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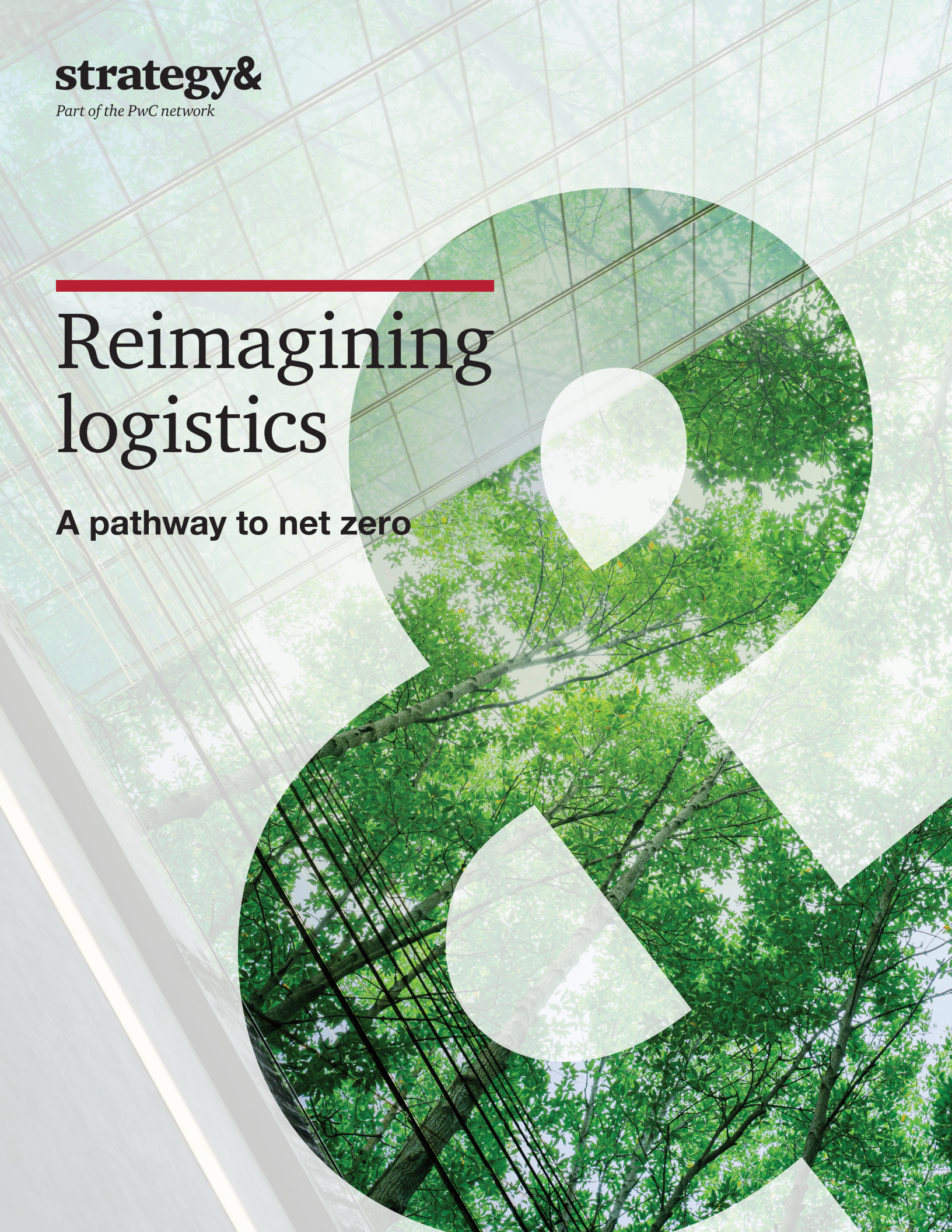
Reimagining logistics

A pathway to net zero



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EXECUTIVE SUMMARY

In recent years, leaders of Gulf Cooperation Council (GCC)[1] countries have committed in numerous ways to making their economies more environmentally sustainable. These commitments are notable for their breadth and for the fact that they will require significant action from stakeholders throughout the region. For the GCC, composed of fast-growing, dynamic markets, meeting sustainability targets will be even more of an uphill battle than it might be in other regions.

