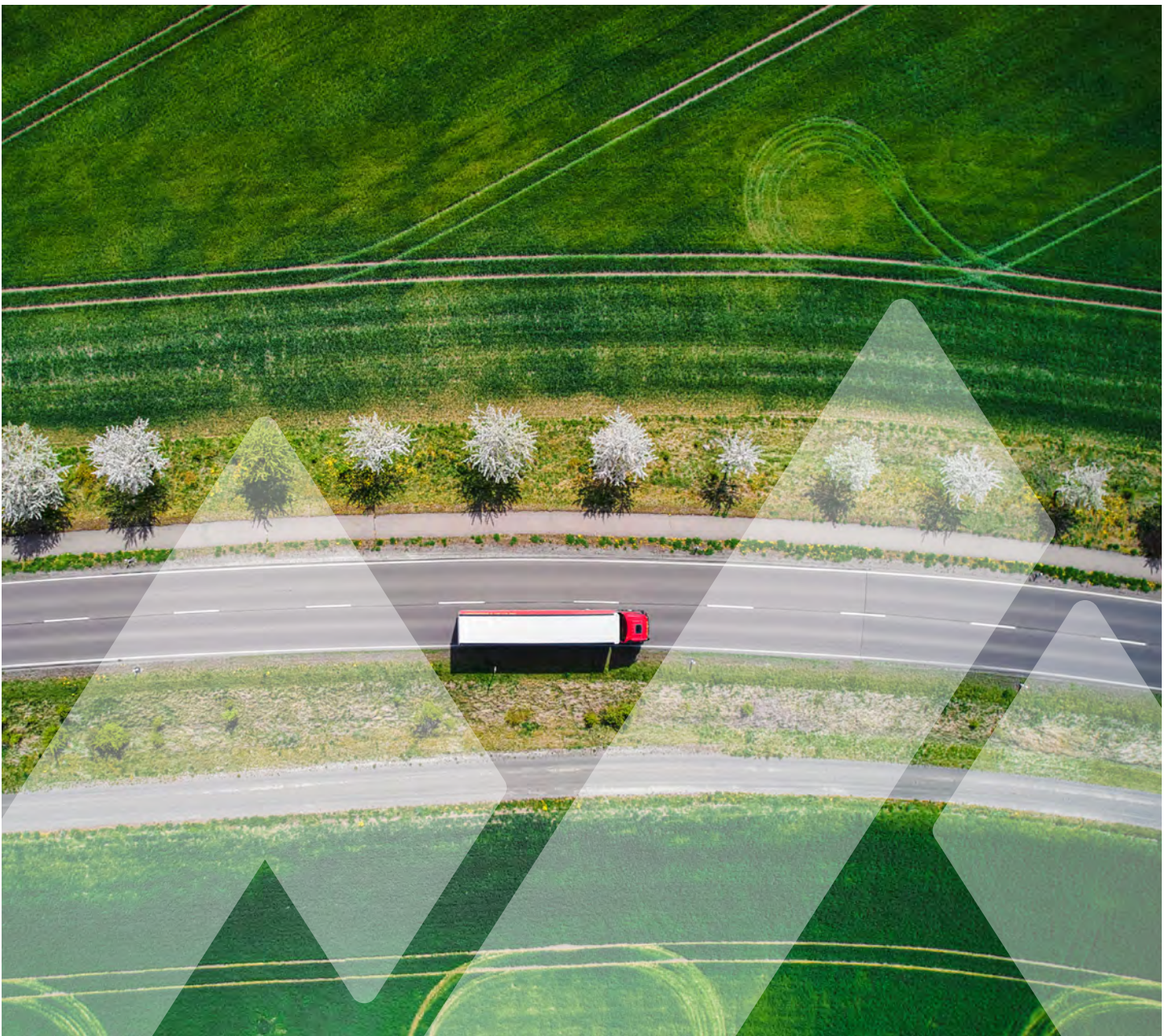




The Green Logistics Playbook:

Sustainable Supply Chain
Best Practices for G20 Leaders



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About RMI

RMI is an independent nonprofit, founded in 1982 as Rocky Mountain Institute, that transforms global energy systems through market-driven solutions to align with a 1.5°C future and secure a clean, prosperous, zero-carbon future for all. We work in the world's most critical geographies and engage businesses, policymakers, communities, and NGOs to identify and scale energy system interventions that will cut greenhouse gas emissions at least 50 percent by 2030. RMI has offices in Basalt and Boulder, Colorado; New York City; Oakland, California; Washington, D.C.; and Beijing.

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Executive Summary



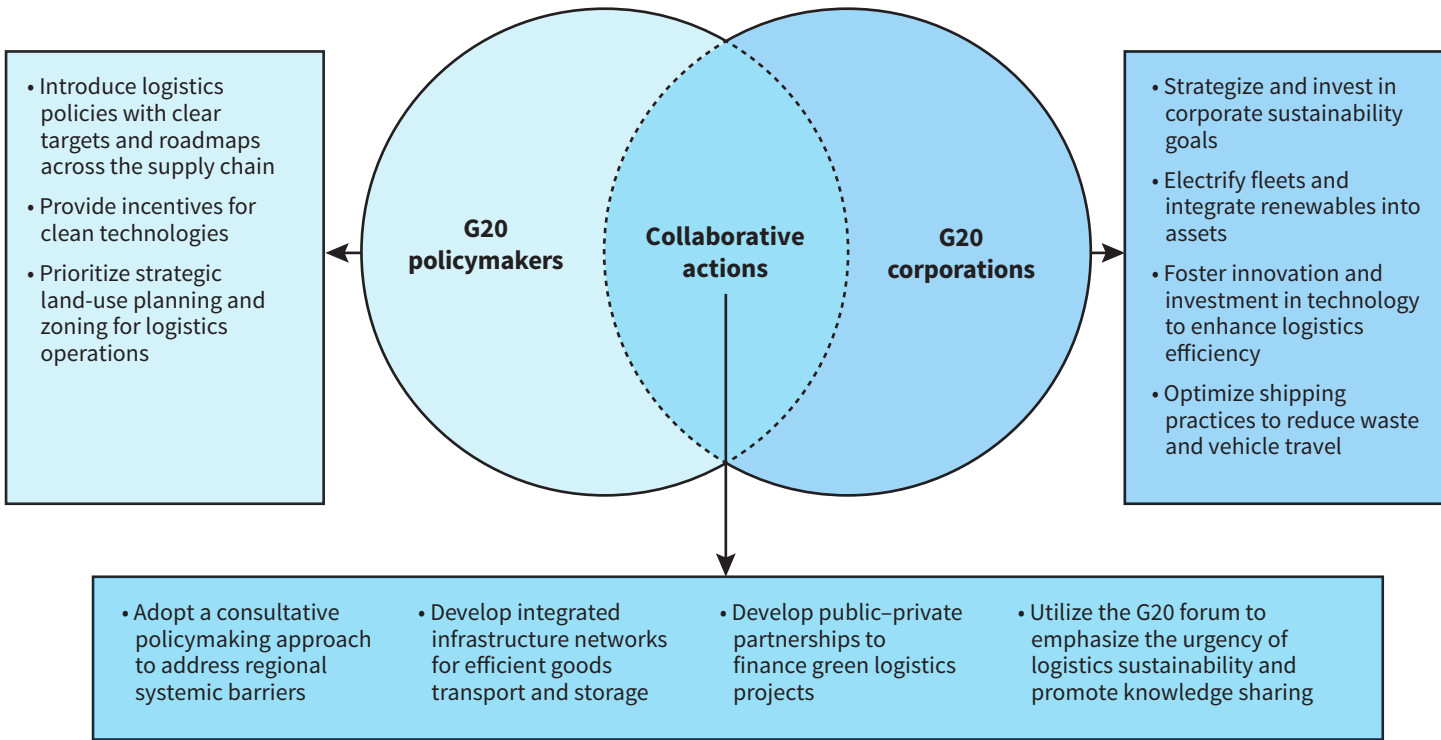
What are sustainable logistics? And more importantly, how can businesses and policymakers implement sustainability into logistics operations?

Sustainable logistics are logistics that minimize negative environmental impacts while ensuring the efficient flow of goods within supply chains. To enhance sustainability in logistics, it is essential to decouple the sector's environmental impact from the economic growth it supports. As the backbone of the economy, the logistics sector plays a crucial role in facilitating the movement of goods for individuals and businesses. The sector contributes to over a 10th of the global gross domestic product (GDP) and a 10th of global emissions and is expected to grow from US\$8.9 trillion in 2023 to US\$18.2 trillion by 2030,¹ leading to increased energy security risks, carbon emissions, urban air pollution, and public health issues. To enhance sustainability in logistics, it is essential to decouple the sector's environmental impact from the economic growth it supports.

The G20 nations house two-thirds of the global population and are responsible for over three-quarters of global trade and GDP. They can greatly influence the transformation of the logistics sector. This report highlights near- and long-term actions that G20 stakeholders can take to improve sustainability in the logistics sector. It offers actionable insights into how policymakers and business decision makers can transition to a clean, optimized, and cost-effective system capable of driving economic growth and sustainable development (see Exhibit 1, next page).

The solutions feature strategies across four areas: (1) logistics operations, (2) policy drivers, (3) infrastructure development, and (4) financial investments. Furthermore, the report outlines system-level changes the G20 forum can drive by elevating the importance of logistics sustainability, creating a logistics task force within the G20, enabling knowledge sharing, developing actionable targets, and establishing criteria to assess sustainable logistics. The corporate and government-led actions outlined in this report can shape the sustainable logistics future — yielding significant economic, environmental, and societal benefits.

