

Climate Action Pays Off in Transportation and Logistics

July 2020

By Camille Egloff, Patrick Herhold, Mikkel Krogsgaard, Cornelius Pieper, and Jannek Italiano

Boston Consulting Group partners with leaders in business and society to tackle their most important challenges and capture their greatest opportunities. BCG was the pioneer in business strategy when it was founded in 1963. Today, we help clients with total transformation—inspiring complex change, enabling organizations to grow, building competitive advantage, and driving bottom-line impact.

To succeed, organizations must blend digital and human capabilities. Our diverse, global teams bring deep industry and functional expertise and a range of perspectives to spark change. BCG delivers solutions through leading-edge management consulting along with technology and design, corporate and digital ventures—and business purpose. We work in a uniquely collaborative model across the firm and throughout all levels of the client organization, generating results that allow our clients to thrive.

Climate Action Pays Off in Transportation and Logistics

Leaders of transportation and logistics (T&L) companies need to transition from defense to offense in their approach to climate action. Typically, T&L executives have viewed sustainability efforts as a compliance burden or a potential source of cost savings. In addition to considering these issues, they need to recognize that climate action offers them a broader opportunity to create tangible value by tapping into new markets and meeting new types of demand for low-carbon services. By taking the right approach, companies can increase their resilience to a known and imminent threat.

The imperative for T&L companies to embrace environmental sustainability is clear. Transportation activities (aviation, rail, shipping, heavy and light trucking) are responsible for approximately 17% of global greenhouse gas (GHG) emissions. Without the industry's participation, countries will not be able to meet their goals for limiting the global temperature increase over the remainder of this century. (See the sidebar “The Case for Climate Action.”) Rather than distracting from this effort, the COVID-19 crisis should be seen as creating [an opportunity and obligation to accelerate action](#). Indeed, climate change exploits many of the same vulnerabilities exposed by the pandemic—but even more severely and over a longer time frame.

Transitioning to playing offense in sustainability will not be easy for T&L companies. Fortunately, they can draw on best practices developed in other industries. Adoption of new fuel technologies will be essential to completing the journey to zero carbon emissions, as will partnering with governments to fund the efforts and reduce the risk. Companies that get it right will create financial value as well as help save the planet. In other words, we believe that “doing well by doing good” is indeed possible.

The Costs and Benefits of Climate Action in T&L

T&L companies have a significant role to play in changing the current trajectory of GHG emissions. Heavy-duty transportation (aviation, heavy road transport, and shipping) is among the harder-to-abate sectors. It accounts for roughly 95% of all freight emissions, exceeding 4 gigatons of carbon dioxide (Gt CO₂) in 2019. If nothing is done, emissions are likely to hit 7 Gt CO₂ by 2050.

To be sure, decarbonizing the T&L sector requires a significant financial investment. Abatement costs are especially high for heavy road freight, air freight, and shipping—they typically range from \$180 to \$230 per ton of CO₂, above and beyond the cost of fuel efficiency measures. But if T&L players act too late, the price tag will continue to grow over time. Given projected emissions, full decarbonization of heavy-duty transportation by 2030 would cost in excess of \$1 trillion, assuming the technology exists to make it happen. The outlay will increase by \$400 billion by 2050. Considering the long asset cycles in T&L, it is vital that players start taking action now. Indeed, the industry is



The Case for Climate Action

The world is approaching a tipping point, as actions taken to address climate change within the next 30 years will determine the outcome of the next 10,000 years. The carbon dioxide (CO₂) concentration in the world today is at the highest level in a million years, and despite ongoing actions from the public and private sectors, emissions have continued to rise over the past decade at a 1.5% annual growth rate. If this pattern continues, global temperatures are projected to increase by 3°C to 5°C by 2100. The COVID-19 crisis is expected to reduce global carbon emissions by 5% to 10% in 2020. Although this is the largest drop since World War II, it does not diminish the climate threat.

Scenarios indicate that GDP per capita will decrease by 30% by 2100 if global warming continues on the current trajectory. In contrast, if countries follow through on the

Paris Agreement by reducing the projected temperature increase to 2°C, GDP per capita will drop by 13% by 2100—a much more manageable burden.

