Act, presumably binding in 2025 for national law but subject to change.

In addition to national supply-chain regulation, protection of human rights and the environment is also the subject

of various legislative initiatives at the European Union level. In February 2022, the European Commission published its proposal for a directive on corporate sustainability due diligence (CSDDD), which is expected to be approved by end of 2023 and sets out due diligence obligations that go beyond the German Supply Chain Act. Moreover, the European corporate sustainability reporting directive (CSRD) has been put into force this year, requiring companies to integrate a third-party-assured sustainability report into their yearly report that includes the disclosure of 2024 fiscal year data.

Many companies are already preparing

for the implementation of these new requirements and setting up cross-functional teams consisting of Sustainability, Compliance, Risk Management, Legal, Procurement, Supply Chain Management, HR, Communication, Finance, and Work Council.

**Fig. 1 – Corporate Sustainability Due Diligence Directive & Corporate Sustainability Reporting Directive**

The European CSRD and CSDDD are expected to be in force by end of 2023 and 2024 and will put even more pressure on companies

Corporate Sustainability Due Diligence Directive (CSDDD)	Corporate Sustainability Reporting Directive (CSRD)
<p><b>Affected</b></p> <ul style="list-style-type: none"> <li>• Expected to be in force end of 2023, implementation into national law by 2025</li> <li>• From 2025: Companies &gt; 250 employees &amp; turnover of &gt; €40m or parent companies of a group with &gt;500 employees &amp; &gt; €150m turnover</li> <li>• Companies located in the EU or with significant operations in the EU (turnover of &gt; €40m In EU)</li> </ul>	<p><b>Affected</b></p> <ul style="list-style-type: none"> <li>• In force since 2023, delegated acts expected in 2024, FY 2024 will have to be disclosed in 2025</li> <li>• From 2025: Companies fulfilling two of three criteria: total assets &gt; €20m, turnover of &gt; €40M and &gt; 250 employees</li> <li>• From 2027: listed SMEs</li> <li>• From 2029: Companies with non-EU parent companies with group turnover in the EU of &gt; €150m for 2 consecutive years</li> <li>• Companies located or listed in EU state or with significant operations in the EU</li> </ul>
<p><b>Scope and Implementation</b></p> <ul style="list-style-type: none"> <li>• Focus on compliance with social standards and environmental impacts in the entire value chain</li> <li>• Own business units, direct suppliers and indirect suppliers</li> <li>• Companies are obliged to:               <ul style="list-style-type: none"> <li>– integrate due diligence into policies;</li> <li>– identify actual or potential adverse human rights and environmental impacts; prevent, terminate or minimize actual/potential risks;</li> <li>– provide remedial actions;</li> <li>– monitor the effectiveness of the due diligence policy and measures;</li> <li>– publicly communicate on due diligence</li> </ul> </li> </ul>	<p><b>Scope and Implementation</b></p> <ul style="list-style-type: none"> <li>• Double materiality concept: Focus on impacts &amp; financial aspects</li> <li>• Branch-specific reporting standards and Sustainability Reporting Standards (ESRS)</li> <li>• Disclosures regarding strategy and policies, targets, resource in- and outflows, and risks and opportunities in environmental and social categories – ranging from pollution, biodiversity, and circular economy impact to influence on the workforce, affected communities and consumers.</li> </ul>

# The benefits of sustainable supply chain transformation

## Sustainable supply chains are a huge business opportunity

More than 60% of global executives state that climate change will have an immense impact on their company strategy and

operations over the next three years. And at 84%, the great majority believe that economic growth and climate goals can go hand-in-hand.<sup>4</sup> There are many good reasons for this:



### Financial performance

Index research shows that the equity of highly socially responsible companies consistently outperforms those with markedly less social responsibility. Companies with a proven track record of sustainability are priced into the market at a higher corporate value because they can generate higher earnings in the future and survive underlying pressures. High-purpose companies can double their market value four times faster<sup>5</sup>. That performance has become a major reason to invest sustainably.



### Access to green capital

Sustainable investment is also being used to manage risk in uncertain times. Major investment firms see sustainable investment as the future, and fund companies are launching sustainable funds at a record pace. Inflow to European sustainable funds increased by almost 500 percent between 2017 and 2020<sup>6</sup>. The EU taxonomy for sustainable business activity is adding to that pressure.



### Business model innovation

Sustainable innovation can not only make a difference, but help build new business lines and unlock new revenue pools by implementing circular business models and services like repair, refurbishment, resale, and reuse. Some leading companies are already taking ad hoc steps toward transforming their business models for improved performance, better environmental and societal sustainability, and sustainable advantage. They are creating and reimagining a new and improved plan for turning a profit while protecting people and the environment. 29% of CxOs reported that sustainability is driving revenue from new business<sup>7</sup>, and 53% reported new revenue streams from socially conscious offerings<sup>8</sup>.



### Higher efficiency

Becoming sustainable will cost money, so remaining sustainable ought to save companies a lot in the long run. Sustainable means doing more with less (improving energy and resource efficiency). Advantage points are lower cost due to carbon reduction (offsetting one ton of CO<sub>2</sub> will be 600% more expensive in 2030<sup>9</sup>), the sourcing of secondary materials, and optimized packaging costs. A Deloitte report confirms that 64% of companies with product sustainability programs have reduced logistics and supply chain costs<sup>10</sup>.