Exhibit 1 Role of G20 policymakers and corporations in driving sustainability in logistics



Source: RMI analysis

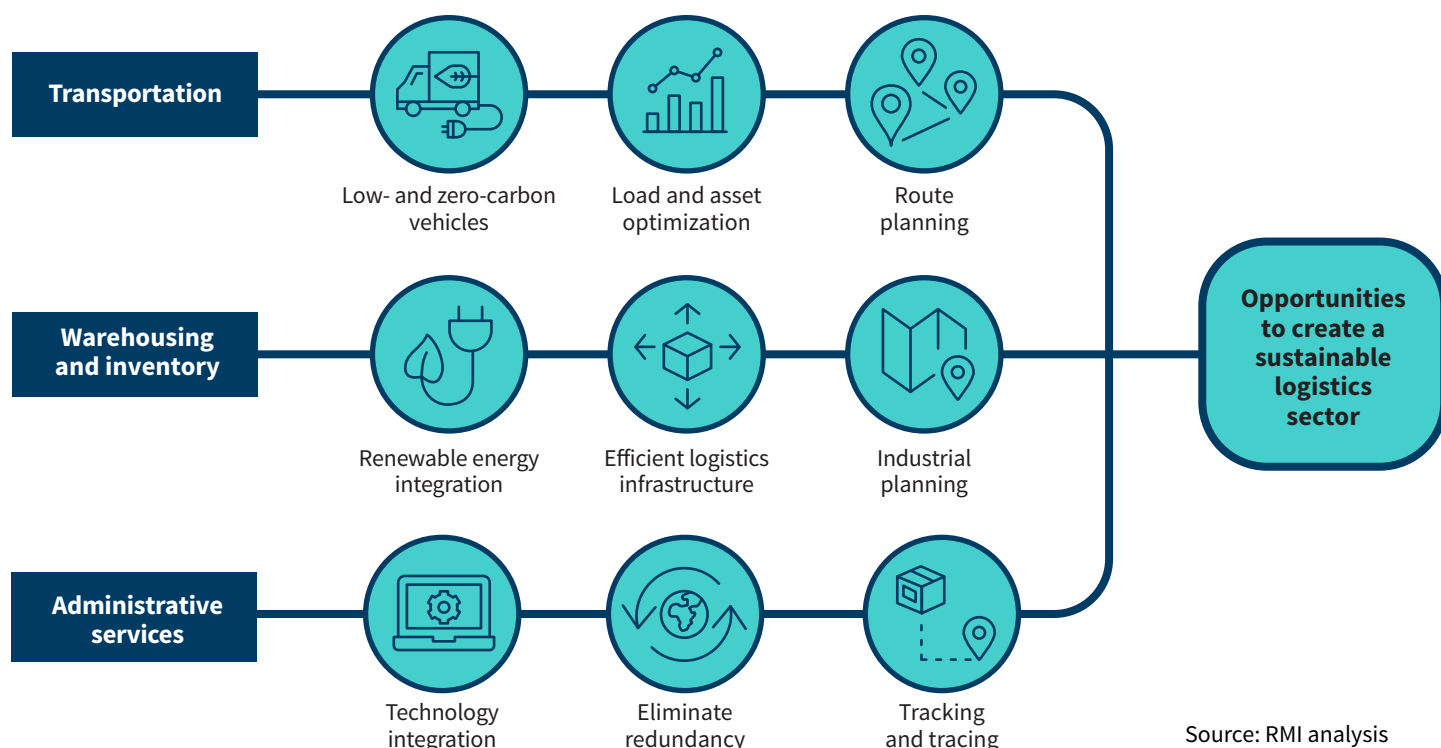
Introduction

The theme of India's G20 presidency — *Vasudhaiva Kutumbakam*, meaning One Earth, One Family, One Future — underscores the G20 platform's objectives of achieving sustainable and equitable development of participating nations. The G20 nations — comprising 19 countries (Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Republic of Korea, Mexico, Russia, Saudi Arabia, South Africa, Türkiye, the United Kingdom, and the United States) and the European Union — represent 85% of global GDP and produce approximately 80% of global greenhouse gas (GHG) emissions.² Given their outsized economic impact and influence, these nations play a vital role in promoting low-carbon and cost-effective logistics practices.

Sustainable logistics means transporting, storing, and distributing goods in an environmentally, socially, and economically responsible manner. It involves integrating sustainability principles into the design and operation of logistics systems across the supply chain to minimize negative impacts on the environment, society, and the economy while maximizing efficiency.

The logistics sector can be broken up into three components: transportation, warehousing and inventory, and administrative services. Each of these areas contains numerous opportunities to promote sustainable and efficient logistics practices (see Exhibit 2).

Exhibit 2 Sustainable logistics practices and their impact



- **Transportation** accounts for 58% of logistics costs and is pivotal in moving raw materials, intermediate products, and finished goods across factories, warehouses, shops, and end consumers.³ Adoption of zero-emissions technologies like electric vehicles (EVs) and integrating multimodal transport (including road-, rail-, air-, and water-based modes) can reduce the emissions intensity of transportation. Additionally, efficient vehicle routing and improved load factors can reduce the environmental impact of vehicle travel.
- **Warehousing and inventory** management involve the storage of goods and account for one-third of logistics costs.⁴ Logistics providers can reduce inventory waste and obsolescence by streamlining warehousing operations and strategically locating warehousing infrastructure.
- **Administrative services**, although representing only a small fraction of logistics costs, bind all logistics activities and enhance transportation and inventory management sustainability.⁵ Logistics providers can more effectively manage resources by leveraging technology to improve both the performance of transportation and storage activities.

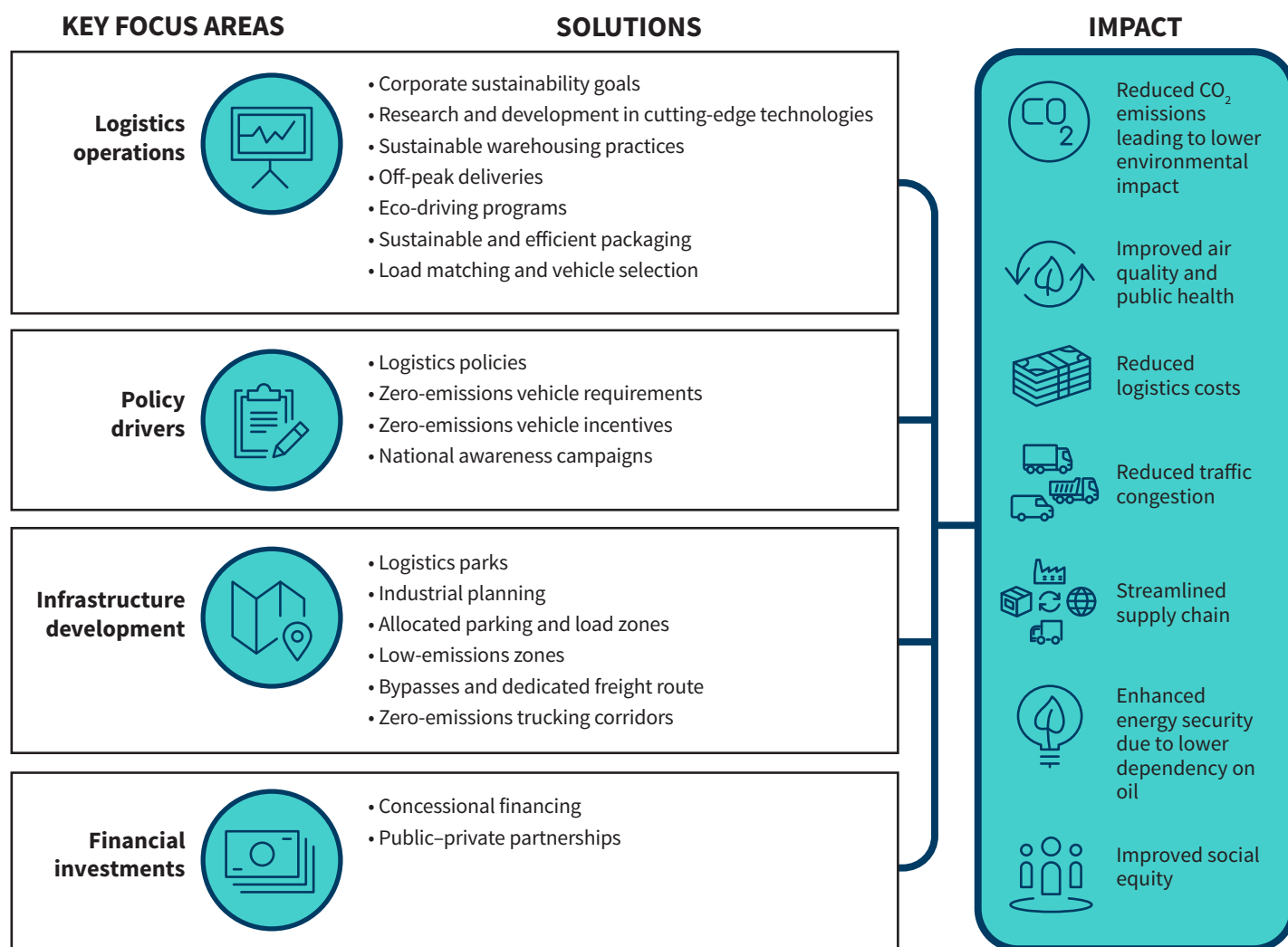
Effective collaboration between the public and private sectors is vital to improve sustainability in these three areas of the logistics sector. The primary ways G20 leaders can support this is through logistics operations, policy drivers, infrastructure development, and financial investment:

- **Logistics operations** to drive bold innovation, research and development, and on-the-ground deployment of sustainable logistics measures
- **Policy drivers** that incentivize efficient logistics practices and convey strong market signals to prioritize sustainability throughout the sector
- **Infrastructure development** to effectively plan and deploy a network of physical facilities for goods storage and transportation
- **Financial investments** through public–private partnerships (PPPs) to mobilize funding for infrastructure and sustainability-focused projects

This report offers 19 solutions across those four areas to help G20 leaders inspire nations and businesses to implement relevant, sustainable logistics policies and practices (see Exhibit 3, next page). Each solution is supported by a global case study that demonstrates successful planning and implementation within a G20 country. Green icons are included at the beginning of each proposed solution to emphasize that solution's positive impact.

By implementing the solutions in this guide, the G20 can help the world shift to sustainable logistics that address climate change, enhance livelihoods, improve public health, and foster economic growth.

Exhibit 3 Solutions to drive sustainable logistics



Source: RMI analysis

Logistics Performance Index and Its Role in Offering a Comparison of G20 Nations' Logistics Activities