Globally, and in the GCC, transport and logistics (T&L) is an emissions-heavy sector that enables and has an impact on many other parts of the economy. That makes T&L a perfect candidate for innovative thinking about sustainability. If GCC leaders and business decision makers can help reduce carbon emissions in the T&L sector, it could have knock-on effects beyond the sector itself. However, achieving the required level of impact demands more than incremental technological changes; it requires a paradigm shift in the actions and expectations of participants across the T&L value chain.

A REGION-WIDE COMMITMENT TO DECARBONIZE

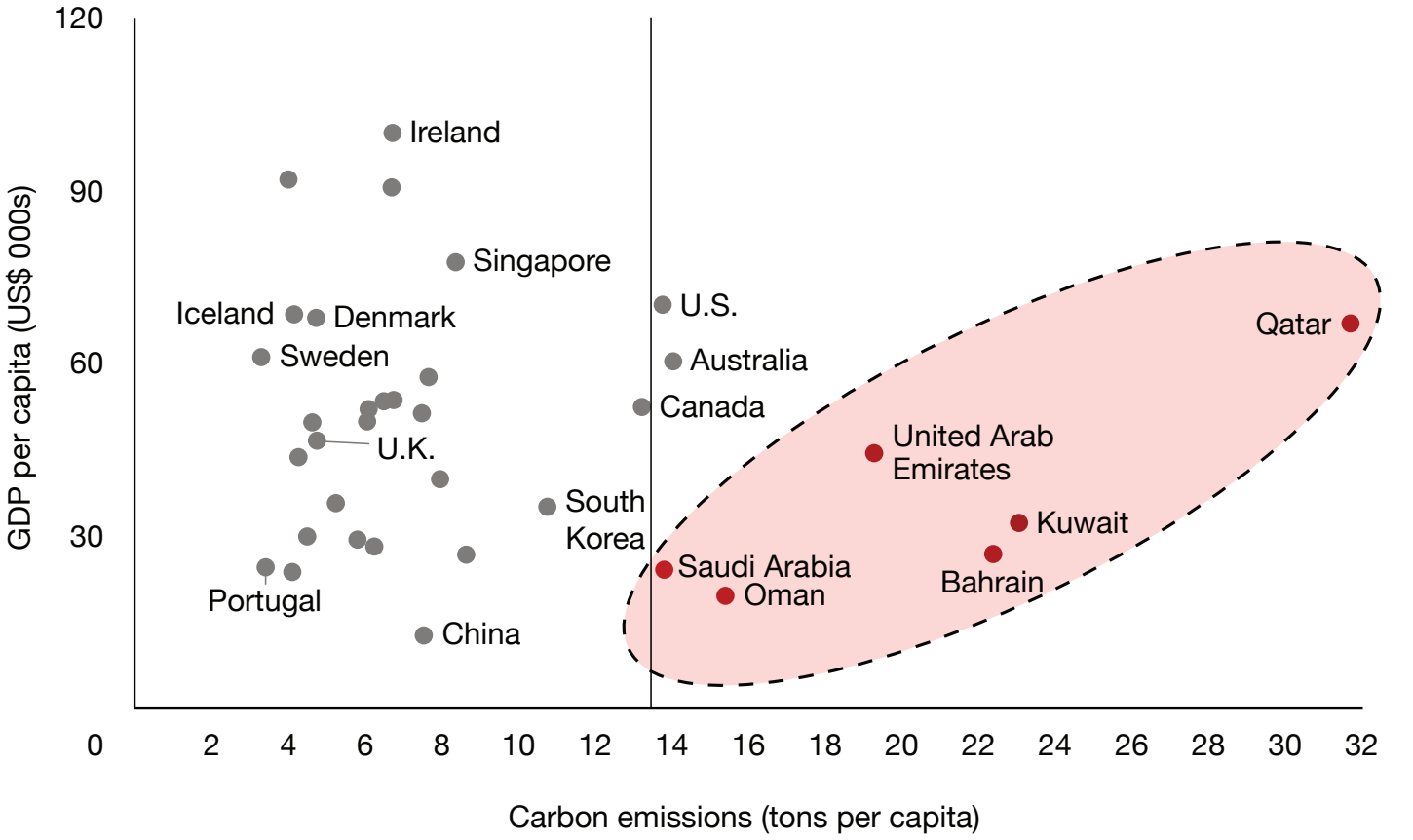
By 2021, all GCC countries had committed to achieve net-zero carbon emissions by either 2050 or 2060, with Saudi Arabia setting interim goals for 2030.[2] At the 2023 United Nations Climate Change Conference (COP28) in the United Arab Emirates (UAE), the region's leaders reinforced these commitments, announcing a number of additional sustainability initiatives. The COP28 presidency, held by the UAE's Dr. Sultan Ahmed Al Jaber, announced the creation of the Industrial Transition Accelerator, with the goal of fostering cooperation among policymakers, experts, and investors to decarbonize heavy-emitting industries. The UAE also launched ALTÉRRA, a US$30 billion investment vehicle for climate action, which has a target of $250 billion by 2030 and a stated aim of positioning the country as a hub for climate finance. The Saudi and Middle East Green Initiatives, meanwhile, are leading joint public and private efforts to invest in the green economy and establish a circular carbon economy framework to support the goal of net-zero emissions.