<sup>4</sup>Deloitte (2023). CxO Sustainability Survey 2023. [Deloitte CxO Sustainability Survey 2023 | Deloitte Deutschland](#)

<sup>5</sup>Monitor Deloitte (2021). The purpose premium: Why a purpose-driven strategy is good for business. [Driving business value with purpose strategy | Deloitte US](#)

<sup>6</sup>Morningstar (2021). Sustainable Funds' Record-Breaking Year. [Sustainable Funds' Record-Breaking Year | Morningstar](#)

<sup>7</sup>Deloitte (2023). CxO Sustainability Survey 2023. [CxO Sustainability Survey 2023](#)

<sup>8</sup>Deloitte Insights (2019). Success personified in the Fourth Industrial Revolution. [Success personified in the Fourth Industrial Revolution | Deloitte Insights](#)

<sup>9</sup>GreenBiz (2021). Carbon offset prices set to increase tenfold by 2030. [Carbon offset prices set to increase tenfold by 2030 | Greenbiz](#)

<sup>10</sup>Monitor Deloitte (2021). The purpose premium: Why a purpose-driven strategy is good for business. [Driving business value with purpose strategy | Deloitte US](#)





### Less risk, higher resilience

Sustainability also means mitigating social and environmental risks, as well as complying with current and future regulations like recycling rates and EPR regulations (EU Packaging Directive) to avoid penalties. Besides regulatory risk, it also reduces supply-chain pressure by increasing resilience to future resource scarcity via circular approaches and keeping materials in the loop. Around 50% of CxOs report that resource scarcity is already impacting company performance<sup>11</sup>. Extending usage lifetimes and avoiding new mining through recycling decreases resource scarcity in the long term.



### Customer loyalty

After quality, sustainability is the second most important driver of customer loyalty<sup>12</sup>. According to a recent study, 84% of consumers stated that their brand loyalty is motivated by knowing that they share the same sustainable values. The two most cited company values that would discourage loyalty are supply-chain partnerships with factories that mistreat employees and affiliation with a big polluter<sup>13</sup>. Deloitte market research suggests that 60% of Millennials and Gen Z would pay more for sustainable offers<sup>14</sup>.



### Employee attraction and retention

The younger they are, the more important employer sustainability is to employees. Seventy-eight percent stated that they would prefer to work for a purpose-driven company, while two-thirds of Millennials would even accept a pay cut at an environmentally responsible company<sup>15</sup>.

“We are witnessing in real time the effects climate change has on our society – the time to act is now. Leaders who understand the cost of inaction and embed sustainability into their strategy and operations to seek to meaningfully transform their organizations meet the moment and reap the benefits for their bottom lines, stakeholder satisfaction, and broader performance.”

**Jennifer Steinmann**  
Global Sustainability & Climate Practice Leader Deloitte

<sup>11</sup> Deloitte (2023). CxO Sustainability Survey 2023. [Deloitte CxO Sustainability Survey 2023 | Deloitte Deutschland](#)

<sup>12</sup> CGS (2020). Retail and Fashion Sustainability Survey. [Survey Reveals Fashion and Apparel Sustainability Shopping Preferences | CGS \(cgsinc.com\)](#)

<sup>13</sup> Yotpo (2022). The State of Brand Loyalty 2022. [The State of Brand Loyalty 2022: Brand Values | Yotpo](#)

<sup>14</sup> Deloitte Global (2023). 2023 Gen Z and Millennial Survey. [The Deloitte Global 2023 Gen Z and Millennial Survey](#)

<sup>15</sup> Monitor Deloitte (2021). The purpose premium: Why a purpose-driven strategy is good for business. [Driving business value with purpose strategy | Deloitte US](#)



# Hurdles to sustainable supply chain transformation

## Between greenwashing and hard realities

Under pressure to adopt both ESG and to harvest huge ESG opportunities – where exactly do companies stand today, and what keeps them from becoming truly sustainable? So far, many companies transitioning from shareholder value to stakeholder value have tended to focus on customers rather than considering the impact of corporate actions on external constituents. Yet too many companies are dealing with sustainability by pursuing haphazard, high visibility initiatives instead of formulating and implementing a holistic, full-scale sustainability strategy that spans the entire supply chain. We summarize some of the most common challenges below.

## Legacy investment causes delays

Legacy investment into obsolete technologies or fossil fuel-based assets reinforces unsustainable behavioral patterns and practices while waiting for amortization before switching to more sustainable solutions. This is an economic reality which cannot be resolved in the short-term, yet it is crucial to evaluate future investment for sustainability to avoid entrenching old ways of doing things.

## Geopolitical realities interfere with ESG plans

External events can slow down or halt the transition to sustainability. In the light of supply chain disruptions, long-term planning is challenging and ESG initiatives run dry, losing their momentum and focus. It may sometimes be necessary to restart strategies that have slowed to a crawl.

## Insufficient end-of-life industry structures

Recycling and other end-of-life practices like refurbishing or repurposing are not yet mainstream for all products. Industry structures for the take-back management of products and end-of-life services are not fully established, challenging simple implementation of circular programs. This can only be solved by building up the structures and end-of-life network through cooperation that enables scaling effects.

## High upfront investment in recycling

The scaling of recycling infrastructure and technology is linked to upfront investment. The recovery of secondary material in large amounts cannot be viewed as a short-term outcome, but as a long-term target for many raw materials so that recycling scales up first.

“Today’s reality is that sustainability, economic competitiveness, affordability, and national security dovetail as never before. This makes the green transformation of our supply chain extremely complex and there are important choices to be made, some of which entail trade-offs between climate mitigation and climate adaptation, rebuilding versus relocating, and investing in new infrastructure versus adapting existing ones.”

**Tomas Henninger**  
Partner, Sustainable Supply Chain, Circular Economy, Deloitte

# Three leading themes for sustainable supply chain transformation

## ESG broken down

Because ESG is so sprawling and complex, especially along the value chain, each company should define its very individual ESG strategy by prioritizing areas where they want to introduce ESG. We have defined three universal themes that companies must hash out in order to define and implement sustainable supply-chain programs.

## Human rights and working conditions

Employment standards are closely linked to brand reputation and customer/investor satisfaction, and are thus important to value creation in the long term. The instrument to control employment standards is often called “human rights due diligence.” While the name is a bit ponderous, it is a crucial means of managing risk in company supply chains. But ensuring ethical labor practices in extended supply chains is often difficult because complex supply chains harbor many potential risks that are impossible to address all at once. Priorities must be set to first address the risks with the most adverse impact. In most cases it is not necessary to change non-conforming suppliers. Subpar ethical standards can instead be remedied using a process that is accompanied and monitored.

## Decarbonization

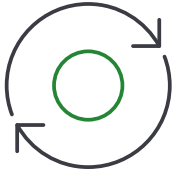
CO<sub>2</sub> and other GHG emissions originate along the entire value chain - from mining and harvesting, via processing and assembly, to distribution and service. There are two ways to mitigate the greenhouse effect: GHG reduction and avoidance programs (energy saving and/or alternative energies), and CO<sub>2</sub> compensation methods, ranging from tree planting to technical carbon storage. In most cases, a combination of both is best. GHG reduction often pays in the mid-term, as energy costs tend to rise faster than other cost categories.