To avoid the catastrophic consequences of climate change, governments and businesses must act decisively to limit global warming to 1.5°C to 2°C by 2100. This requires net human-caused CO₂ emissions to fall 45% by 2030 (versus 2010 levels) and ultimately reach net zero by 2050. Achieving a reduction of this magnitude will entail unprecedented changes in consumption and ways of doing business over the coming decades.

experiencing mounting pressure from customers, employees, regulators, and investors to act on emissions.

The imperative for climate action amplifies a perfect storm of challenges that already existed in the T&L sector, including stagnating revenue and declining profitability as well as ongoing disruption from digital technology and innovative business models. To ensure their long-term survival, T&L players should launch a transformation with climate action at the center.

Unfortunately, most companies are not taking action, and those that have started have not yet been ambitious enough. BCG research reveals that among 872 transport companies, 70% do not disclose, or only partially disclose, their emissions and only 23% have set emissions targets. Of those setting targets, less than half (9% of the total) have reduced CO₂ emissions versus last year. But the few goals that companies have established are too low: transportation companies are targeting, on average, a 30% emissions reduction by 2030, whereas the 1.5°C scenario requires a 50% drop across the industry by that year and a 100% decrease by 2050.

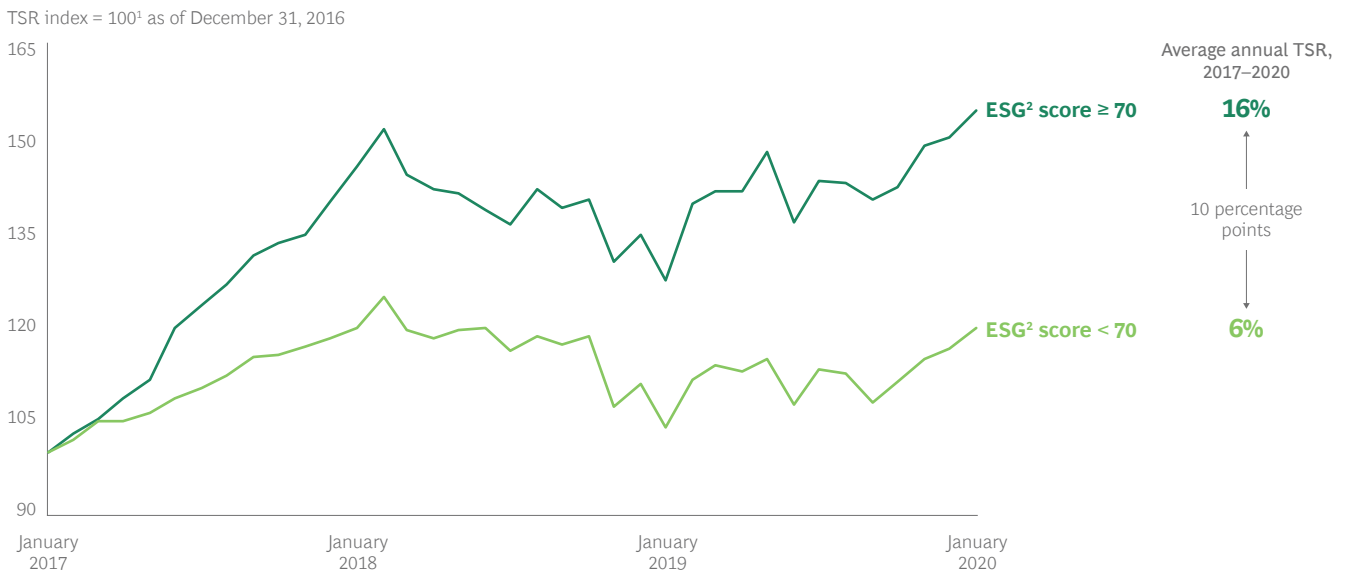
T&L companies that are pursuing tangible plans to reduce emissions have generated superior total shareholder return (TSR), according to our analysis. From 2017 to 2020, the average annual TSR of T&L companies that demonstrated a high commitment to environmental, social, and corporate

governance (ESG) standards was 10 percentage points higher than that of industry peers. (See Exhibit 1.) Although it is difficult to prove causality between ESG commitments and TSR, the correlation is striking.