These initiatives, and many others, are a testament to the seriousness with which the region's business and government leaders are confronting the sustainability challenge. Indeed, there is broad awareness that without effective near-term action, carbon emissions in the GCC would increase, rather than decrease (*see Exhibit 1*). Measurable progress, of course, needs to come from direct action and efforts from the industries that generate the most emissions.

EXHIBIT 1

GCC countries need proactive mitigation to prevent GHG emissions from rising

Carbon emissions per capita compared with GDP per capita (2021)



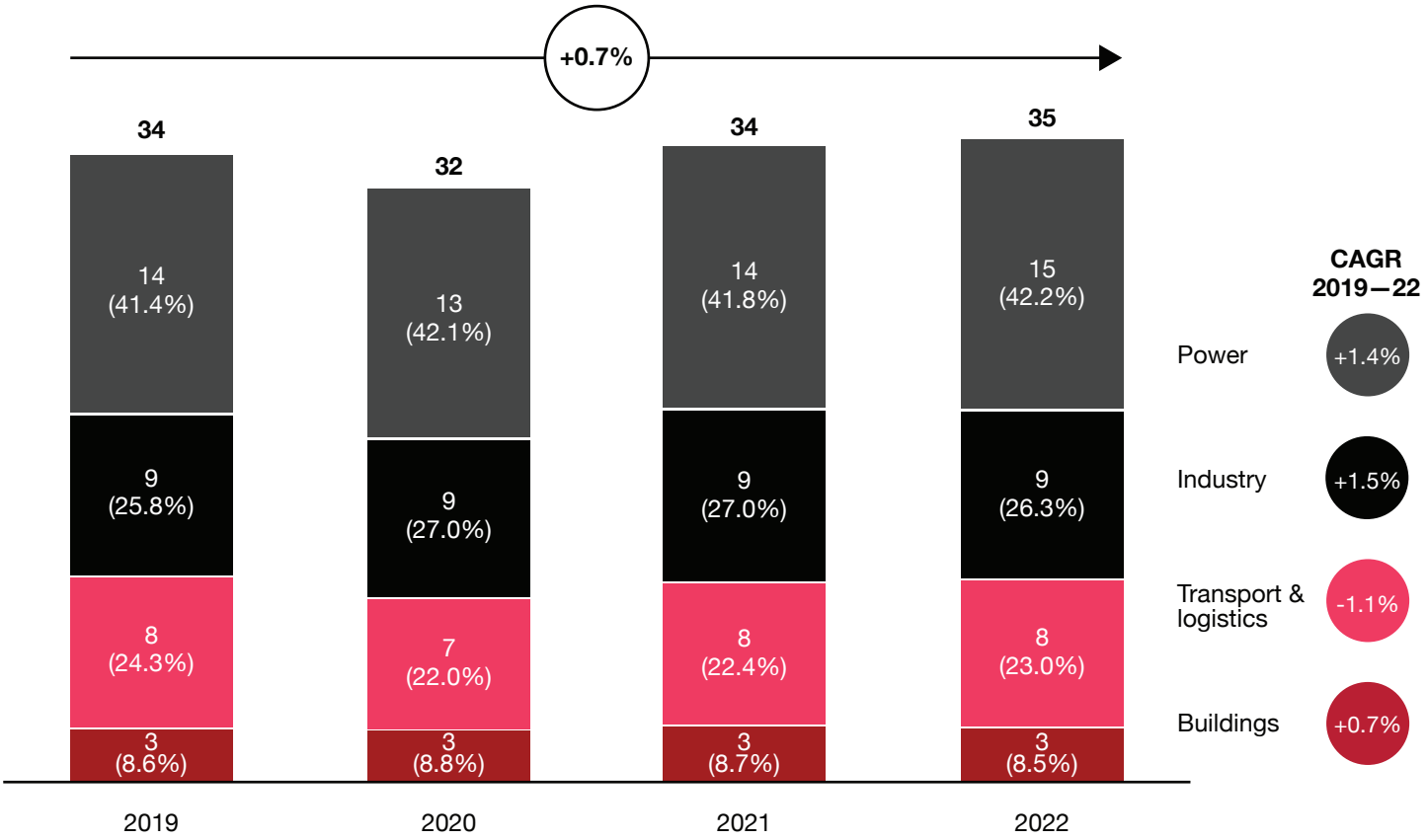
Source: The World Bank, DataBank; International Energy Agency, "Energy system of the Middle East" (https://www.iea.org/regions/middle-east)

In the search for levers that can generate this level of impact, the T&L sector, which is responsible for one-quarter of global greenhouse gas emissions, represents a critical opportunity (*see Exhibit 2*). In addition to its first-order activities, T&L is interwoven deeply as an enabler for almost all other sectors. For example, reducing carbon emissions in the retail or manufacturing sectors would rely significantly on rethinking the transportation element of the value chain. The fact that T&L is embedded within so much of the region's economy gives it a potential that exceeds its already large direct footprint.

EXHIBIT 2

Globally, the transport and logistics sector accounts for around a quarter of emissions

Global CO_2 emissions by sector (gigatons, 2019–22)



Source: International Energy Agency, "Data and statistics," 2023 (https://www.iea.org/data-and-statistics)

T&L comprises domestic and cross-border logistics. These two groups of activities have specific decarbonization considerations—and GCC countries have variable degrees of influence over them.

Cross-border logistics are concerned with shipments that either originate in, or are destined for, international air, sea, and land ports. They are subject to a significant number of existing and emerging regulations and policies, largely put in place by supranational bodies such as the International Maritime Organization (IMO), the International Air Transport Association, and the International Civil Aviation Organization (ICAO).

Domestic logistics are concerned with the shipment of cargo within the borders of a given country. Overall, domestic logistics are more open to direct intervention, regulation, and reinvention by national governments, which makes them a key area of focus in the efforts to meet the region's deep commitments to sustainability.