## Circular economy

The concept of circular economy seeks to minimize the use of energy and raw materials – especially of rare and energy-intensive materials – along the value chain. Another goal is to reduce waste. This is done by closing material loops and improving the longevity of products via repairability and recyclability, as well as by redesigning core value-chain processes such as design and manufacturing. Sharing and reuse are also promising concepts. Switching to a circular supply chain can significantly reduce company waste disposal and energy bills. It is also possible to lower raw material costs by replacing scarce or difficult materials with materials that are easier to get, process, and recycle. Circular supply chains also facilitate compliance with new regulations and laws, like the EU Packaging Directive.

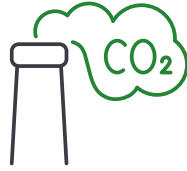
## Fig. 2 – The Spheres of Sustainable supply chains

To help companies meet their sustainability and financial objectives, we identified the following areas of action that ensure holistic and meaningful impact.



### Circular Economy

- The Circular Economy represents an alternative and holistically sustainable economic system
- The model focuses on minimization of resources, waste, pollution, emissions and energy loss
- While transitioning towards a circular supply chain, new business models can be developed to boost revenue and enable resilient as well as compliant operations



### Decarbonization

- Companies must reduce and or, even better yet, avoid upstream and downstream emissions
- Supply chains play a central role, as they connect players on a global level and thus carry the responsibility for minimizing the carbon footprint (CCF/PCF) and related costs
- A large variety of abatement levers can be taken, ranging from the use of alternative powertrains to shifting to fully carbon-neutral operating models



### Human Rights & Working Conditions

- Companies must prevent or mitigate adverse human rights impacts that are linked to their business
- Integration of human rights into business practices ensures brand reputation, compliance, customer/investor satisfaction and thus long-term value creation

The selected topics are addressed along the entire value chain to ensure maximum business benefit and social impact

“Successful sustainable supply chain transformation is not about pursuing haphazard, high visibility initiatives. It requires a holistic, full-scale supply-chain-sustainability strategy that not only addresses your company’s carbon footprint, but its transition towards closed value loops and elevating personal wellbeing.”

**Oliver Bendig**

Partner Supply Chain and Network Operations, Lead After Sales and Industrial Manufacturing EMEA, Deloitte

# Fields of action for successful supply chain transformation

## Functional sustainability levers and how industry leaders put them into action

Sustainability is a multi-faceted task spanning the length of the value chain – from product development, procurement, production, logistics and distribution, to after-sales service and end-of life operations such as return, reuse, and recycling. Each function must contribute to the three

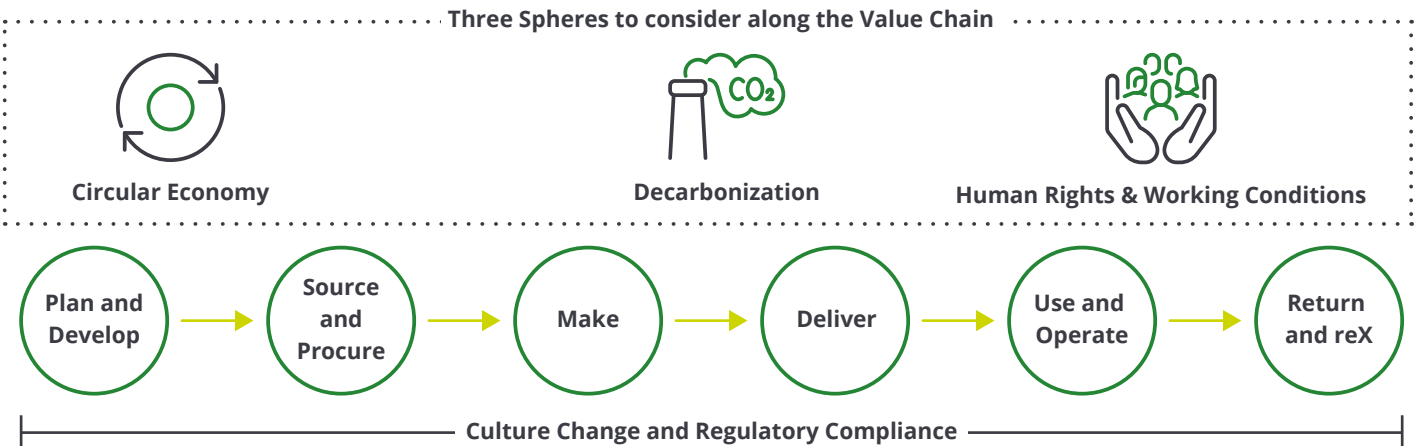
sustainable supply chain transformation themes – not as a standalone endeavor, but following an orchestrated approach characterized by close cross-functional alignment in pursuit of an overarching sustainable supply-chain transformation north star derived from corporate strategy. Functional efforts must then be underpinned by truly horizontal activities and considerations that include a green cultural mindset

shift and transparent efforts to ensure, track, and report regulatory compliance (in particular with the SCDDA<sup>16</sup>).

Below we outline selected functional levers to drive progress within the three sustainable supply chain themes and showcase how companies are putting them into action.