From our experience, we have found that climate initiatives enable T&L companies to create significant TSR by promoting three important sustainability levers:

- Top-Line Growth.** A sustainable T&L company gains access to new markets and customer segments. Many T&L customers now ask for emissions data as part of their request for tenders. Customers' willingness to pay more for sustainable transportation and services has enabled companies with a proven reputation for providing climate-friendly transportation to charge premium prices. BCG research shows that 70% of end-consumers are willing to pay a 5% premium for green products, which eventually results in an increase in green offerings throughout the industry. In addition, sustainable companies' employees are more motivated and engaged in their work, enhancing their effectiveness.
- Bottom-Line Improvements.** By investing in more sustainable operations, companies can achieve significant cost reductions relating to resources (for example, fuel and utilities) and operations (such as through fleet optimization). Firms with a sustainable brand also incur lower costs to acquire and retain high-caliber

Exhibit 1 - T&L Players with Higher Sustainability Scores Achieve Higher TSR



Sources: S&P Capital IQ; BCG ValueScience Center; BCG analysis.

Note: ESG = environmental, social, and governance; TSR = total shareholder return.

¹Median rebalanced monthly total return of 242 T&L players.

²ESG score measures a company's relative performance, commitment, and effectiveness with respect to environmental issues (resource use, emissions, and innovation), social issues (workforce, human rights, and community and product responsibility), and governance (management, shareholders, and corporate social responsibility strategy).



**The imperative for climate
action amplifies a perfect storm
of challenges that already existed
in the T&L sector.**

employees—many job applicants say that they consider a company’s sustainability when evaluating job offers. And, when on the job, employees’ higher satisfaction and engagement boost their productivity. Moreover, these companies gain preferential access to attractive financing and funding that are linked to sustainability metrics, reducing the cost of debt. Many banks have incorporated sustainability standards into the loan approval process. (See the sidebar “Maersk’s Sustainability-Linked Loans.”)

- **Valuation-Multiple Expansion.** By investing in a sustainable brand and improving operational resilience, companies reduce strategic and operational risks. Moreover, by communicating to investors about their climate initiatives, they strengthen expectations for growth and profitability and boost confidence in their management practices.

Exhibit 2 provides concrete examples from leading T&L players.

Some of the most prominent T&L incumbents, such as Maersk, FedEx, and DB Schenker, are leading the way. They have already reduced CO₂ emissions by up to 40% compared with 2008 levels and have ambitious plans to be climate neutral by 2050.

Exhibit 2 - The Sustainability Levers for Boosting TSR in T&L

Selected examples from T&L

TSR	Top-line growth	Market expansion	<ul style="list-style-type: none"> • Target new, attractive sustainability segments and markets • Increase market share by using green brands to improve customer loyalty and reach more customers
		Price premiums	<ul style="list-style-type: none"> • Charge a higher price for low-carbon transportation, which end users are willing to pay
		New revenue streams	<ul style="list-style-type: none"> • Create an innovative low-carbon offering (such as 100% green-freight transport and carbon offsets)
	Bottom-line improvements	Cost of operations	<ul style="list-style-type: none"> • Identify new cost-cutting opportunities through climate-proof operations and resource efficiencies • Decrease future abatement and compliance costs through proactive climate initiatives
		Green funding	<ul style="list-style-type: none"> • Gain access to attractive low-carbon financing (typically subject to emissions reduction commitments)
		Employee satisfaction	<ul style="list-style-type: none"> • Raise staff productivity, fulfillment, and engagement through a strong commitment to climate action • Attract better talent at lower acquisition costs and reduce attrition
	Valuation-multiple expansion	Brand value	<ul style="list-style-type: none"> • Improve company perception (including brand equity and valuation) by gaining recognition for a commitment to sustainability • Strengthen negotiation power across stakeholders, enabling more beneficial terms and conditions
		Market valuation	<ul style="list-style-type: none"> • Enhance investor confidence that the company is “fit for the future” and boost expectations for long-term growth and profitability • Leverage a strong and honest narrative to attract investors and bolster engagement
		Risk management	<ul style="list-style-type: none"> • Secure environmental regulatory compliance and limit associated transition costs • Minimize operational risks through climate change resilience (such as fewer environmental accidents)

Source: BCG analysis.