GCC COUNTRIES MUST INTEGRATE AND INNOVATE IN CROSS-BORDER LOGISTICS

Globally, cross-border logistics are largely governed by policies and emissions targets agreed upon by international organizations and other global bodies. These initiatives are focused primarily on the tracking and measurement of emissions, as a first step toward effective reduction. For example, the IMO's Energy Efficiency Existing Ship Index (EEXI) requires ships to attain approval for their design parameters based on a measure of CO_2 emissions per transport work.[3] Maritime policies and guidelines also promote the development of "green" fuels and the vessels that run on them, stricter emissions guidelines at ports, and the design of more efficient ships.

Similar international efforts are emerging to promote sustainable approaches to aviation. The ICAO's Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), for example, harmonizes national and regional regulations in the effort to reduce airline emissions. On a national and regional level as well, policies have been designed to improve the efficiency of air transport by transitioning to sustainable aviation fuels (SAFs), optimizing routes, and developing fuel-efficient aircraft. The European Union's ReFuelEU Aviation plan, for example, will require fuel suppliers to gradually increase the percentage of SAF mixed with kerosene from 2 percent to 63 percent by 2050.[4]

GCC countries need to adapt their T&L approach to integrate these and myriad other international norms and regulations. However, they also need to adapt to keep up with the sustainability commitments of leading shipping companies. Maersk, for example, has stated its aim to reach net-zero greenhouse gas emissions for its entire business by 2040. The French corporation CMA CGM has an objective of going net zero by 2050.[5]

GCC leaders can go further by shaping and accelerating the adoption of alternative fuels in highly emitting logistics activities and deploying innovative solutions and fleets that optimize carbon emissions. Specifically, the GCC region could play a leading role in research and development (R&D); production; and supply of alternative fuels such as green hydrogen, ammonia, or other clean energies to power the global logistics sector.[6] Furthermore, GCC governments could position the region in the forefront of sustainable T&L globally through their drive toward the localization of industries such as shipbuilding, technology, and digitization; and through increased cross-ministerial collaboration on innovations in fleet engines, building material, and power technologies.

As they continue to develop their ports and gateway infrastructure, GCC countries can also incorporate elements that support sustainable logistics. For example, port authorities can deploy bunkering infrastructure for low-carbon fuels around key seaports, introduce green shipping corridors, and offer incentives to sustainable carriers or vessels.

It is critical, in particular, that GCC countries align their regulatory approach with international norms. For example, they can implement equivalent emissions reduction guidelines for vessels operating in close proximity to GCC waters. Lack of alignment would lead to the risk of the region's waters and ports becoming a preferred destination for noncompliant vessels.

> Overall, domestic logistics are more open to direct intervention, regulation, and reinvention by national governments, which makes them a key area of focus in the efforts to meet the region's deep commitments to sustainability.

RESHAPING THE CARBON FOOTPRINT OF DOMESTIC LOGISTICS

Domestic logistics offer fertile ground for a fundamental rethinking of decarbonization because they are more directly under the control of the national governments. Drawing on our work with governments and stakeholders in the logistics arena, we have developed a set of initiatives that could significantly reduce emissions.

Innovations in technology offer potential for reductions, including electric and solar panel container trucks; vehicles that run on alternative fuels such as ethanol, hydrogen, and biodiesel; green warehouses that make use of energy-efficient technologies and that are built with eco-friendly materials; and a shift in last-mile delivery to more efficient technologies such as electric bikes or drones. Although tech adaptations and innovation remain important factors in the global push to reduce greenhouse gases, incorporating sustainable practices into a new paradigm for supply chain management offers the potential for more significant reductions.

Enabling this new paradigm requires changes in common practices. Indeed, stakeholders need more flexible and subtle approaches that give higher weight to sustainability practices, approaches that replace the traditional modus operandi in which cost efficiencies, rapid deliveries, and "just-in-time" (JIT) delivery are the most important factors in supply chain management. That demands changes in the expectations, actions, and behaviors of stakeholders along the supply chain.