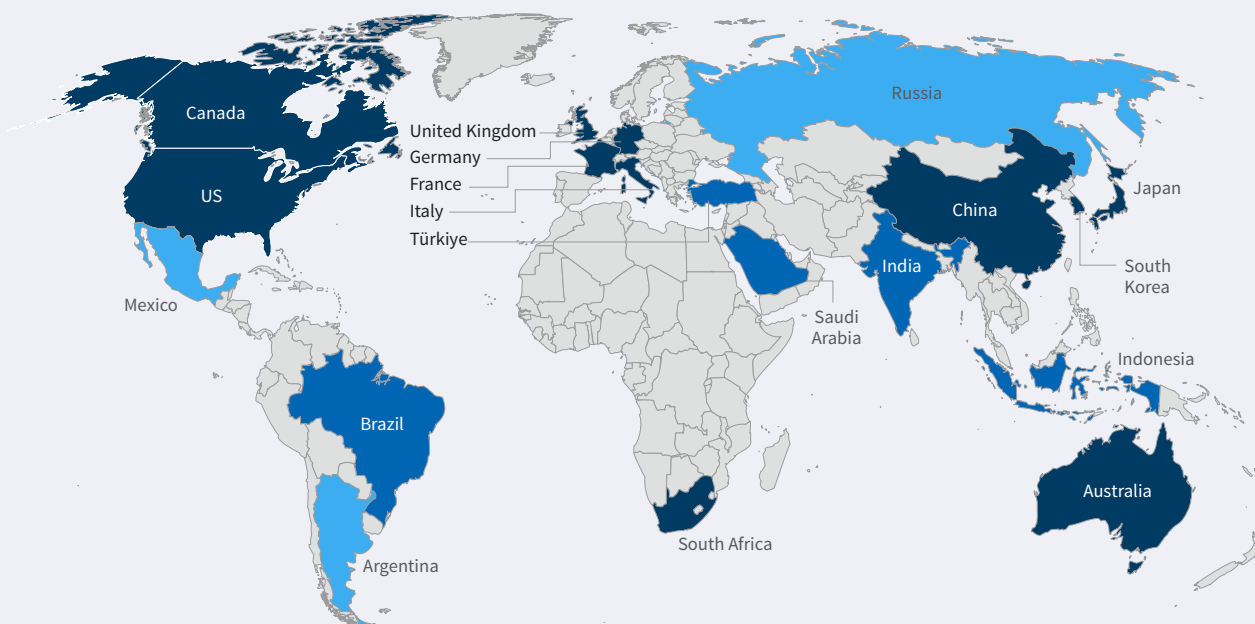
The logistics performance index (LPI) is a benchmarking tool created by the World Bank to assess a country's logistics performance and efficiency. The tool was developed to help countries identify and address bottlenecks such as the need for supportive logistics policies, infrastructure investment, and supply chain connectivity. The tool generates an LPI score for each country using quantitative and qualitative data on the country's infrastructure, customs and international shipments,

logistics competence and quality, timeliness, and tracking and tracing. Although the tool does not directly measure logistics sustainability, specific parameters such as improved logistics efficiency and infrastructure connectivity can decrease waste and reduce the distance traveled by goods, thereby promoting sustainable logistics practices. Exhibit 4 provides details of each country's unique LPI scores, summarizing how G20 countries score on logistics performance individually and collectively.

Exhibit 4 Logistics performance index score for G20 nations

Logistics performance index by country

■ Greater than 3.5 ■ 3.0-3.5 ■ Less than 3.0



Note: This map is only for illustration purpose and doesn't depict actual geographical boundaries.

Source: RMI analysis of The World Bank Group, <https://lpi.worldbank.org/global>

A high LPI score indicates strong logistics performance. Countries with a high score generally have cost-effective logistics operations, optimized resource use, and streamlined flow of goods domestically and internationally. A lower score suggests that improvements can be made to logistics infrastructure, processes, or policies. On average, G20 nations scored

3.6, which is 19% higher than the global average.ⁱ Finland and Denmark obtained the highest score among G20 member countries, with LPI scores of 4.2 and 4.1 respectively. These countries score particularly strongly on logistics competence, quality, and tracking. In contrast, countries with a low LPI score appear to underperform in infrastructure monitoring and tracking.

ⁱ Based on RMI's analysis of the International Logistics Performance Index by the World Bank.

Call to Action for G20 Leaders

As noted above, the G20 nations produce approximately 80% of global GHG emissions, a large portion of which come from the logistics sector. Although we must ensure the efficient flow of goods within supply chains, there are steps G20 nations can take to improve sustainability in the transport of goods while continuing to drive economic growth. The following actions can help the G20 implement the best practices outlined in this report and drive systemic change within the logistics sector:

- 1. Elevate the importance of logistics sustainability:** The G20 can work to emphasize logistics sustainability as part of the formal G20 agenda by communicating the importance and impact of climate change on the logistics sector. As the host country of this year's summit, India has highlighted climate and sustainability as one of the topical areas of focus for the gathering. Incorporating logistics sustainability into the G20 agenda can generate productive dialogue on how the G20 can use its multilateral platform to promote the creation of a global sustainable logistics economy.
- 2. Create a logistics sustainability task force within the G20:** As a part of the working groups, the G20 can create a task force dedicated to sustainable logistics. This task force can compile and create a comprehensive compendium of policy best practices and regulatory frameworks to support efforts to decarbonize the logistics sector.
- 3. Enable collaboration and knowledge sharing:** Through the G20 forum, member countries can learn from others through collaborative dialogues, pilot projects, and practices. The learning can be tailored to local contexts. The forum can introduce capacity development initiatives by establishing training programs, creating guidelines for infrastructure development, and providing technical assistance and mentorship to member countries. The G20 can also promote partnerships between public, private, and financing organizations leveraging combined resources and expertise to fund and implement sustainable logistics infrastructure projects. See the next page for actions that governments, corporations, and multilateral financial institutions can take to help transform the logistics sector.
- 4. Develop actionable targets:** The G20 can establish an international sustainable logistics development target by soliciting member nations to come forward with specific and measurable goals and actions. These targets can be aimed at reducing emissions from the logistics sector and lowering the cost of logistics as a share of GDP.
- 5. Establish criteria to assess sustainable logistics:** Establishing evaluation criteria is essential to define a baseline for logistics sustainability and monitor progress across member countries. The development of such criteria can support documenting incremental progress through a standard monitoring mechanism. The requirements could include key performance indicators to track the implementation of sustainable practices and their economic, environmental, and social impact. The monitoring mechanism will help hold nations accountable for achieving sustainable logistics targets.

The G20 platform has the potential to galvanize logistics sustainability practices across nations and businesses through the development of clear agreements prioritizing sustainable logistics. By taking the above actions, the G20 can encourage member countries to adopt relevant policies and businesses to prioritize logistics modernization, thereby driving logistics decarbonization. Additionally, by formulating a global narrative that emphasizes the need and urgency for logistics sustainability, the G20 can stimulate public and private action. This in turn can generate unequivocal momentum for logistics sustainability and lead to the establishment of bold national targets and cooperative commitments.

Government, Corporate, and Financial Institution Roles

Collaboration is essential for driving sustainability in the logistics sector. Governments, corporations, and multilateral financial institutions all have a role to play:

Governments can foster sustainable logistics by developing infrastructure and implementing supportive policies. To help streamline the transport of goods, governments can invest in sustainable infrastructure, such as efficient transportation networks, intermodal facilities, and logistics hubs. Additionally, establishing regulatory frameworks that include incentives can promote the use of alternative fuels, help reduce congestion, optimize logistics operations, and promote sustainable logistics development.

Corporations, being at the forefront of implementing logistics operations, have the power to execute efficiency measures that reduce emissions and waste while meeting the company's goals. Innovative technologies and practices can help companies streamline goods transportation, optimize warehousing, and digitize administration. These practices can gradually decarbonize supply chains and play a critical role in realizing net-zero ambitions.

Multilateral financial institutions can channel funds into sustainable logistics projects because these organizations are best positioned to provide affordable financing to emerging economies to drive sustainable logistics development. Such institutions can also work to prioritize lending for projects with sustainable underpinnings — shifting the focus from funding solely conventional infrastructure (e.g., roads) to funding infrastructure that can support the decarbonization of the logistics sector (e.g., chargers on electric corridors).

Additionally, public and private actors should strategically allocate project risks and financial liabilities to develop more green logistics initiatives. Effective collaboration can lead to the establishment of logistics networks and assets that support efficient storage and seamless movement of goods. Exhibit 5 (next page) shows some actions governments and corporations can take to foster progress in sustainable logistics in both the near and the long term.

**Collaboration
is essential
for driving
sustainability
in the logistics
sector.**

Exhibit 5 Actions for G20 governments and businesses to foster sustainable logistics

	Near-term actions (<1 year)	Long-term actions (>1 year)
G20 policymakers	• Establish comprehensive frameworks and set targets for sustainable logistics. • Establish policies to deploy zero-emissions vehicle fleet and enable integration of renewable energy in warehouses.	• Plan and develop road infrastructure, including bypasses, ring roads, and dedicated freight routes. • Develop the necessary public charging infrastructure to support zero-emissions truck mobility on major highways. • Develop strategic industrial land-use plans for transportation and warehousing infrastructure.
G20 corporations	• Develop a sustainability strategy and allocate resources to drive innovation and reduce waste in logistics operations. • Integrate digital technologies that enhance the supply chain efficiency. • Implement efficient shipping practices, including reduced packaging, route planning, and load matching.	• Transition the entire fleet to electric and low-emissions vehicles. • Implement energy efficiency measures and integrate renewable energy across the logistics infrastructure. • Monitor sustainability targets and conduct internal audits to identify actionable measures for reducing emissions.
Multistakeholder collaboration	• Foster collaboration between the government and industry to identify regional systemic barriers and prioritize areas for improving logistics efficiency. • Launch campaigns and initiatives to raise awareness about sustainable logistics practices.	• Forge partnerships to secure financing for a more integrated warehousing infrastructure. • Develop infrastructure that facilitates intermodal connectivity for the efficient movement of goods.

Source: RMI analysis

1. Logistics Operations

The importance of adopting sustainable operations within the logistics sector cannot be overstated. As the global demand for efficient transportation and distribution continues to rise, so does the environmental impact of these activities. Integrating sustainability practices throughout the logistics sector is paramount — from warehouse management to transportation and last-mile delivery.

To decarbonize goods transportation, logistics providers must reduce vehicular movement and promote the adoption of low-carbon modes of travel. Improving warehouse operations and technology integration can reduce inventory loss, avoiding excess production of goods and the associated environmental impacts. It can also enhance storage space utilization and warehouse efficiency, lowering both the energy consumption of warehousing and the resulting emissions. Additionally, implementing intelligent technologies can streamline administrative processes associated with transportation and warehousing.

Here we highlight a series of innovative solutions and present compelling case studies that exemplify successful implementation of sustainable logistics practices. These examples demonstrate the positive impact on carbon emissions, traffic, energy security, and air and noise pollution, all while maintaining operational efficiency and profitability.

	Intervention strategy	Solution	Description	Case study	Geography
1.1	Corporate strategy	Corporate sustainability goals	Frameworks and commitments to reduce logistics carbon footprints of businesses	FedEx's carbon-neutral operations	Global
1.2	Corporate strategy	Research and development in cutting-edge technologies	Investment in R&D to optimize supply chains and enhance logistics efficiency	Shell GameChanger Accelerator	Global
1.3	Warehouse management	Integrating sustainable warehousing practices	Energy efficiency, renewable energy integration, and waste reduction measures in warehouses	OK Produce	California, United States
1.4	Vehicle use	Allowing nighttime deliveries in congested cities with EVs	Expand scheduling for timely deliveries outside peak hours for suitable industries	Nighttime deliveries using electric trucks	Stockholm, Sweden
1.5	Vehicle use	Eco-driving programs	Training programs for fleet operators	SmartDriver for highway trucking	Canada
1.6	Vehicle use	Sustainable and efficient packaging	Compact packaging to minimize the space required to transport goods	Ikea flat-pack furniture	Global
1.7	Vehicle use, technology integration	Load matching and vehicle selection	Online system matching shippers with goods carriers based on the size, weight, and delivery time line	Frete.com, a freight-matching platform	Brazil

1.1 Corporate Sustainability Goals



Need: With the implementation of stricter environmental regulations and a rising focus on sustainability from consumers and investors, corporations should establish near- and long-term sustainability targets across their operations. The establishment of such targets can provide direction to companies in terms of actionable and measurable solutions they should implement. Additionally, the companies' actions are communicated and disclosed through sustainability reporting, enabling enhanced accountability.