Maersk's Sustainability-Linked Loans

Many large banks are gradually starting to impose sustainability standards—such as significant reduction targets for CO₂ emissions—as a condition to approving loans. For example, Maersk's new credit facility, worth \$5 billion, is linked to the company's CO₂ emissions. In a deal with 26 banks, the company's credit margin will be adjusted on a

continual basis according to its progress in reaching its target of reducing CO₂ emissions per cargo moved by 60% by 2030. As a result, the new finance facility promotes and supports the company's efforts to implement sustainability in its operations and supply chains.

The Journey Toward Zero Carbon Emissions

To transform and decarbonize their business while creating TSR, T&L companies should take three overarching actions:

- **Develop a low-carbon business strategy.** By understanding their current trajectory on the zero-carbon journey as well as the climate scenarios and related risks, companies can identify opportunities for a low-carbon business that could contribute to revenue growth. T&L firms can also set bold fact-based emissions reduction targets for 2050 and form strategic partnerships. Many T&L companies will need to engage in partnerships and participate in ecosystems in order to plan, execute, and derisk the zero-carbon journey.
- **Climate-proof operations.** The ultimate goals should be for companies to reduce the CO₂ intensity of their operations, engage in sustainable sourcing with suppliers to address their carbon footprint holistically, and manage the physical risks (such as damage to equipment and facilities from flooding) posed by climate change.
- **Engage honestly with stakeholders.** It is crucial that companies be open and communicate about their climate journey with external stakeholders, and this should include making climate-related financial disclosures. Superficial communication about sustainability will not generate benefits—today, most investors reward only

tangible environmental results. In addition, companies should actively work with regulators, the public, and other players in the value chain to foster the support needed for decarbonization and justify the risk-return reward.

Each action comprises several concrete initiatives. (See Exhibit 3.)

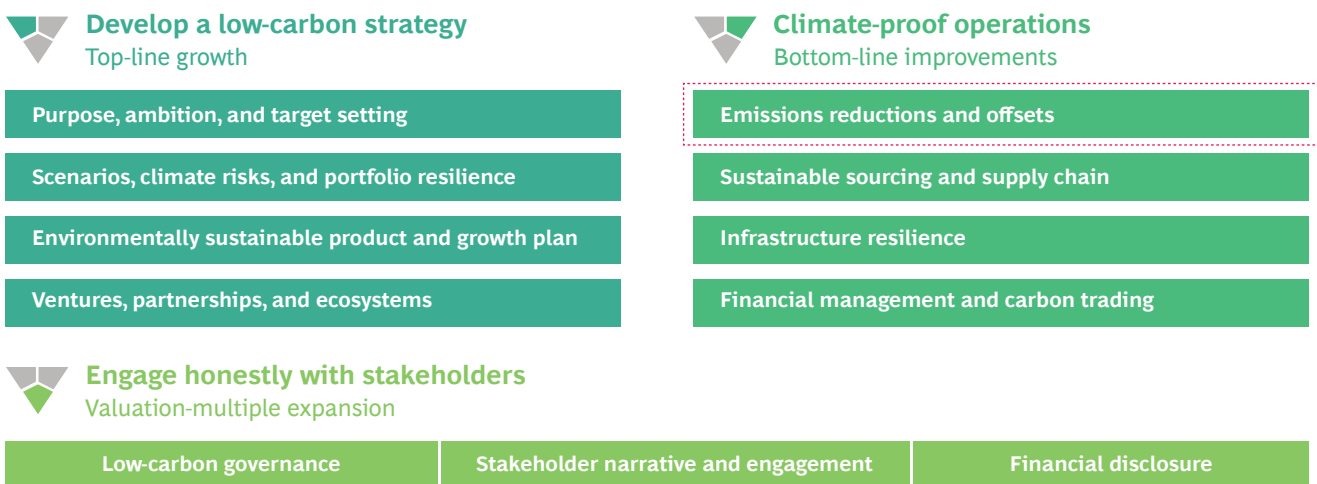
A Subsector Example: Emissions Reductions and Offsets in Shipping