**Fig. 3 – Opportunities in Sustainable Value along the Supply Chain**

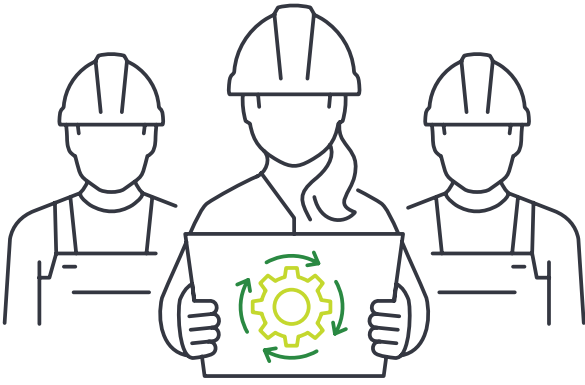
Sustainability should not be pursued as a standalone initiative that is disconnected from value generation, – but rather incorporated across the organization’s broader value chain



### Selected function value levers

- |  |   |  |  |  |  |
|--|---|--|--|--|--|
| <ul style="list-style-type: none"> <li>• Reduced material requirements</li> <li>• Less material waste from production</li> <li>• New product modularity opportunities</li> </ul> | <ul style="list-style-type: none"> <li>• Increased ROI from reusable materials</li> <li>• Protect /grow supply base</li> <li>• Reduce waste management costs</li> </ul> | <ul style="list-style-type: none"> <li>• Reduced carbon emissions</li> <li>• Reduced energy consumption</li> <li>• Minimized production waste</li> </ul> | <ul style="list-style-type: none"> <li>• Reduced carbon emissions</li> <li>• Increased delivery efficiency</li> <li>• Reduced shipping distance</li> </ul> | <ul style="list-style-type: none"> <li>• Green Service fulfilment</li> <li>• New aftersales service revenue streams</li> <li>• Improved resource efficiency</li> </ul> | <ul style="list-style-type: none"> <li>• Revenue streams from remanufacture</li> <li>• Value for recyclable material sale</li> <li>• Reduced raw material consumption</li> </ul> |
|--|---|--|--|--|--|





## Plan and develop | Rethinking products

The rapid evolution of consumers in embracing a sustainable lifestyle represents one of the biggest business opportunities of our times. It is here where, as several organizations have put it, “sustainable is the next digital.” Indeed, entire industries are profoundly changing – even revolutionized – by sustainability, and at an accelerating pace. Think of vegan products. Electric cars. Wind turbines. And this is only the tip of the iceberg.

Many smaller companies have also adopted sustainability as their differentiation factor, many thriving in up-market niches with high profitability and growth. Think of organic shampoos and beauty products. Fair fashion. Sustainable building. Sustainable thinking will soon drive revolutions in practically all industries. Laboratory food, for example, might soon replace a large part of agriculture.

Practically all existing products can and should be continuously optimized according to sustainability aspects. This gives rise to questions: Can we do that with a less scarce/less harmful/more environmentally-friendly material? Should we really keep that glossy finish? Can we extend the service life of that product? Can the product be repaired and, if so, by how many people? Would a lend/lease model work better, ecologically and business-wise? Are our products recyclable, and how can we design our products to optimize recycling? How can we achieve a high recycling quota?



### Functional levers

**Human rights and working conditions:** implement a staff suggestions scheme

**Decarbonization:** reduce product energy consumption; reduce product weight to reduce emissions in production

**Circular economy:** reduce raw materials; design the product for longevity; design the product modularly for simpler and more efficient repair, refurbishing, repurposing, and recycling; explore Product-as-a-Service models; integrate product lifecycle management, from product concept to supply-chain tracking, by creating a digital twin that enables transparency and continuity of data (scope 1-3); develop a recycling scheme, offer take-back of old equipment



### Industry spotlight – Electronics equipment manufacturer Challenge

- Industry Situation: Smartphones contributed 11% of information- and communications-technology emissions in 2020. More than 1.2 billion smartphones were sold in 2022 with an average service life of 2.7 years – 75kg of resources used to produce each phone – creating a huge amount of electronic waste
- More efficient maintenance and adaptability of smartphones
- Increase of product service life and recycling rate

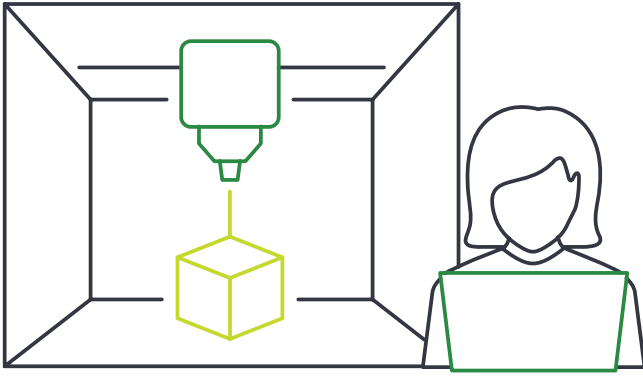
#### Solution

- No adhesion of spare parts and a modular design that allows easy repair, update, and recycling of mobile phones
- Detailed instructions empower end-users to carry out repairs themselves

#### Impact

- Reduction of repetitive consumption by increasing the service life of smartphones to 5.5 years
- Modular design allows for 50-60% recovery of quality materials that could directly be reused for smartphone production, compared to the EU standard of only 30% recovery of materials contained in a smartphone.





## Source and Procure | Resetting sourcing and procurement

For most companies, the supply chain is the main source of negative effects on their overall sustainability record. This is especially true for manufacturing companies with a diverse and global supply chain. One culprit here are traditional behaviors in the purchasing department: Many companies still select their suppliers with little regard for ESG criteria.

Economic aspects like price, quality, and ability to deliver must include aspects like supplier employment practices, pollution, energy consumption, and raw material origin. This implies increased transparency within the supplier network, including 2nd-tier suppliers and beyond.

Compliance, for instance with employment practices, must be secured without permanent on-site presence by making sustainability factors like human rights and emission levels measurable and assessable in the form of numbers, creating the basis for procurement decision-making.