Overview: Corporate sustainability goals refer to near- and long-term targets and comprehensive action plans set by companies to actively address climate change while balancing their financial growth. This may include carbon-neutrality targets, circular economy initiatives, sustainable sourcing practices, renewable energy adoption and fleet electrification targets, waste management, and recycling standards. When designing these goals, companies should consider their entire value chain and address emissions at all levels. They can also align their sustainability goals with recognized and credible global standards.

Case study: FedEx goal of carbon-neutral operations by 2040, global



FedEx, a leading transportation and logistics company, operates in over 220 countries and territories and handles an average of 15 million packages per day worldwide. FedEx is committed to connecting people and possibilities around the world responsibly and resourcefully, with a goal to achieve carbon-neutral operations by 2040. Its Practical Sustainability philosophy and Reduce, Replace, Revolutionize strategy are enabling the company to strategically invest in sustainable solutions to achieve this goal globally.

First, FedEx aims to transition its entire parcel pickup and delivery fleet to zero-tailpipe-emissions vehicles by 2040. Additionally, the company continues to invest in initiatives such as the successful FedEx Fuel Sense program, aircraft fleet modernization, renewable energy, sustainable packaging choices, and alternative fuels. Second, the company has pledged to invest US\$100 million in establishing the Yale Center for Natural Carbon Capture. This initiative supports research into scalable carbon sequestration solutions. Finally, FedEx invests in energy management programs and on-site solar systems to improve the efficiency of its facilities and supports the development of sustainable cities through strategic charitable investments.

Impact: With its sustainability efforts, FedEx has saved 164 million gallons of fuel, avoiding more than 1.5 million tons of CO₂e emissions from its aircrafts. The company has also deployed over 6,000 electric and alternative fuel vehicles, eliminating 1 million tons of CO₂e emissions. FedEx saved 225 million kilowatt-hours (kWh) and generated 28.3 million kWh of electricity with building retrofits and 29 on-site solar facilities, respectively, in 2021.⁶ Overall, it has reduced its emissions intensity on a revenue basis by nearly 50% over the past 13 years.⁷

1.2 Research and Development in Cutting-Edge Technologies



Need: Given the dynamic nature of the logistics sector, there is a need for constant innovation in technologies, processes, equipment, and infrastructure to meet consumer demand in a sustainable manner. Allocating dedicated resources for research and development for logistics decarbonization can propel the sector toward a low-carbon trajectory.

Overview: Businesses can play a pivotal role in enhancing the sustainability of the logistics sector by investing in R&D and dedicated staff and resources. These teams can assess the emissions from the entire supply chain, identify areas of intervention, and develop low-carbon solutions. Companies can then evaluate the viability and impact of these solutions by developing pilots and demonstrations. Large corporations can also create collaborative platforms in partnership with start-ups, research facilities, and investors to further promote R&D across the logistics sector and create funds to invest in innovative solutions.

Case study: Shell GameChanger Accelerator program (GCxN), global



The Shell GameChanger (GC) is an incubator and accelerator program established by Shell, an energy company, to identify and support early-stage projects focused on clean energy. The program collaborates with start-ups, investors, and entrepreneurs to foster research and development in areas such as clean energy, carbon capture storage, and mobility by providing seed funding, technical expertise, and a strong network of resources.

For instance, in partnership with the US Department of Energy's National Renewable Energy Laboratory (NREL), the accelerator has launched the GCxN platform that offers start-ups up to US\$250,000 in non-dilutive funding, granting them access to advanced research facilities and the opportunity to collaborate closely with leading experts.⁸ Additionally, through collaborations with YES!Delft, Rockstart, and Get in the Ring, the platform organizes the New Energy Challenge, a competition that provides opportunities to start-ups to collaborate with investors and experts and seek funding for their innovative solutions.⁹

Impact: Since joining the GCxN program, the companies within the cohort have collectively raised US\$317 million in funding. The GCxN program has also led to job creation, with over 285 new jobs created across the companies since joining the accelerator. The accelerator already has 19 companies on board spanning different stages of development, with future plans to incorporate more companies.¹⁰

1.3 Integrating Sustainable Warehousing Practices



Need: Warehousing plays a crucial role in logistics operations, but it also contributes significantly to costs and emissions within the industry. These facilities occupy extensive space, consume substantial amounts of water and other natural resources, frequently rely on high-powered mechanical equipment, and are often the overnight base for trucks hauling goods to and from the warehouse. Integrating sustainable measures such as energy efficiency, renewable energy, and waste reduction can lower the carbon footprint associated with warehouses.

Overview: Several strategies can enhance the efficiency of warehouse buildings, including implementing insulated building envelopes; utilizing LED lights and advanced heating, ventilating, and air-conditioning systems; and installing monitoring systems to manage energy usage from mechanical equipment. Moreover, operators can take further steps to mitigate the carbon footprint of warehousing operations by integrating renewable energy sources on-site, typically via rooftop solar, and providing on-site charging for electric trucks.

In addition to energy considerations, sustainable warehousing practices also prioritize waste reduction and water management. Increasing recycling efforts and adopting comprehensive waste management strategies can minimize the environmental impact associated with waste generation. Additionally, implementing water reclamation systems to capture and reuse water will lower the dependance on water draws from rivers, especially in water-stressed regions. Finally, digitizing logistics operations within warehouses through warehousing management software, automated order processing, and real-time tracking can streamline logistics activities, enhance visibility, and reduce inefficiencies.

Case study: OK Produce green warehousing, California, US



OK Produce is a wholesaler that deals with handling and distribution of fresh fruits and vegetables in an environmentally responsible manner. The company sources its products through local and responsible suppliers to serve a wide variety of retail store chains in California and beyond.

In efforts to reduce the carbon footprint, the company is investing in a green warehousing operation. Practices include using 100% LED lighting to reduce energy consumption, integrating renewables by installing over 10,000 solar panels on-site, utilizing highly efficient refrigeration using ammonia, and investing in low-carbon vehicles. It currently has 20 hybrid EVs in its light-duty

fleet and has replaced three diesel trucks with Daimler's e-Cascadia battery-electric trucks.¹¹ Focusing on resource use, OK Produce has also installed drought-resistant landscaping, installed a water reclamation system, and integrated a compost and recycling system to divert over 95% of its materials from the landfill.

Impact: OK Produce's facility in Fresno, California, can generate 3 megawatts of solar energy, meeting 70% of the site's energy demand. It has also dramatically reduced its water consumption compared with similar sites.¹² Such measures have given OK Produce a competitive edge because it has seen that consumers value sustainability efforts and support the company's aims to promote public and planetary health.

1.4 Allowing Nighttime Deliveries in Congested Cities with EVs



Need: Deliveries made during peak daytime hours significantly contribute to congestion, as well as air and noise pollution, particularly in urban areas. A potential solution to mitigate these issues in congested cities is to expand the delivery window to off-peak hours, which include evenings, nights, and early mornings. For example, estimates suggest an up to 45%–67% reduction in emissions per kilometer in cities like New York and São Paulo with off-peak deliveries.¹³

Overview: Off-peak deliveries refer to allowing businesses to schedule deliveries during periods of lower traffic, such as late evening or early morning. Businesses, like retailers and those in the food industry, can benefit from after-hours deliveries because they allow vehicles to occupy the entire lane on empty streets for unloading goods, enabling faster operations without disrupting traffic flow. This will also free up curbside space for diverse daytime use. Using EVs, which are typically quieter than internal combustion engine vehicles at similar speeds, would minimize disturbances in and around residential areas while conducting nighttime deliveries. By incentivizing suitable industries to adopt off-peak deliveries, governments can reduce congestion and emissions associated with urban freight transport.

Case study: Nighttime deliveries using electric trucks, Stockholm, Sweden



In 2019, Stockholm conducted a pilot project in collaboration with Scania (a hybrid truck manufacturer), HAVI Logistics (a freight management company), and McDonald's (a fast-food chain) to test the feasibility of nighttime deliveries. HAVI completed three weekly trips to McDonald's using Scania's electric plug-in hybrid truck for eight months. Noise reduction measures were implemented to minimize disturbances during the loading and unloading process.

Impact: The pilot demonstrated that off-peak deliveries resulted in improved parking availability, reduced queuing, and higher driving speeds. On average, off-peak deliveries were 30% faster than daytime deliveries, resulting in a 44% reduction in carbon emissions.¹⁴ The municipality of Stockholm has deemed the project highly successful and has expanded the delivery time frame by granting permission to more companies to conduct nighttime deliveries with electric freight vehicles.¹⁵

1.5 Eco-driving Programs



Need: Inefficient driving practices, such as aggressive acceleration and braking, speeding, and prolonged idling, can increase fuel consumption. This contributes to higher costs and emissions and poses safety risks to drivers, other road users, and the cargo being transported.

Overview: Eco-driving programs promote fuel-efficient and safe driving habits by providing comprehensive training and educational materials for drivers. These programs cover techniques such as smooth acceleration and deceleration, maintaining a consistent speed, and minimizing unnecessary idling. Additionally, drivers receive guidance on the significance of regular vehicle maintenance to enhance the vehicle's operating efficiency. Furthermore, the program offers training on engine management systems, fuel-efficient routing and navigation systems, and telematics to monitor and improve truck performance.

Logistics companies can integrate eco-driving practices into their onboarding process for new drivers and establish incentive structures that reward drivers for consistently following such techniques. Likewise, governments can consider incorporating an eco-driving curriculum as part of the requirements for obtaining a truck driving license.

Case study: Eco-driving program for highway trucking, Canada



Since 1970, the Canadian government has been a leader in promoting fuel efficiency in the trucking industry. One of its notable initiatives is SmartDriver for Highway Trucking (SDHT), developed by the Office of Energy Efficiency.¹⁶

SDHT is an extensive online training program offering a wealth of resources and guidance for individuals and fleet operators. It encompasses a range of online courses, instructor resources, and on-road training materials, all dedicated to helping drivers of medium- and heavy-duty commercial vehicles reduce fuel consumption, operating expenses, and emissions. The training

focuses on eco-driving techniques such as minimizing idling, practicing progressive shifting, and adhering to proper vehicle maintenance practices. SDHT is widely regarded as a gold standard program, with several Latin American countries adopting similar eco-driving best practices based on its success.¹⁷

Impact: An SDHT study conducted in 2021 found that implementing eco-driving practices and routine maintenance resulted in fuel savings of up to 3.8% for trucks and fleets.¹⁸ Moreover, when similar eco-driving practices have been applied beyond Canada in less mature markets, the fuel savings are even more substantial. For instance, in Peru, the eco-driving training launched in 2019 resulted in a 17% increase in fuel savings.¹⁹

1.6 Sustainable and Efficient Packaging



Need: Excessive packaging and the use of unsustainable packaging materials are the primary contributors to waste generation in the logistics sector. For example, in 2022, the e-commerce industry utilized nearly 1 billion kilograms of plastic packaging, and this figure is projected to rise to 2 billion kilograms by 2025.²⁰ Furthermore, unoptimized packaging design results in goods occupying more space in warehouses and trucks, which escalates the demand for storage space and vehicular movement.