For a concrete example of how the levers are applied, we take a closer look at climate-proofing operations in shipping—specifically initiatives related to emissions reductions and offsets. Ship operators have a significant opportunity to create value through these initiatives, as the shipping sector is a major source of emissions and faces high abatement costs. Moreover, the relevant concepts are applicable to other hard-to-abate T&L sectors, especially air freight and heavy road transportation.

These initiatives involve the use of four key levers for transportation activities, each relevant to shipping:

- **Efficiency Improvements.** Companies can use existing technologies and improvements to operations and infrastructure in order to reduce fuel consumption and enhance the efficiency of operations. Vessel efficiency, in particular, can be increased through changing the hull

Exhibit 3 - The Key Elements of the Zero-Carbon Journey for T&L Companies



Source: BCG analysis.

To ensure economic sustainability, T&L players should move quickly to incorporate environmental sustainability into their business model and long-term strategies.



design (for example, the shape or coating), boosting the power and propulsion system (such as trim optimization or turbochargers), and implementing operational improvements (for instance, voyage optimization or capacity utilization). Vessel operators have already pursued most of these levers since the financial crisis in an effort to cut costs through lower fuel consumption. Although not the primary objective of past efforts, decreased fuel consumption also reduces emissions.

- **Emerging Technologies.** New technologies support efficiency increases, reduce fuel impact, and enable the use of alternative fuels. In the commercial long-distance shipping sector, innovative tools to cut emissions include new propulsion systems (for example, adoptions and adaptations of older technologies such as sails and kites), robotics (for use in cleaning hulls and enabling smoother voyaging, for instance), exhaust treatment offerings (such as scrubbers for sulfur oxide and nitrogen oxide emissions), and digital solutions (including digital twins). These technologies can reduce fuel consumption as well as emissions.
- **Alternative Fuels.** New fuel technologies include liquefied natural gas (LNG), biofuels (such as biodiesel), power-to-X fuels (that is, renewable electricity transformed into fuels, such as e-methanol, e-ammonia, and synthetic diesel), and electrification (for example, batteries that are either 100% batteries or a hybrid of battery and fuel cell). This lever focuses solely on reducing emissions. Most technologies are immature to date, and there is a broad variety of alternative fuel candidates for full decarbonization, each with relative merits.

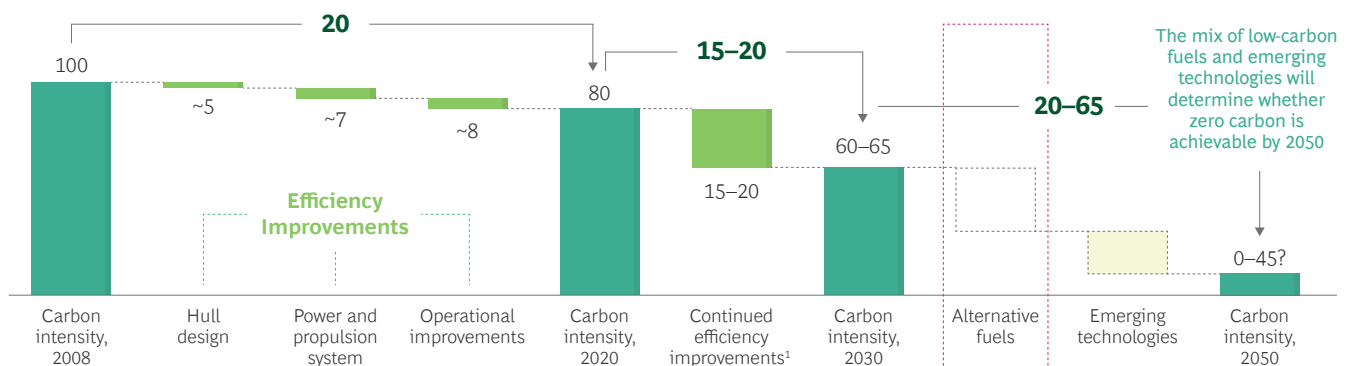
- **Carbon Offsets.** Companies can compensate for, but not reduce, CO₂ emissions through offsetting mechanisms. Offsets can be voluntary, where companies commit to decreasing their net carbon footprints using offsets (such as paying to plant trees), or mandatory, where companies are required by their respective governments to purchase carbon credits equal to their emissions.