### Functional levers

**Human rights and working conditions:** adapt the current procurement model to include supplier employment practices; create transparency and introduce a global minimum standard; i.e., observance of human rights and working conditions across the entire supply chain

**Decarbonization:** determine sustainability requirements for suppliers; define guiding principles and standardized measuring mechanisms for scope 2 and scope 3 emissions; assess current status for transparency; for scope 2 switch to zero-emission providers; for scope 3 switch from acquisition costs to lifecycle costs (LCC)

**Circular economy:** define role of procurement as coordinator of internal and external ecosystem to drive circular supply-chain transformation and manage the associated ecosystem; source secondary materials and refurbished components



### Spotlight – Multinational chemicals company Challenge

- Ambitious CO<sub>2</sub> reduction goals with clearly defined targets on a yearly basis
- Procurement function not sufficiently included and leveraged to reach annual scope 2 and 3 reduction targets
- Integration of GHG emission reduction into the category strategies

### Solution

- Analysis of current emissions tracking and reporting (definition of scope 2 and 3 measurement, monitoring, reporting)
- Definition and execution of improvement measures in line with category strategy: Supplier collaboration and roadmap to source external products that have been produced using renewable energy and recycled materials by applying lean management and waste reduction
- Waste management providers selected based on sustainability criteria
- Implementation of a governance framework to identify, define, execute, monitor, measure, and report procurement sustainability initiatives

### Impact

- Procurement established as a trailblazer for driving the sustainability agenda across the organization
- Procurement contributes more than 60% of the CO<sub>2</sub> savings required to reach the yearly reduction targets
- Procurement established a process for early involvement in investment projects/ plant construction to support sustainable facilities from the right suppliers



## Make | Green and lean manufacturing

Manufacturing has always striven to become more efficient, so conservation of energy and natural resources is nothing new to manufacturing companies. But the focus has been primarily on costs and outcomes, without factoring in conservation of scarce materials or other sustainability goals. With sustainability as part of company strategy, it becomes important to minimize overall energy use, to use renewable energy sources, to reduce production waste and reuse/recycle as much as possible, thereby lowering waste disposal costs.

Suppliers within sustainable ecosystems can boast sustainability chops that help gain new contracts and increased orders. Like energy savings, closed-loop recycling often combines higher sustainability with cost savings.



### Functional levers

**Human rights and working conditions:** optimize processes in production to increase workplace safety; ensure compliance with national employment laws and with supplier ecosystem standards; certify employment practices (ISO 54001)

**Decarbonization:** execute extended value stream analysis to build a baseline for the environmental footprint, then monitor and optimize (water/power consumption); introduce “Lean & Green Manufacturing” to reduce emissions/waste and optimize uptime (with renewable energies and predictive maintenance); utilize artificial intelligence to leverage machine learning and human intelligence

**Circular economy:** use production waste as fuel for further production processes that drive financial benefits and optimize recycling processes within manufacturing; reprocess production resources and materials (incl. operating and auxiliary materials); use more secondary materials



### Spotlight – Automotive OEM

#### Challenge

- Target net carbon-neutral operations at all sites by 2025
- Sustainable use of raw materials and resources
- Decreased emissions in material production
- Reduced energy consumption in energy-intensive aluminum production

#### Solution

- Closed-loop recycling of aluminum offcuts within four plants
- Aluminum is recycled into coils of the same quality for reuse in production

#### Impact

- More than 500,000t CO<sub>2</sub> savings from 2017 to 2021
- Emission reduction of around 40% in 2018
- Up to 95% less energy consumption from the reuse of secondary aluminum
- First automotive OEM certified by the Aluminum Stewardship Initiative (ASI)



## Deliver | Accelerating zero emission freight

Logistics is the physical link in the flow of commodities, products, and spare parts. It requires a lot of energy and storage space. To increase efficiency in both warehouse and transport, digital optimization and improved synchronized production and logistics planning are key. This not only increases efficiency but helps reduce energy usage and emissions. Warehouse setups are changing, and while digitalization helps track and reduce environmental impact, it is also crucial in order to keep count. Moreover, current logistics chains are often merely cost-optimized but unsustainable. And while there is no one-size-fits-all solution for more sustainable logistics, there are starting points: more attractive working conditions for drivers, electric drivetrains, regional supply chains, less overall parts, 3D printing, reusable packaging, to name just some.



### Functional levers

**Human rights and working conditions:** evaluate and deploy autonomous driving and driver-assist systems to enhance driver safety and wellbeing on road transports

**Decarbonization:** optimize logistics network with a focus on CO<sub>2</sub> reduction (route and fleet utilization optimization); synchronize production and logistics planning; evaluate and promote broad deployment of new powertrain technologies such as electric to bring down GHG emissions of logistics fleets; reduce product volume and transport weight through design

**Circular economy:** embed 4R (reduce, reuse, recycle, repair) into your distribution strategy and (predictive) reverse logistics to close material loops; implement highly integrated green packaging solutions



### Spotlight – Food/consumer goods company

#### Challenge

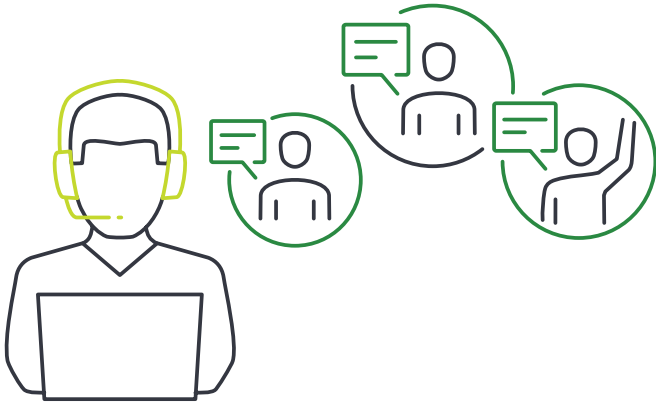
- Already existing in-house decarbonization roadmap for scope 1 and 2, however no holistic and long-term strategy for decarbonizing scope 3
- Transportation accounts for ~30% of total emissions at approx. 55,000 truckloads per year

#### Solution

- Creation of a transformational decarbonization roadmap for scope 3 emissions by 2030 based on customer 1.5°C science-based target
- Defined CO<sub>2</sub>-reduction measures: freight-forwarding contracts for conversion of fleets to green hydrogen, biogas and electricity; combined rail/truck transport; efficient driving; payload increase and use of double stacking; decentralized warehouses in metropolitan areas; use of e-forklifts

#### Impact

- Since 2020, climate neutrality in entire value chain through carbon offsetting
- Ambitious science-based 1.5°C target with reduction goal of 59% by 2030
- Forward-looking assessment of main reduction measures and classification for reduction potential and other factors (price development, availability)



## Use and operate | The overlooked green opportunity of industrial after-sales service

Among sustainability efforts such as designing more energy- and resource-efficient products, establishing sustainable sourcing programs, minimizing ESG exposure, and achieving carbon-free manufacturing, after-sales service is often overlooked. But a closer look at product lifecycles paints an entirely different picture. A whopping 65% of greenhouse gas emissions come from product use. That puts some of the key sustainability fields of action squarely in the service domain, where they have the potential to produce positive top- and bottom-line effects.