Overview: Sustainable and efficient packaging can be promoted through three key strategies: reduce, redesign, and replace. First, the demand for packaging material can be reduced by rightsizing shipping boxes for the goods and using multiple layers of packing only when necessary. Second, well-designed packaging that optimizes the size and dimensions of the package can minimize the space required by goods for storage and transportation. Finally, businesses can replace conventional packaging materials with environmentally friendly alternatives that are reusable, recyclable, or compostable. For instance, substituting polyvinyl chloride with paper or utilizing biodegradable or recyclable polyethylene-based plastics, using algae ink, and leveraging QR code technology can reduce paper consumption in merchandising.

Case study: IKEA flat-pack furniture, global



IKEA, a Swedish home accessories company, offers ready-to-assemble furniture with all the necessary hardware included in the package. The company utilizes a flat-pack model, wherein products are disassembled and packed into compact, flat packages. This strategy was initially adopted to enhance the convenience of shipping large furniture items. Due to the associated cost reductions, the concept of flat packing gained popularity across various product ranges. The flat-pack approach enables IKEA to maximize the number of furniture pieces fitted into each shipment, optimize storage and trucking space, reduce the number of trips required for transportation, and ultimately lower emissions and costs.

Impact: Flat packing led to a reduction in packaging size, packaging weight, and associated costs and emissions to move the shipments. For example, in 2010, with flat packing, IKEA reduced the packaging size for its EKTORP sofa by 50%, removing 7,477 trucks from the roads annually and saving EUR 1.2 million (US\$1.34 million) a year. The realized cost savings from transportation and packaging optimization led to a 14% reduction in the purchase price of the sofa, which made the product more cost-competitive in the market.²¹ In 2012, the company reduced the packing weight of the TEXTUR lamp by 34%, which allowed 128 lamps to fit on a pallet, an increase from the previous 80. Overall, flat packing will contribute to IKEA's goal of reducing carbon emissions from every product by an average of 70% by 2030 compared with 2017.²²

1.7 Load Matching and Vehicle Selection



Need: In the logistics sector, suboptimal use of transportation resources, such as underutilized trucks or overloaded shipments, is a common problem. This arises due to mismatches between the characteristics of the cargo and available vehicles or carriers.

Overview: Load matching and vehicle selection refer to the process of aligning available cargo with the right logistics provider and delivery vehicle. Online digital shipping platforms and third-party logistics providers (3PLs) are commonly used for this purpose. These platforms use algorithms and intelligent matching systems to efficiently match shippers with carriers based on factors such as shipment requirements (load size, weight, volume, etc.), carrier capabilities, availability, delivery time line, and pricing. This helps shippers quickly find a suitable vehicle that would have otherwise spent time traveling empty, thereby reducing excessive vehicle travel. 3PL platforms also provide real-time tracking, digital documentation, payment processing, and customer support for seamless coordination across vehicle operations.

Case study: Frete.com, a freight-matching platform, Brazil



Brazil is the third-largest trucking industry in the world in terms of market value and spends 12% of its GDP on the logistics sector.²³ Despite its significant size, the trucking sector in Brazil faces certain inefficiencies, including low trucking productivity and a lack of technology integration.

In response to these challenges, Frete.com, a logistics company based in Brazil, has taken proactive measures to

address the issues prevalent in the trucking sector. Frete.com has digitized the load-matching process of connecting carriers to truck owner-operators. Through an app, shippers can specify their shipment characteristics such as size, weight, origin, and destination and request quotes from logistics providers so they can make an informed decision based on factors like price and delivery time. The route optimization algorithm further reduces fuel consumption from trucking operations.

Impact: Since its launch in 2013, Frete.com has reduced truck idling capacity by 50% through the online freight-matching platform. Furthermore, the company's initiatives have decreased its CO₂ emissions by 20 million tons per year.²⁴

2. Policy Drivers

Favorable policy mechanisms are critical to driving sustainable logistics practices. These mechanisms include targets, campaigns, regulatory frameworks, standards, requirements, subsidies, and incentives. Targets and campaigns establish a vision for sectoral growth and encourage sustainable logistics practices. And regulatory frameworks and standards require action from the industry to make high-level targets achievable. Fiscal and non-fiscal incentives further support these objectives by promoting the adoption of clean technologies and infrastructure development.

At different levels of government, various entities contribute to driving logistics policy formulation. The national government often defines broad regulatory frameworks, sets standards and targets, and conducts awareness campaigns. National and state governments provide fiscal and non-fiscal incentives, while city governments focus on local policies related to land-use and infrastructure development.

This section highlights policies, regulations, and incentives that stimulate economic growth, improve air quality, reduce congestion, and more.

	Intervention strategy	Solution	Description	Case study	Geography
2.1	Policy roadmaps and targets	Logistics policies	A roadmap for advancing logistics sector development	National logistics policy	India
2.2	Incentives	Zero-emissions vehicle incentives	Demand-side incentives for zero-emissions vehicles	Inflation Reduction Act	United States
2.3	Regulatory framework	Zero-emissions vehicle requirements	Purchase and sales requirements for zero-emissions vehicles	Advanced clean trucks rule	California, United States
2.4	Initiatives	National awareness campaigns	Campaigns to spread awareness about the benefits of sustainable logistics	Shoonya – Zero-Pollution Mobility campaign	India

2.1 Logistics Policies



Need: The logistics industry comprises numerous elements, including transportation networks, infrastructure development, financing, inventory management, and vehicle operations. However, these elements often evolve in isolation, leading to low systemic efficiency. To address this issue, an overarching logistics policy at the national level can play a vital role in coordinating and aligning these efforts. It can provide a cohesive vision to various stakeholders in the logistics ecosystem, enabling a unified approach.

Overview: A logistics policy serves as a set of guidelines and frameworks to govern the planning, implementation, and management of logistics activities. These policies encompass transportation regulations, trade facilitation, infrastructure development, and environmental considerations. The government can engage with industry to understand the regional systemic barriers in the logistics sector and identify priority areas for the policy. It may include measurable targets and specific objectives that can provide the industry with clarity and enable effective evaluation of the policy's impact.

Case study: National logistics policy, India



India, the world's fifth-largest economy and a growing manufacturing hub, launched its National Logistics Policy (NLP) in 2022.²⁵ The vision of the policy is to support technological advancement, cost efficiency, resilience, and sustainability within the logistics ecosystem in India.

The policy highlights three critical areas of focus: transportation, warehousing, and inventory management. First, the NLP encourages the adoption of sustainable transportation modes, including road, rail, and waterways. Second, it promotes efficient land-use planning and facilitates investments in new warehouses and multimodal logistics parks. Finally, the policy encourages the digitization of supply chains to improve inventory management. The policy also simplifies the regulatory processes to streamline dialogue between industry and government.

Desired Impact: The NLP aims to reduce India's logistics cost from the current 13%–14% to 8% of its GDP and aims to improve the nation's LPI from 38th place (2023) into the top 25 countries by 2030.²⁶ The launch of this policy has also generated momentum at the state level, with 14 states having already developed their state logistics policies, and 13 states having prepared their draft.²⁷

2.2 Zero-Emissions Vehicle Incentives



Need: Two primary considerations for fleet operators when making vehicle purchasing decisions are the up-front capital cost and the cost to own and operate the vehicle over the lifetime. Zero-emissions commercial vehicles currently have a higher total cost of ownership (TCO) than traditional internal combustion engine counterparts, especially for heavy trucks.²⁸ This is mainly because of the higher initial purchase price and charging infrastructure expenses related to zero-emissions vehicles (ZEVs).

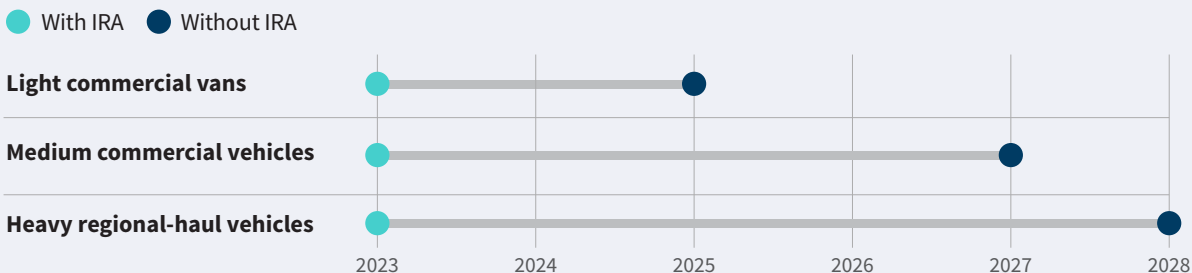
Overview: Governments can implement fiscal and non-fiscal incentives to encourage the manufacturing and deployment of ZEVs and associated charging infrastructure. Policies for demand-side incentives involve measures aimed at lowering the TCO of ZEVs. These measures include up-front purchase subsidies, special EV charging tariffs, exemptions from road taxes and tolls, lower interest rates, scrappage incentives for internal combustion engine vehicles when replaced by a ZEV, and more. Among these measures, up-front purchase subsidies are significant because they address the barrier of high capital investment for fleet operators and are usually the foundational element of most ZEV policies across the globe. These purchase incentives are intended to create a near-term market push to drive ZEV sales.

Case study: Inflation Reduction Act, United States

The United States passed the Inflation Reduction Act (IRA) in August 2022 to help transform US energy systems.²⁹ The IRA includes incentives for EVs including the Commercial Clean Vehicle Credit, also known as the 45W credit.

Under the 45W credit, commercial ZEVs are eligible for a tax credit of 30% of the vehicle cost or (1) US\$7,500 for smaller commercial vehicles (gross vehicle weight rating [GVWR] up to 14,000 lb.) or (2) US\$40,000 for medium and heavy commercial vehicles (GVWR greater than 14,000 lb.), whichever is lesser.³⁰ Starting from 2024, these tax credits will be available at the point of sale, effectively functioning as purchase incentives or subsidies for commercial ZEVs (see Exhibit 6).