Industrywide collaboration is essential for implementing these levers. For example, a group of major industry players, led by Maersk, has established a research institute in Denmark to pursue the goal of zero-carbon shipping. A global, cross-disciplinary team of specialists will collaborate to accelerate the development of alternative fuels and emerging technologies.

Since 2008, a few large shipping incumbents have reduced their carbon intensity by approximately 20%. (See Exhibit 4.) To decrease it by an additional 80% by 2050, companies will need to implement other measures. Continued efficiency improvements within the existing fuel platform (using marine gasoil [MGO]) are projected to cut carbon intensity by only an additional 15% to 20%. To reach zero carbon emissions, companies need to adopt alternative fuels and emerging technologies. Below, we take a closer look at the options.

Exhibit 4 - Shipping Players Will Need Alternative Fuels and Emerging Technologies to Reach Zero Carbon Emissions by 2050

CO₂ abatement levers for international shipping
(grams of CO₂ per tonne-nautical mile, index 100)



Sources: IMO; ICCT; BCG analysis.

Note: Exemplary vessel carbon intensity at 50,000 dead-weight tonnage.

¹Includes modified versions of marine gasoil, such as LNG with limited reduction potential. Involves capturing the full potential of efficiency measures with existing fuel platforms.

Next-Generation Fuel Platforms in Shipping

For long-distance shipping, several options are available that combine alternative fuels and emerging technologies. These include a wide variety of fuel types, each of which is different with respect to technical and commercial maturity and viability. We believe it is too early to meaningfully project the best possible solution. Candidates include the following:

- **Liquefied Natural Gas.** Some shipping players are exploring LNG as a future fuel option, mainly because it can be used without modifying existing engines (that is, it can be “dropped in”) and is widely available. But it has downsides. To use LNG globally, companies need to build new infrastructure, such as gas pipelines at ports, and that means making long-term investments. Most important, LNG decreases emissions by only approximately 25% relative to MGO. Advanced forms of LNG that would enable further reductions, such as bio-LNG or hydrogen-based LNG, will not become cost-competitive compared with other alternative fuels.

As a result, LNG is regarded as an interim means of reducing emissions until other alternative fuels are commercially ready; only a fraction of vessels use LNG today. Considering these limitations, as well as the 30-year-plus asset cycles in shipping, LNG seems unlikely to provide the fuel platform needed to decarbonize shipping before 2050.

- **Biofuels.** This alternative fuel produces low carbon emissions. As an example, biodiesel reduces CO₂ emissions by approximately 80% compared with MGO. Moreover, drop-in is possible. But biofuels also have significant limitations. The production of bioenergy consumes land resources and comes at the expense of food production. In addition, the availability of feedstock is limited and could be further threatened by climate events, such as droughts. And demand could be heavy owing to cross-industry competition for fuel (such as from aviation). As a result, biofuels should be regarded as a mid-term complementary fuel, rather than a stand-alone, scalable decarbonization solution for shipping.