### Functional levers

**Human rights and working conditions:** leverage remote support technology (AR/VR) to avoid deployment of service workforce in dangerous environments and reduce strenuous travel; enrich technician jobs by changing their roles from pure maintenance and repair execution towards helping customers use less energy and produce less waste

**Decarbonization:** introduce AI-based dispatch planning to reduce travel and spare-parts transport; improve parts identification in the field for less waste and returns; replace vehicle fleets with EVs; establish equipment-as-a-service offers with energy-consumption target values

**Circular economy:** plan for end-of-life and deposit schemes to incentivize users to return equipment components at end of life; introduce circular leasing offers including decommission, remanufacture and recycle after service life; start predictive maintenance and equipment-as-a-service offers to ensure optimal product performance and increase product lifetimes; collect and analyze data on the flow of products and materials



### Spotlight – Packaging machinery manufacturer

#### Challenge

- Long distances between jobs lead to high share of non-productive worktime
- Rising fuel prices and vehicle expenses
- Increasing customer requirements for “zero downtime”
- Lack of skilled field technicians and rising personnel costs
- High retirement rate leading to loss of experience and knowledge among service workforce

#### Solution

- Introduced fast trouble-shooting solution via smart headsets and augmented-reality glasses to enable remote-service experts to see what the customer sees
- Created a secure connection with the customer machine to allow access to live and stored machine data, in many cases leading to an immediate solution to the issue
- Created a system that guides the customer through solution steps in real time by making use of technical data, drawings and visual indications projected onto the lenses of AR glasses

#### Impact

- Eliminated unnecessary travel emissions as many tasks can now be done remotely
- Time and cost savings through rapid problem-solving
- More effective deployment of field technicians with timely problem-solving and the ability to simultaneously serve different customers remotely, reducing attrition challenges
- Technicians enjoy greater job satisfaction thanks to better working conditions and customer satisfaction

# No-regret actions

## **Development of a strategy road map to achieve corporate goals**

To embark on a successful Sustainable supply chain transformation, companies should take a step back and look at their performance in all material environmental, social, and governance (ESG) areas along the key value chain functions. Then they should focus on the areas that matter most to stakeholders, and not just to investors, today and going forward, and where outperformance can most contribute to long-term business success. Prioritization is critical to helping companies avoid the common pitfall of siloed initiatives that ultimately have little impact.

## **Create transparency in the status quo**

There should be investment in data and transparency. Traceability across supply chains poses a particular challenge, making it all the more important for companies to deal with the sustainability data of their own products right from the start and to develop the corresponding analytical skills.

No function is left untouched when changes of this magnitude are needed: everyone is involved and responsible for bringing sustainability to life in their area—from purchasing and production and logistics to marketing and service. Implementation requires key actors in the individual divisions to contribute function-specific data points and sustainability metrics. Relevant information fields include:

Supply chain human rights and emissions: Evaluate supplier employment standards, carbon footprint, resource handling, and mining conditions

Own emissions: Track and evaluate emissions in production, administration, logistics, product usage, and end-of-life management (scope 1-3)

Products and lifecycle aspects: Evaluate product material usage (raw material sourcing and related risk) and product circularity, incl. its modular alignment for recycling and end-of-life handling; track product and material flow

## **Set the right target level**

After evaluating current status, determining your sustainability vision is the next crucial step. This should include a number of considerations: What are the regulatory expectations? Where are competitors raising the bar? What are the expectations of customers and other stakeholders, including investors? Focusing on the three overarching areas of human rights and working conditions, decarbonization, and circular economy, yields a wide variety of targets – from basic and easy to implement to far-reaching ambitions, integrated into the entire company and cooperation network. The targets and their achievement should be based on realistic assumptions and plans. Knowledge of the levers and technical possibilities for fulfilling a realistic ambition are particularly important (see Fig. 4).

**Fig. 4 – Ambitions along**

The three Spheres of Sustainable supply chains



**Plan the transformation and the right framework**

Once targets have been set, senior management should make the transformation a visible priority for everyone and plan it in detail. Measures must be developed and incorporated into an overall road map. Each company and product will show different needs for improvement; there is no one solution. However, there are typical needs that are more common than others. Some potential levers to consider for closing common sustainability gaps include:

**Social responsibility:**

- ESG supplier auditing
- Creating transparency on employment practices
- Introduction of global minimum employment standard

**Consumption:**

- Switching to renewable energy in production and administration

- Switching to suppliers with low carbon footprint
- Monitoring and optimizing energy/water consumption to avoid peaks
- Optimizing equipment efficiency and reprocessing production resources
- Implementation of green packaging strategy
- Electrifying logistics

**Materials:**

- Sourcing secondary materials and refurbished components
- Creating sourcing transparency (product passports)
- Reprocessing production waste
- Recycling at the end-of-life

**Products:**

- Designed for repair, recycling and longevity
- Increasing product utilization rate through new business models (sharing)
- Extending lifetime through new business

models and services like predictive maintenance, repair, refurbish, reuse

- Optimizing take-back planning and reverse logistics through predictive end-of-life management

Governance is also crucial to implementation. It is worth setting up a transformation office that regularly measures target achievement. This enables prompt adoption and reprioritization of countermeasures. Companies will need to adapt operations, product portfolio, and business models as the bar for sustainability inevitably rises. What qualifies as leading performance in carbon footprint or equitable business practices today, for example, will likely be table stakes tomorrow. Companies must embrace an “always-on” mentality toward innovating in sustainability.