Overall, a paradigm shift in domestic logistics requires extensive collaboration among all stakeholders. Three major changes are necessary to introduce this new paradigm. We calculate that combined, these three changes in traditional supply chain approaches could reduce emissions related to T&L activities by up to as much as 40 percent.

From JIT to a more balanced supply chain management model

T&L needs a holistic supply chain model that balances acceptable levels of efficiency, cost, speed, and environmental impact. That means reconsidering the high emissions of today's supply chains. These are built around efficient, fast, and highly synchronized activities and operations with JIT delivery. This model revealed its vulnerabilities during the COVID-19 pandemic as global supply chains were largely disrupted. Change is further required because today, JIT is under pressure to demonstrate its environmental friendliness. In fact, JIT leads to more frequent and smaller deliveries—for instance, between a factory and distribution centers—to ensure efficient storage and inventory management.

From a model centered on delivery schedules to one centered on capacity management optimization

Stakeholders need to reconsider the management of supply chains in a way that does not compromise cargo owners' business performance and that delivers significant carbon emissions reduction. The new approach should effectively manage logistics capacity through load consolidation, load optimization, dynamic routing and scheduling, and backhauling. These changes are necessary because traditionally, supply chains run on a model that is predominantly driven by the speed of delivery from the first to the last mile, and frequently at the expense of operational efficiencies and the environment. For example, that means a stock of manufacturing parts or an e-commerce parcel delivery is organized to honor the delivery window promise, regardless of whether a vehicle is near capacity.

From monomodal to multimodal deliveries

In the current practice, cargo flows are typically transported in a single transport mode across the GCC. There should be a policy framework that ensures partial or full migration to a greener mode that generates cost and operational advantages to shippers. With the expansion of transport networks and alternative transport modes such as rail or maritime in Saudi Arabia and the UAE, a multimodal approach to freight management and transport would realize freight savings and reduce emissions by up to 65 percent from long hauls, according to the U.S. Environmental Protection Agency.[7]

A COLLABORATIVE AGENDA FOR DECARBONIZING T&L

Each set of players in the T&L ecosystem has a distinct role to play. They should undertake a specific set of actions and initiatives if the industry is to contribute fully to the GCC's net-zero commitments. Just as the smooth functioning of supply chains relies on cooperation and interconnected agendas, so successful decarbonization relies on commitment and partnership among the system's many stakeholders.

Governments

GCC agencies can use many levers to embed decarbonization goals into their T&L sector strategies and plans. At the policy level, governments can introduce and enforce international sustainability rules and standards (for example, minimum truckloads). They can incentivize green practices and green fleet deployments, and define acceptable emissions standards and the related operational changes. At the infrastructure level, authorities should ensure the upgrade of ports, airports, and roads to make them more energy-efficient and support the use of clean technologies and operations. Also, GCC governments have the opportunity to invest in the R&D of green fuels and technologies with the aim of making the regional and global T&L sector greener. GCC governments can also consider the gains from regional schemes (*see "Remapping industrial zones: The potential of regional coordination"*).

Remapping industrial zones: The potential of regional coordination

A more ambitious initiative has the potential to set the GCC region on a sustainable path for the longer term. This approach would relocate industrial zones across the region based on a master plan that optimizes the carbon footprint, depending on the type of industry involved. In this model, production facilities for carbon-intense value chains such as steel production would be located closer to one another, leading to a reduction of emissions. Conversely, for less carbon-intense value chains (food processing, for example), production would be located closer to end-users or markets, thereby reducing emissions created by transporting the goods—in this case the primary source of emissions. An endeavor of this scope and ambition would require pan-regional cooperation. Despite potential obstacles, a structural reimagining of the GCC's logistical map is the kind of aspirational project that might be required in the long-term battle to reduce greenhouse gases.