- **E-Methanol.** Unlike LNG and biodiesel, e-methanol and other power-to-X fuels produce zero CO₂ emissions. Although the existing conversion technology is not ready for widespread commercialization, some drop-in opportunities exist. Moreover, e-methanol has low toxicity. A key disadvantage of this fuel is that it requires carbon capture technology (which is currently immature) and a new propulsion engine, resulting in high investment costs. Nevertheless, it is among the candidate technologies because it is similar to MGO with respect to its density and versatility and in how it is transported and stored.
- **Hydrogen-Based Fuels and E-Ammonia.** Environmentally friendly hydrogen provides the basis for fuels, including e-ammonia, that produce zero CO₂ emissions and are, in principle, fully scalable. But these fuels pose several challenges. Chief among them is the need for substantial infrastructure to transport liquid hydrogen and protect against the high toxicity of ammonia. Additionally, there are constraints related to bunkering infrastructure and limited opportunities for drop-in, which creates the need for a new propulsion engine. Despite the downsides, we believe these hydrogen-based fuels are viable candidates for large-scale decarbonization of shipping.

Unlocking the potential of alternative fuels requires significant action, collaboration, and commitment from all value chain participants: engine suppliers, ship builders, green-energy vendors, ship owners and operators, and freight customers. Each participant should define a strategy for achieving decarbonization. Additionally, the public sector will likely need to provide funding in order to support investments.

How to Get Started

T&L companies should embark on a climate action transformation journey today. From our experience supporting hundreds of decarbonization efforts around the world and across industries, we believe that T&L companies should act on six crucial imperatives:

- Assess the status quo of the business and understand how climate change and carbon policies can affect it and day-to-day operations.
- Define a low-carbon ambition and strategy and back them up with a concrete and realistic plan that will also boost TSR.
- Initiate no-regrets moves immediately to create momentum inside the company and demonstrate results to external stakeholders.
- Enable the journey through cross-sector partnerships to reduce risk. Increase the size and feasibility of efforts by applying a variety of resources and experiences.
- Decarbonize operations by focusing on direct emissions (known as “scope 1” emissions) and their impact on the overall value chain.
- Engage the full ecosystem of stakeholders by adapting governance and communication practices to achieve the low-carbon ambition and strategy.

A company’s initial focus depends on its current progress in the sustainability journey. A rapid “health check” is often a good first step to assess where the company stands today, which provides the basis for defining the path and initiatives to move forward. This will uncover whether a company can target specific areas or needs to embark on a full climate transformation.

To ensure economic sustainability, T&L players should move quickly to incorporate environmental sustainability into their business model and long-term strategies. The investments and abatement costs will only get more expensive over time, and operational resilience will diminish. Fortunately, T&L companies can draw upon concrete approaches and best practices developed in other sectors. The methods are available—it is just a question of which T&L players will be the first to capture the advantages.

About the Authors

Camille Egloff is a managing director and senior partner in the Athens office of Boston Consulting Group. You may contact her by email at egloff.camille@bcg.com.

Patrick Herhold is a managing director and partner in the firm's Munich office. You may contact him by email at herhold.patrick@bcg.com.

Mikkel Krogsgaard is a managing director and partner in BCG's Copenhagen office. You may contact him by email at krogsgaard.mikkel@bcg.com.

Acknowledgments

The authors thank Jens Burchardt, Elena Corrales, Lydia Foster-Smith, Kati Fuisz-Kehrbach, Esben Hegnsholt, Alejandra Huerta Moragón, Martina Ianev, Katherina Kyrtas, Jesus Montero Gomez-Serranillos, and Maria Verde Pujol for their contributions to this report. They are also grateful to David Klein for writing assistance and Mary Leonard for marketing help. They thank Katherine Andrews, Siobhan Donovan, Kim Friedman, Abigail Garland, and Shannon Nardi for editorial, design, and production support.

Cornelius Pieper is a managing director and partner in the firm's Boston office. You may contact him by email at pieper.cornelius@bcg.com.

Jannek Italiano is a principal in BCG's Copenhagen office. You may contact him by email at italiano.jannek@bcg.com.

BCG's Center for Climate Action

BCG's Center for Climate Action partners with businesses and governments to help them prepare for a decarbonized world, supporting them as they drive technological and economic transformations and realize competitive advantage in a low-carbon economy. Our work is supported by BCG's range of consulting experience across all industries and capabilities, as well as by our expanding reach of brands.