Exhibit 6 TCO parity for ZEV with and without IRA



Source: RMI analysis

Desired Impact: The IRA's Commercial Clean Vehicle Credit will accelerate TCO parity for ZEVs. Light-duty commercial vans will achieve parity by 2023 instead of 2025, medium-duty commercial vehicles by 2023 instead of 2027, and heavy-duty regional-haul vehicles by 2023 instead of 2028.³¹ Overall, the IRA incentives will enable additional sales of 8 million commercial ZEVs between 2022 and 2032.³²

2.3 Zero-Emissions Vehicle Requirements



Need: ZEVs, such as battery-electric and fuel cell vehicles, have lower emissions and operational costs than their diesel, petrol, and compressed natural gas counterparts. However, the market for light commercial ZEVs, such as vans and light trucks, as well as medium- and heavy-duty zero-emissions trucks (ZETs) is still in its early stages of development. Fleet operators have few options for ZEV models that can effectively meet their operational requirements. On the other hand, manufacturers are hesitant to invest in technology and facilities for large-scale ZEV production without clear demand signals. Policies mandating the sale and purchase of ZEVs can break this impasse.

Overview: ZEV sales and purchase requirements are regulatory measures that set a mandate or requirement for the manufacturing and adoption of ZEVs over time. Such sales requirements stipulate that a certain percentage of vehicles produced and sold by original equipment manufacturers (OEMs) must be ZEVs. This ensures that OEMs prioritize the production and sale of ZEVs in the market.

To incentivize this transition, regulators can implement a credit and deficit accounting system in which OEMs earn credits for every ZEV sold and accumulate deficits for every internal combustion engine vehicle sold. Moreover, OEMs with deficits can purchase credits from OEMs with excess credits to adhere to the compliance.

Complementing the sales requirements, purchase requirements focus on the demand side of the market, mandating that fleet operators adopt ZEVs as a certain percentage of their total fleet. This requires fleet operators to embrace ZEVs and integrate them into their operations, further driving demand for these vehicles. Together, these regulatory measures create a comprehensive framework that fosters the manufacturing, supply, and adoption of ZEVs.

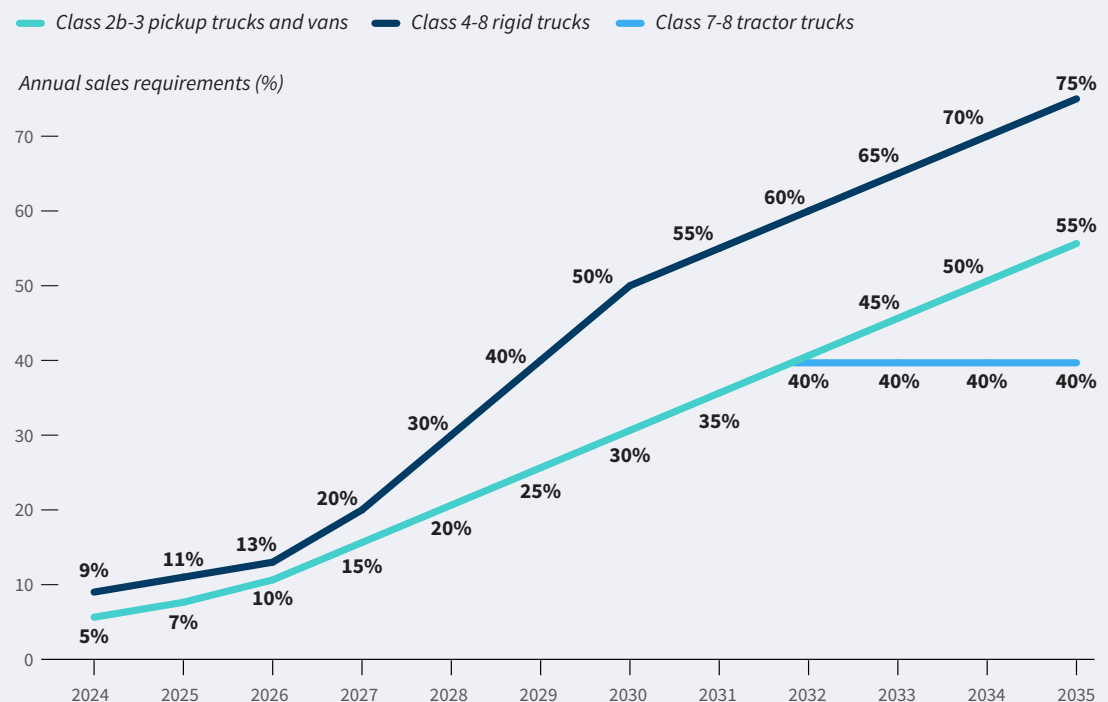


Case study: Advanced Clean Trucks Rule, California, United States

Medium- and heavy-duty trucks represent only 7% of California's total vehicle fleet but contribute to over 55% of particulate matter and 25% of GHG emissions from all vehicles.³³ To promote the manufacturing and adoption of ZETs, the state has launched the Advanced Clean Trucks (ACT) rule.

ACT is a supply-side policy that stipulates manufacturers must sell an increasing percentage of ZETs over time. As shown in Exhibit 7, the regulation outlines specific sales targets for three different truck classifications by 2035: 55% of new class 2b–3 (3.8–6.8 tons) pickup trucks and vans, 75% of class 4–8 (6.3 tons and above) rigid trucks, and 40% of class 7–8 (11.7 tons and above) tractor trucks.³⁴

Exhibit 7 ACT annual sales percentage requirements by weight class



Source: RMI analysis

Desired Impact: The enactment of ACT is expected to help California achieve its goal of 100% zero-emissions medium- and heavy-duty vehicle sales by 2045.³⁵ Moreover, through this rule the state will be able to avoid 17.3 million tons of GHG emissions between 2020 and 2040.³⁶

2.4 National Awareness Campaigns



Need: Consumers often lack knowledge about the health, air quality, economic, and environmental impacts of sustainable logistics, leading to insufficient demand for such practices. Without sufficient demand, businesses and organizations may not prioritize implementing sustainable logistics measures, leading to lower adoption rates.

Overview: National awareness campaigns for sustainable logistics are coordinated efforts by governments, possibly in collaboration with industries and other civil organizations, to raise public awareness about the benefits and necessity of adopting sustainable logistics practices. The campaigns aim to educate individuals, corporations, and other stakeholders about the positive impacts of sustainable logistics on the environment, economy, and society. They may involve various strategies, such as traditional and digital media, events, workshops, or educational resources, to maximize consumer engagement.

Case study: Shoonya – Zero-Pollution Mobility campaign, India

Shoonya – Zero-Pollution Mobility is a consumer awareness campaign by NITI Aayog in partnership with over 180 companies. The campaign aims to fully electrify India’s delivery and ride-hailing sector by 2030 by raising awareness about the benefits of EVs among consumers and applauding corporate efforts toward fleet electrification.

The campaign has three components as shown in Exhibit 8: (1) corporate branding: parcels, vehicles, and driver uniforms for electric deliveries and rides are branded with Shoonya collateral to recognize the industry effort and create visibility for EV-operated services; (2) a consumer awareness drive: various traditional and digital media strategies, including ad films, billboards, blogs, social media, podcasts and contests, promote awareness about EVs; and (3) a resource toolkit: online knowledge resources assist buyers with their EV procurement, providing valuable information and guidance.

Impact: The Shoonya campaign has reached over 100 million consumers since its launch in September 2021, enabling more than 150 million Shoonya rides and deliveries.³⁷ In the first year of the campaign, corporate partners successfully completed 20 million deliveries and 15 million rides, leading to 13,000 tons of avoided carbon dioxide, 59 tons of avoided nitrogen oxide, and 1.6 tons of avoided particulate matter emissions.

Exhibit 8 Three components of the Shoonya campaign



Source: RMI’s compilation

3. Infrastructure Development

The build-out of logistics infrastructure — the network of physical assets that facilitates the efficient transportation and storage of goods — is crucial in streamlining logistics operations, reducing inventory waste, and enhancing the effective distribution of goods. This encompasses various storage facilities, including logistics parks, warehouses, and consolidation centers, as well as transportation networks such as roadways, railways, ports, and airports. Additionally, it involves the development of urban infrastructure to facilitate smooth delivery processes and support the use of ZEVs.

Strategically locating industrial and warehousing facilities through land-use planning can reduce truck movement and create a clear demarcation between industrial and residential areas. Furthermore, developing road infrastructure, such as bypasses and dedicated freight routes, can make goods transportation more efficient and improve connectivity between warehouses and urban centers. Finally, deploying EV charging infrastructure along major roadways can enable the widespread adoption of ZEVs and efficient goods transport.

	Intervention strategy	Solution	Description	Case study	Geography
3.1	Warehousing infrastructure	Logistics parks	Facilities that enable the pooling of logistics assets and workforce and serve as intermodal transport hubs	Integrated Logistics Park at Jeddah Islamic Port	Saudi Arabia
3.2	Land-use planning	Industrial planning	Land-use plans that strategically site industries, logistics facilities, and residential areas	Saemangeum Industrial Complex	Korea
3.3	Land-use planning	Allocated parking and load zones	Dedicated space for truck loading and unloading	Multiuse lanes	Barcelona, Spain
3.4	Land-use planning	Low-emissions zones	Reduced operation of high-emissions vehicles within demarcated areas	Low-emissions zones	London, United Kingdom
3.5	Road infrastructure	Bypasses and dedicated freight routes	Streamlined paths for efficient movement of trucks	North East Link project	Melbourne, Australia
3.6	ZEV infrastructure	Zero-emissions trucking corridors	Highway equipped with charging or hydrogen refueling infrastructure to facilitate zero-emissions truck travel	Highway corridor equipped with battery swapping stations for e-trucks	China

3.1 Logistics Parks



Need: Logistics infrastructure is typically characterized by a high degree of dispersion, with warehouses, storage facilities, distribution centers, and transport terminals scattered across different locations. This dispersion often leads to inefficiencies due to the loss of economies of scale and density in logistics activity, resulting in increased distances traveled by goods and longer required lead times.

Overview: Logistics parks act as centralized hubs for all logistics activities, including warehousing, distribution, and transportation. They can also offer a range of specialized facilities such as storage, customs clearance, and packaging tailored to the specific types of goods being handled. This leads to effective utilization of space and resources, enhanced productivity, and faster lead times. If located near network intersections, logistics parks can also serve as intermodal hubs, facilitating seamless cargo transfer between various modes of transportation such as trucks, trains, ships, and planes. Integrating renewable energy into logistics parks through rooftop solar can further reduce the carbon footprint from logistics infrastructure.

Case study: Integrated Logistics Park at Jeddah Islamic Port, Saudi Arabia



Mawani (Saudi Ports Authority) and AP Moller Maersk (a global logistics and shipping company) have formed a strategic partnership to develop Saudi Arabia's integrated logistics park at Jeddah Islamic Port.³⁸ The park will cover an expansive area of 225,000 square meters and will be developed with an investment of US\$346 million. Within the park, 70% of the space will be dedicated to warehouses and distribution centers that will serve various industries, such as automobiles, furniture, chemicals, cold storage for food and vegetables, consumables, and e-commerce fulfillment.