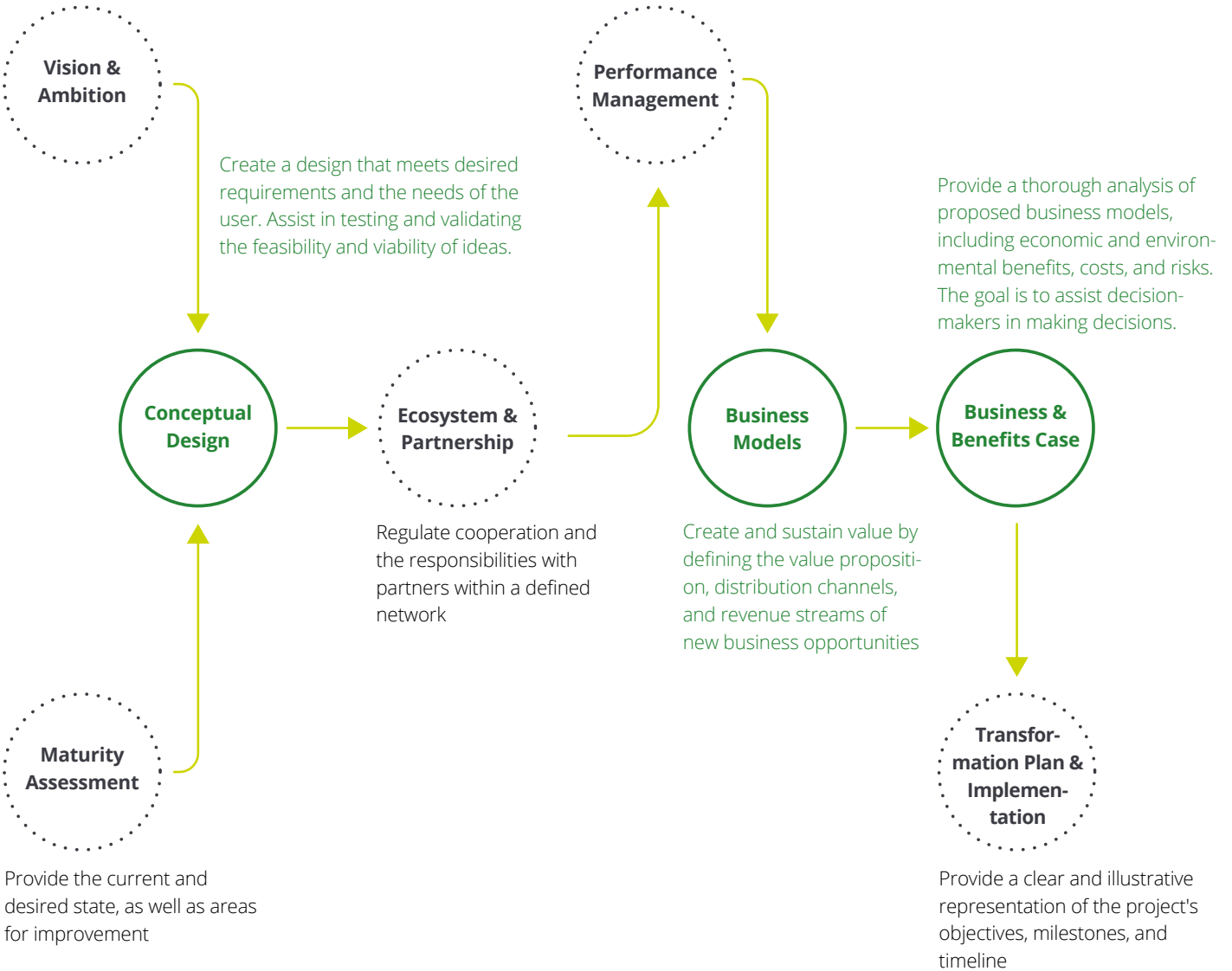


**Fig. 5 – Roadmap to Sustainability**

The right approach is critical for successful supply chain transformation

Provide direction, purpose and motivation to achieve a common goal

Set process-performance-recording KPIs in accordance with a global performance management standard



# How Deloitte can help

## Our consultants are happy to discuss your ESG plans with you

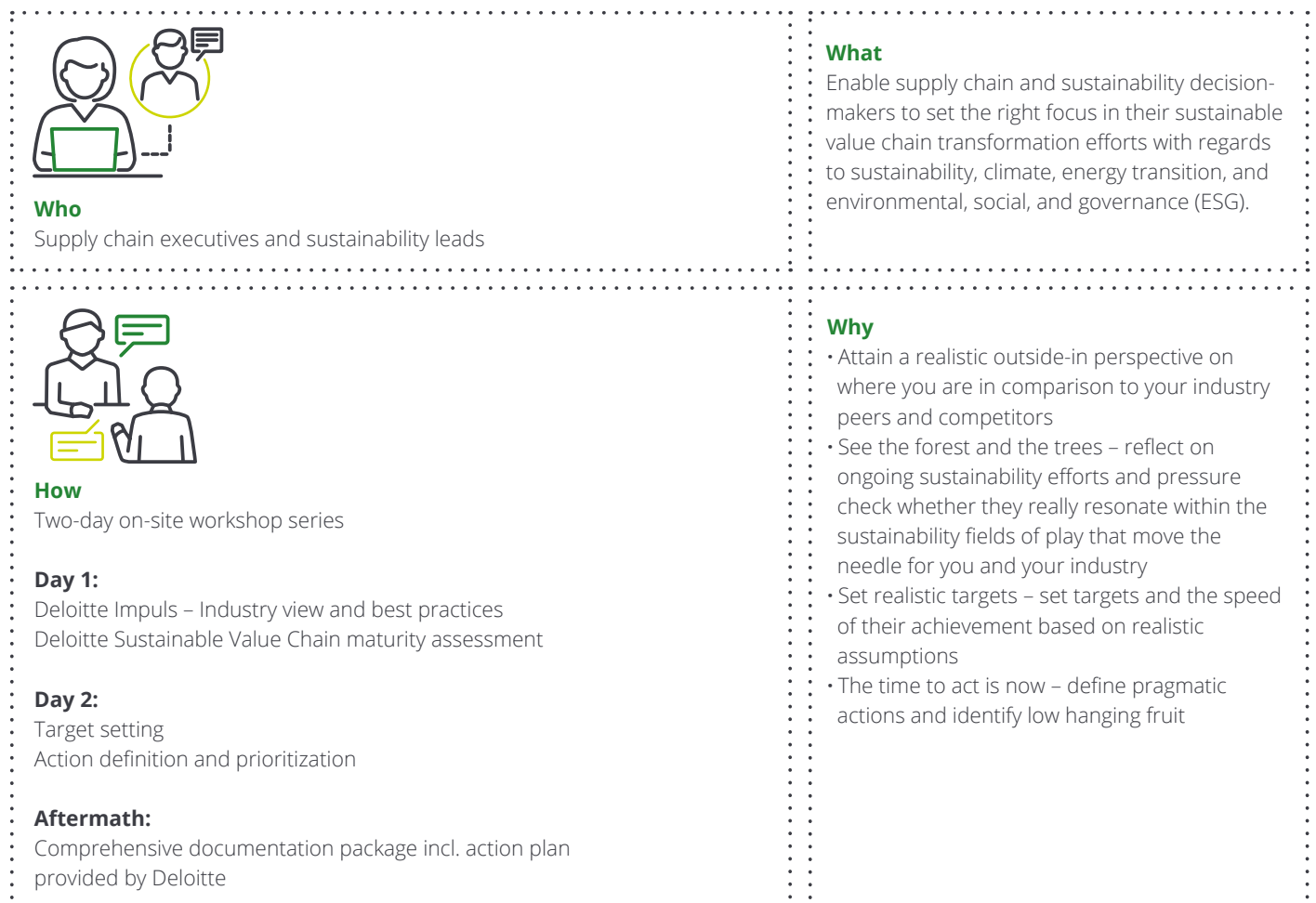
As illustrated, the move to sustainability can lead to very practical, strategy-driven activities with clear outcomes along the entire supply chain, and within all three of the leading themes. Deloitte has practical experience in design and implementation of successful ESG programs across a wide range of industries, and is determined to provide companies with the knowledge