Carriers and logistics service providers

Carriers and logistics service providers (LSPs) are two groups of stakeholders that can make significant carbon footprint reductions and encourage behavioral changes among other players in the value chain. Carriers and LSPs should adopt international rules and standards rapidly—especially for globally integrated supply chain activities. Domestically, they should revise their network operations to balance efficiencies and carbon footprint. That entails adjusting logistics networks, optimizing routes and capacity, integrating multiple T&L modes, and deploying electric vehicles and advanced technologies.

Cargo owners

Cargo owners (e.g., manufacturers and retailers) can help build a more resilient system, minimize unnecessary movements and storage, and ultimately optimize their carbon footprint. They can reevaluate their expectations for rapid delivery, adopting a more balanced approach to supply chain management, utilizing advanced and predictive analytics to forecast demand, manage inventories, and plan operations and production. As they become more carbon conscious, cargo owners are likely to accelerate the adoption of green measures by other ecosystem stakeholders, namely carriers, LSPs, and consumers.

Consumers

Consumers can wield significant power in the T&L ecosystem. As consumers become more environmentally aware, they can influence other stakeholders by choosing products from companies that are committed to sustainable practices in manufacturing, supply chain practices, and delivery.

CONCLUSION

GCC countries have set an ambitious but achievable goal to reach net zero by 2050 or 2060. Reaching that goal will require sustained efforts and cooperation from governments, industrial leaders, and society more broadly. The critical T&L sector presents an opportunity for these joint efforts for two reasons: First, it is the source of significant carbon emissions; second, it enables and interacts with numerous other critical sectors. To advance, stakeholders need targeted and incremental changes, particularly in the realm of technology and innovation. However, reaching net zero demands something more: a deep rethink of traditional approaches and expectations in logistics. As is often the case, true change will rely heavily on how open participants are to this new paradigm.

ENDNOTES

1. The GCC countries are Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.

2. Saudi and Middle East Greece Initiatives, “SGI Target: Reduce Carbon Emissions by 278 Mtpa by 2030” (https://tinyurl.com/4a4sc77j); UAE, “The UAE’s Net Zero 2050 Strategy” (https://tinyurl.com/6j8xs3v8).

3. A related measure, the Energy Efficiency Design Index, applies similar requirements to newly built ships (https://www.imo.org/fr/MediaCentre/HotTopics/Pages/EEDI.aspx).

4. “Fit for 55 and ReFuelEU Aviation,” European Union Aviation Safety Agency (https://www.easa.europa.eu/en/light/topics/fit-55-and-refueleu-aviation).

5. CMA CGM, “CMA CGM Heading Towards a Carbon-Free Transport and Logistics Industry” (https://tinyurl.com/2re7hfb3); Maersk, “A.P. Moller-Maersk Accelerates Net Zero Emission Targets to 2040 and Sets Milestone 2030 Targets,” January 12, 2022 (https://tinyurl.com/wvvmd3rz).

6. Dr. Yahya Anouti, Dr. Shihab Elborai, Dr. Raed Kombargi, and Ramzi Hage, “The Dawn of Green Hydrogen: Maintaining the GCC’s Edge in a Decarbonized World,” Strategy&, 2020 (https://www.strategyand.pwc.com/m1/en/reports/2020/the-dawn-of-green-hydrogen.html); Dr. Ulrich Koegler, James Thomas, and Susie Almasi, “How the GCC Can Become a Force in Global Green Hydrogen: The Green Ammonia Supply Chain,” Strategy&, 2020 (https://www.strategyand.pwc.com/m1/en/reports/2020/how-the-gcc-can-become-a-force-in-global-green-hydrogen.html).

7. U.S. Environmental Protection Agency, National Service Center for Environmental Publications (NSCEP), “A Glance at Clear Freight Strategies: Intermodal Shipping” (https://tinyurl.com/yw4kdksw).

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