These warehouses will be equipped with state-of-the-art management systems and other technological and digital solutions to enhance inventory management, traceability, and visibility into inventory flows. As part of their commitment to sustainability, all park operations requiring electricity will be powered by renewable energy sources. Additionally, transportation within the park will be facilitated by electric trucks.

Desired Impact: The optimized logistics park design will increase overall productivity by 50% and accommodate 200,000 TEUs (twenty-foot equivalent units) of container traffic annually. This project will create 2,500 jobs in the country and contribute to Maersk's target of achieving net-zero logistics operations by 2040 because it will help aggregate shipments and work to reduce the carbon emissions of its logistics operations.

3.2 Industrial Planning



Need: The absence of long-term urban planning can lead to the scattered and disorganized expansion of industrial zones throughout a city. Such fragmented growth can result in more truck travel through the urban core, negatively impacting communities because trucks contribute to poor air quality, noise pollution, and traffic congestion.

Overview: Through industrial planning, the government can create a comprehensive long-term land-use plan for the city, designating specific areas for factories and warehouses, ensuring they are located away from residential boundaries. This strategic approach promotes the consolidation of industrial activities within distinct zones and enhances the interconnectivity between industry and logistics infrastructure. These plans also contribute to the creation of livable cities by minimizing truck travel and industry within urban centers. This improves air quality, reduces congestion, and enhances the well-being of urban residents.

To ensure the sustainability and adaptability of industrial plans, it is crucial for the government to work collaboratively with industry. By considering the growth plans of industrial sectors, the government can develop industrial plans that support the future economic development of the city. Additionally, to achieve seamless connectivity between these different areas, industrial plans should prioritize the development of highways or railways, enabling residents to easily access the job opportunities generated by these industries.

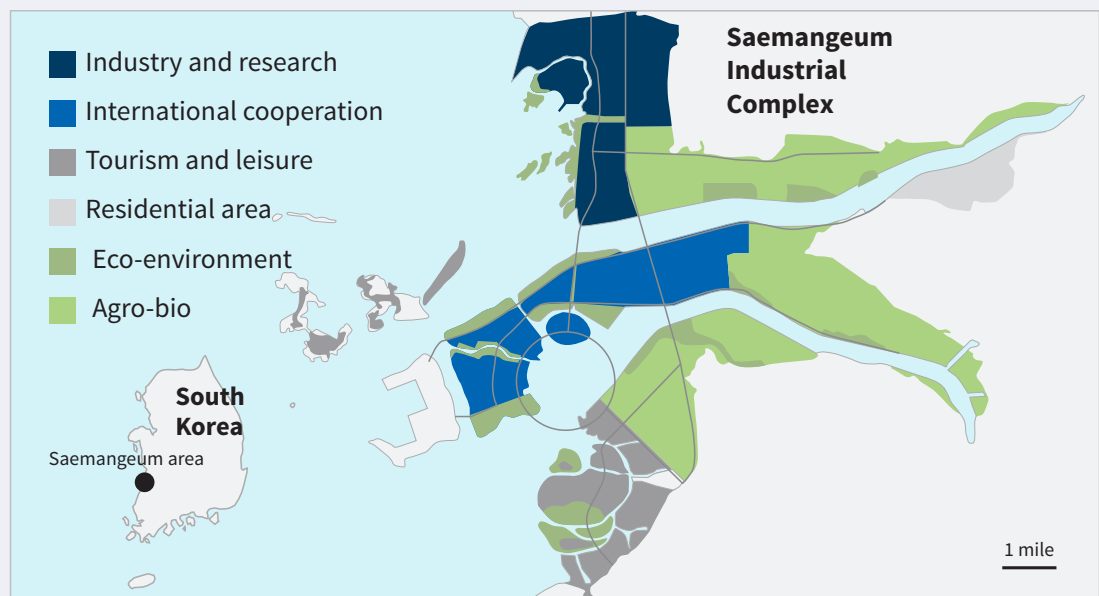


Case study: Saemangeum Industrial Complex, Korea

The Saemangeum area, situated along Korea's west coast, is currently undergoing a significant reclamation and land-use planning process (see Exhibit 9). Among the top priorities in this new development plan is industrial planning.

To achieve this, the city will establish a dedicated industrial complex that is strategically located and separated from residential, agricultural, and tourism zones. The industrial complex will spread over an area of 41.7 km² and house key industries like renewable energy, automobile and component manufacturing, and information and communications technology.³⁹ Once completed, this area will serve as an industrial hub, facilitating seamless sea linkages with other countries for efficient trade.⁴⁰ The industrial and urban spaces, while being segregated, will be well connected via road and sea networks.

Exhibit 9 Saemangeum land-use plan



Note: This map is only for illustration purpose and doesn't depict actual geographical boundaries.

Source: Invest Korea

Impact: The Saemangeum development project is expected to consolidate logistics activities in the industrial complex. With Saemangeum's port network, this industrial complex will facilitate exports. The industrial planning process will improve the quality of life of 706,000 residents by reducing emissions and congestion from industrial activity. The complex will reduce GHG emissions by 25% due to the expanded renewable energy supply.⁴¹

3.3 Allocated Parking and Load Zones



Need: Cities frequently face challenges related to inadequate parking and loading/unloading areas for trucks and deliveries. Consequently, drivers often find themselves driving in circles around the city in search of available parking spots, resorting to illegal street parking to carry out their deliveries, or being compelled to park at considerable distances from their intended destinations. These circumstances result in inefficient delivery processes, longer delivery times, and increased congestion in urban areas.

Overview: Parking, loading, and unloading processes can be streamlined by assigning designated areas in the urban core in which to carry out these activities. This can be achieved through dedicated logistics parking spaces or designated on-street parking areas where delivery vehicles can conveniently stop and unload their goods. Infrastructure such as curb modifications for wheeled crates or trolleys and smart parking sensors can further enhance these zones, improving goods handling, reducing unloading time, and minimizing disruptions to traffic. Overall, the implementation of designated parking and loading/unloading areas, along with the integration of appropriate infrastructure, can streamline logistics operations and improve traffic flows.

Case study: Multiuse lane in Barcelona, Spain



Barcelona implemented a multiuse lane system to streamline goods deliveries in the city.⁴² Depending on the time of the day, these lanes are used for different applications by various vehicles. During hours of peak traffic, the 3.3-km-long multiuse lane is used as a priority bus lane with a frequency of 25 buses per hour. During nonpeak hours, the lane is converted to 44 temporary on-street parking spaces for goods loading and unloading. Digital display screens are used to provide clear information on lane priorities throughout the day to drivers.

Impact: The creation of multiuse lanes in Barcelona has reduced the travel time of goods by 12%–15% and has enabled delivery drivers to more efficiently load and unload trucks while eliminating congestion caused by delivery vehicles.⁴³ Given the success of the multiuse lane system pilot, Barcelona is planning to extend this measure along other primary roads and is working to integrate the concept into future traffic engineering plans.⁴⁴

3.4 Low-Emissions Zones



Need: Urban areas with heavy traffic flow frequently experience poor air quality in residential and commercial areas due to vehicle emissions. This underscores the importance of promoting the use of low-emissions vehicles in cities.

Overview: Low-emissions zones (LEZs) are designated areas within cities or regions that implement regulations to restrict the entry of polluting vehicles based on their emissions levels. The primary goal of these zones is to enhance air quality and diminish pollution by either prohibiting the entry of vehicles that do not meet the specified emissions standards or imposing fees on them. The criteria for LEZs, including emissions standards, enforcement measures, penalties, boundaries, and operating hours, are determined by the respective governments and vary across different regions.

Case study: Low-emissions zones, London, United Kingdom

London introduced LEZs in 2008, intending to reduce the exhaust emissions of older and more polluting vehicles and promote the adoption of ZEVs. Under the scheme, vehicles are subject to incremental fees based on their compliance with European emissions performance standards.⁴⁵ Success with LEZs led the city to impose stricter tailpipe emissions standards for cars, vans, specialist vehicles, and minibuses entering the city through the creation of the Ultra Low Emission Zone (ULEZ) in 2019. As a result, more vehicles in London have begun to meet the latest version of the European emissions performance standards (Euro 6).

Impact: Since its implementation, the ULEZ has led to a 50% reduction in nitric oxide emissions in central London.⁴⁶ Building on this success, the ULEZ was expanded to all London boroughs on August 29, 2023. This will bring cleaner air to over 5 million people in the city.⁴⁷



3.5 Bypasses and Dedicated Freight Routes



Need: Urban roads frequently lack the capacity to handle large freight volumes and trucking activity. As a result, trucks traveling through the urban core experience traffic congestion and delivery delays and negatively impact air quality, leading to adverse effects on public health.

Overview: A bypass or ring road redirects freight traffic away from the city, offering an alternate route that circumvents the urban core. It is a convenient alternative for truck drivers who do not require stops within the city, while ensuring seamless connectivity to the urban core for vehicles involved in final-mile deliveries. Ultimately, this reduces truck travel times and alleviates city traffic congestion.

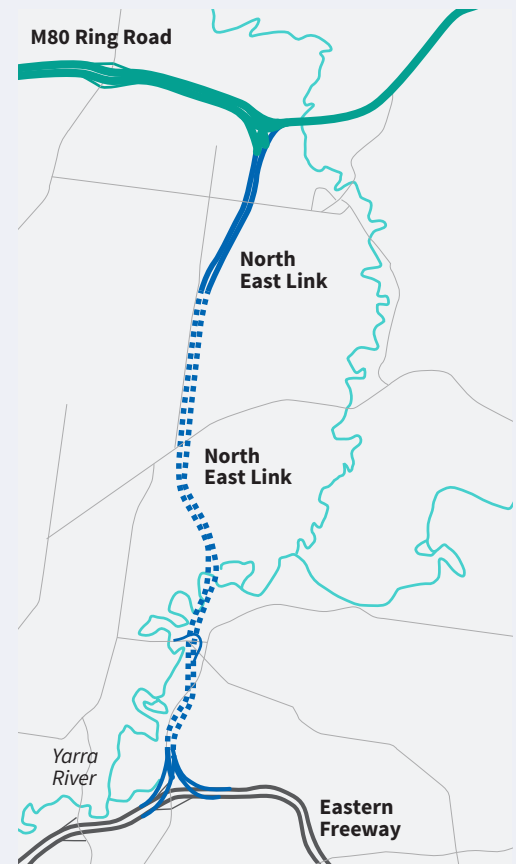
Case study: North East Link project, Melbourne, Australia

Approximately 46 million tons of freight are transported via the road networks in the northeast area of Melbourne, the capital of Victoria state in Australia. As a result, the city experiences a high volume of trucks, with approximately 8,100 to 9,000 passing through the city daily. This number is projected to increase due to the growing population and the rising demand for goods.⁴⁸

To address this issue, the Victoria government has initiated a North East Link project to improve connectivity between two major freeways, the M80 and Eastern Freeway (see Exhibit 10). By creating a ring road around Melbourne and constructing the North East Link Tunnel, city planners aim to redistribute traffic and divert trucks away from arterial roads, thus enhancing freight movement between the city's north and southeast regions. It is anticipated that the North East Link will serve as a connection point for over 135,000 vehicles per day by 2036.⁴⁹

Desired Impact: Traveling via the North East Link is expected to reduce travel times by up to 30 minutes — a 65% improvement from the current conditions.⁵⁰ The project anticipates reducing congestion of heavy vehicles in the city and improving the overall livability for communities in the northeast region.