and tools to turn sustainability into action. We have launched our Deloitte Sustainable supply chain Competency Lab with the goal of helping all industry sectors transform to green supply chains. We help our clients build tomorrow's green supply chain operations, retire and repurpose high carbon intensity assets, drive green transition of their installed base, and scale nature-based solutions.

In a pragmatic two-day workshop series, we help clients grasp their status quo and derive sustainable value-chain transformation measures that really move the needle.

### Fig. 6 – Deloitte Sustainable supply chain Competency Lab

Providing companies with the transparency and action plan to really move the needle in greening out their supply chains



Paying special attention to circular economy transformation, Deloitte's sustainable value-chain experts help clients identify the right strategy and action fields to guide you to a successful transition.

Our Deloitte **Circular Maturity Assessment** is the gateway to integrating circular practices.

The first step to not only sustainability but circularity is identifying possible points of action. By evaluating the circularity status quo with our Circular Maturity Assessment, Deloitte identifies areas for improvement and fields of action to help kick-start transformation. This assessment lays the foundation for devising a strategy and performing a feasibility study. Deloitte supports company circularity transformation from strategy to implementation.

Beyond circularity, Deloitte enables the transition towards net-zero decarbonization targets along the value chain. To reach decarbonization targets, the first step is tracking current emissions and identifying pollution causes.

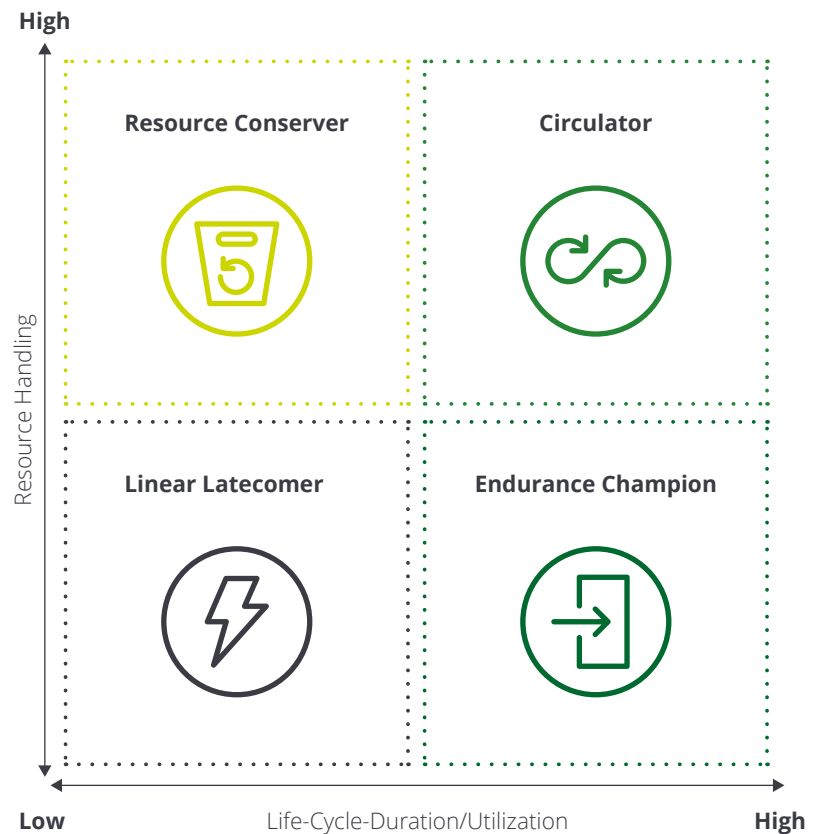
Deloitte steers over 90% of the inbound supply chain to premium Automotive OEMs. With this impressive figure also comes the responsibility to act in a sustainable manner.

Deloitte has developed a tool for CO<sub>2</sub> tracking of all transport that allows transparency and decision-makers' call to action. The tool is already helping with the transition to more sustainable modes of transport such as rail.

Enabling the transformation towards net-zero logistics.

### Fig. 7 – Our Circular Economy Matrix shows where our clients are on their journey towards circularity

Based on the matrix clients can classify themselves and derive next steps



This article provides an initial system view on value-chain functions and their potential contribution to overarching company sustainability efforts. In a series on Supply Chain Sustainability, Deloitte will explore sustainability in each of the described functions, and elaborate on the challenges and opportunities by providing first-hand industry insights and best practices. Subscribe to our sustainability newsletter to stay up to date on our upcoming publications.

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