Exhibit 10 North East Link project



Note: This map is for illustration purposes only and does not depict actual geographical boundaries.

Source: Victoria's Big Build

3.6 Zero-Emissions Trucking Corridors



Need: ZETs have lower operating costs and emit fewer emissions than their diesel counterparts. Despite the benefits, the ZET market is still in its early stages due to several challenges, such as limited financing, lack of scaled demand, technological reliability concerns, and the absence of widespread charging infrastructure.

Overview: ZET corridors are highway segments equipped with the necessary refueling infrastructure to support seamless travel for ZETs. This infrastructure includes options like fast charging, battery swapping, catenary charging, and hydrogen refueling stations.

ZET corridors work to channel investment and enable the deployment of ZETs and charging resources to facilitate seamless ZET travel and scaled ZET deployment. First, ZET corridors provide sufficient charging infrastructure over a set route, providing fleets with the confidence they need to adopt ZETs along specific corridors. Adequate public, en route infrastructure is critical, especially for trucks that do not regularly return to the same overnight destination. Second, ZET corridors aggregate the demand for ZETs, enabling manufacturers to efficiently scale up production and meet market requirements. Third, they provide businesses with the opportunity to test different refueling strategies and identify the most suitable options. Finally, ZET corridors allow financiers to invest in the technology without requiring substantial capital outlays.

By establishing dedicated highway segments with comprehensive refueling infrastructure, stakeholders can effectively work to scale ZET deployment, validating the viability of ZETs, while minimizing risks. The valuable insights gained from these corridors can be extrapolated and applied to accelerate ZET adoption on a larger scale. Additionally, the knowledge acquired from these corridors can support policymakers in designing effective policies for ZETs.



Case study: Highway corridor equipped with battery swapping stations for ZETs, China



Battery swapping — exchanging existing depleted truck batteries with fully charged ones at battery swapping stations — is one of the popular technologies utilized for refueling ZETs.

China is piloting the adoption of ZETs by investing in battery swapping corridors. The first pilot

project was implemented in southern Fujian Province in 2022, with battery swapping stations installed along a 175-km high-traffic highway corridor to support electric dump trucks.⁵¹ Another project is underway, planning to deploy 50 electric trucks that will utilize six swapping stations along a 300-km highway segment connecting the major southwest cities of Chengdu and Chongqing. These projects are supported by a suite of policies incentivizing the adoption of battery swapping technologies, including national-level targets, subsidies, and battery standardization policies.⁵²

Impact: These corridors have decreased the overall investment cost of installing swapping stations on account of the high utilization of such stations. Moreover, these developments have led to battery-swappable trucks being the primary mode for deploying ZETs in China; over 50% of the electric trucks on roads today are battery-swappable.⁵³

4. Financial Investments

Access to finance and capital is vital in facilitating investments in the logistics sector. Logistics projects require substantial capital investments and are often considered high risk due to significant funding needs, lengthy gestation periods, potential construction delays, and regulatory and operational uncertainties.

To address this challenge, various entities can collaborate and share risks, responsibilities, and investments associated with these projects. Multilateral development institutions can offer preferential financing for logistics infrastructure projects in emerging economies. In addition, the public and private sectors can work together to plan, finance, and execute projects. The government can provide incentives, such as preferential tax rates or subsidized land costs, to stimulate investments. At the same time, the private sector can contribute capital and provide the technical expertise necessary for successful project implementation.

	Intervention strategy	Solution	Description	Case study	Geography
4.1	Development institutions	Concessional financing	Provision of loans at below-market rates to finance large-scale public infrastructure projects	Chisinau ring road	Moldova
4.2	Public-private collaboration	Public-private partnerships	Partnerships to mobilize finance, leverage technical expertise, and distribute project risk	NorthConnex tunnel	Sydney, Australia

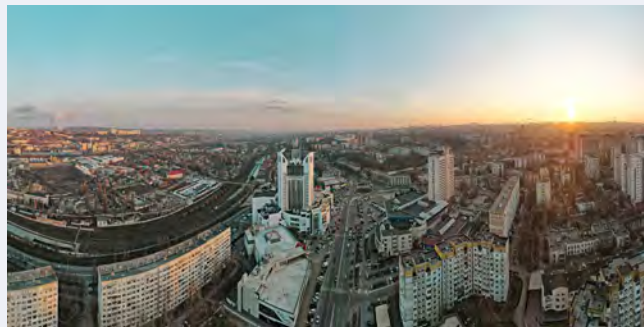
4.1 Concessional Financing



Need: Developing sustainable logistics projects requires significant capital investment. However, emerging economies frequently lack access to the patient, low-cost capital needed for such ventures. This hampers the growth and development of the country's logistics sector.

Overview: Concessional financing is funding provided by development finance institutions on more favorable terms than standard commercial loans. Such lending can include below-market interest rates, extended repayment periods, and flexible terms, such as grace periods for loan repayment until projects start generating revenue. Although concessional financing is primarily offered as loans, it can also include grants, guarantees, equity investments, or a combination of these forms of financial support. Concessional finance is often directed to regions with limited financing options, such as emerging economies. It aims to support high-impact projects that align with global development objectives, including climate goals and the development of the logistics sector.

Case study: Chisinau ring road, Moldova



The European Investment Bank (EIB), an investment and global multilateral development bank, works to catalyze socioeconomic development, environmental sustainability, and infrastructure development across Europe. One of EIB's many modalities to fund public-sector projects is concessional loans. In 2019,

EIB committed EUR 150 million (US\$165 million) to the Ministry of Finance of Moldova to fund construction of major highways.⁵⁴ The funds were rolled out as a public infrastructure loan with a long-term period. Moldova utilized this finance to develop and retrofit the Chisinau bypass, enabling a major pan-European highway (Road E584) connecting Ukraine, Moldova, and Romania to circumvent the city of Chisinau.⁵⁵

Impact: Access to concessional finance enabled the Moldovan government to successfully construct the first segment of the ring road, which opened in 2023. This segment is 6.6 km long with four traffic lanes and includes five new and five rebuilt bridges, which will enable faster and more efficient movement of freight trucks.⁵⁶ The Chisinau bypass will serve as a key freight transport link within Central Europe, resulting in safer road travel for the transportation of goods.⁵⁷

4.2 Public-Private Partnerships



Need: Large-scale logistics projects, such as transportation networks, airports, ports, and shared warehousing centers, require significant financing and technical expertise. Due to the scale and complexity of these projects, a single entity often lacks the necessary expertise and capital to fund them alone. PPPs are needed to leverage industry technical expertise and government capital and credit worthiness.

Overview: PPPs are collaborative engagements between government and industry to plan, finance, develop, and operationalize projects to share responsibilities, risks, and rewards. PPPs are typically used for funding various logistics initiatives, such as toll roads, highways, rail systems, and freight and logistics centers.

In a PPP, the government offers incentives, such as tax benefits, guarantees, or subsidies, to attract investment in the project, and the industry often provides capital and expertise to develop projects. This enables risks — such as cost overruns, demand uncertainties, technology maturity, and political risks — to be distributed among various entities. Through PPPs, the project has access to both public- and private-sector capital as well as private-sector expertise to achieve sustainable logistics outcomes such as enhanced air quality, improved logistics capabilities, and employment opportunities. In turn, the private sector receives revenue or repayments once the project becomes operational.



Case study: NorthConnex tunnel, Sydney, Australia



NorthConnex is a 9-km tunnel in Sydney, Australia, designed to improve freight access and connectivity across the city. The tunnel serves as a crucial interlink between two key highways. It was funded through a combination of private- and public-sector financing between the New South Wales government transport agency, Transurban (a toll road operator), and Bouygues Construction. By

combining debt (borrowed funds) and equity (capital invested to own or hold an operating lease), stakeholders better managed their risk exposure and raised AUD 3 billion (US\$2 billion) to fund the project.⁵⁸

Bouygues Construction was responsible for the design and construction of the project, while Transurban took on the role of operating the tunnel and collecting tolls during the concession period that extends until 2048. The government partner, New South Wales, provided planning and regulatory oversight for the project and will make periodic payments based on the tunnel's performance over the agreed-upon concessional period.⁵⁹

Impact: The PPP model greatly facilitated the financing process, enabling the private partners to complete the NorthConnex project within a three-year time frame after receiving the final approval.⁶⁰ The project will create a free-flowing motorway alternative that will significantly reduce traffic congestion. This will lead to 70% reduction in nitrogen oxide and particulate matter emissions by heavy vehicles.⁶¹

Conclusion

Across G20 nations, the logistics sector is growing rapidly. The 19 best practices outlined in this report can help advance sustainable logistics that address climate change, enhance livelihoods, improve public health, and foster economic growth. India's G20 presidency — focused on One Earth, One Family, One Future — can play a vital role in galvanizing logistics sustainability practices across nations and businesses.

Making the transportation, warehousing and inventory, and administrative services of our goods and global supply chains more sustainable takes efficient operation practices, innovative policies, new and updated infrastructure, and financial investment.

Making the operation of logistics more sustainable requires reducing vehicular movement, promoting the adoption of low-carbon modes of travel, improving warehouse operations, integrating technology to reduce inventory loss, enhancing storage space utilization, and more.

Favorable policy mechanisms to improve the sustainability of the logistics sector include targets, campaigns, regulatory frameworks, standards, requirements, subsidies, and incentives. These need to be implemented at all levels of government, from the city level to the national level.

Strategically building out logistics infrastructure — such as storage facilities, transportation networks, and EV charging stations — is crucial in streamlining logistics operations, reducing inventory waste, and enhancing the effective distribution of goods.

All of the above is not possible without financial investment. Although logistics projects are often considered high risk, various entities can collaborate and share the risks, responsibilities, and investments. Multilateral development institutions can offer preferential financing, the government can provide incentives, and the private sector can contribute capital and provide the technical expertise necessary for successful project implementation.

Globally, from Asia and Europe to the Americas, communities and businesses are adopting sustainable logistics models from which others can learn. Our hope is that G20 leaders can utilize the best practices and case studies outlined in this document to facilitate the decarbonization of the logistics sector in their respective regions. By championing sustainable logistics practices, G20 nations can enable a paradigm shift toward a sustainable future that mitigates climate change, improves livelihoods and public health, fosters global economic growth, and showcases inclusive collaboration.

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