

# Companies and carbon neutrality, a story of systemic transformations and cooperation: Illustration on the freight transport sector

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The latest IPCC Special Report on 1.5°C highlights that reaching carbon neutrality by 2050 will require unprecedented, rapid and far-reaching systemic transitions in energy systems but also land, urban and infrastructure, and industrial systems, and will imply deep emission reductions in all sectors, including the freight transport sector.

This sector currently represents about 10% of all energy-related emissions and 40% of global transport emissions, and these sectoral emissions have grown continuously over the past years. To reverse this trend and structurally reduce them, the IPCC pinpoints that technological innovations are not sufficient and a larger spectrum of mitigation options is required. Reaching zero-emission freight transport implies for example to transform existing production and consumption systems to reduce goods deliveries, shorten supply chains and facilitate modal shift and logistics optimization. Such systemic transformations require a strong involvement of the private sector and companies who are the major transformational players of freight characteristics, supply chain organizations and demanded transport service levels. In this sector, companies could therefore play a key role in looking further into how to transform their business activities and under which conditions they could implement it.

Based on the knowledge gathered through the Movin'On Community of Interest led by IDDRI and the SLOCAT Partnership on Sustainable Low Carbon Transport since 2020, this *Note* presents three structural business transformations which could support the implementation of systemic transitions contributing to reach zero emission in the freight transport sector and going beyond the development of zero-emission technologies. Delving deeply into what these business transformations are is necessary to identify the conditions of feasibility and the necessary actions of companies but also of governments and customers. These first insights could therefore be relevant to structure dedicated sectoral conversations and facilitate cooperation between actors.

## KEY MESSAGES

1. Carbon neutral freight transport requires strategic actions by companies in support of systemic transitions in industrial systems.

2. Key business actions in support of carbon neutrality include:

- a. Revisiting existing industrial processes and business models to reduce the number of freight movements;
- b. Revamping industrial facilities and suppliers to reduce the spatially fragmented supply chains;
- c. Changing logistics organizations and lowering transport service levels to support the consolidation of flows and facilitate modal shift.

3. The capacity and incentive for companies to implement systemic transitions required by carbon neutrality depends on the environment in which they operate, which is in turn critically conditioned by public policy. Structured cooperation between business actors and national and local governments is therefore a critical enabler to accelerate action towards carbon neutrality.

## 1. INTRODUCTION

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Achieving the Paris Climate Agreement objective to limit the temperature increase to well below 2°C and towards 1.5°C by the end of century requires reaching carbon neutrality by mid-century and implies (almost fully) decarbonizing all sectors of the economy. In order to achieve this goal, public authorities, companies and citizens need to implement unprecedented, rapid and far-reaching systemic transitions.<sup>1</sup> The freight transport sector represents an important stake for global neutrality, as its emissions are continuously growing and could double from now until 2050, taking technological improvements into account.<sup>2</sup> Existing strategies to decarbonize freight transport focus mostly on the development of zero-emission fuels and vehicles and their penetration in the vehicle fleets. However, considering implementation challenges and timeframe, these transformations will not be enough and other options are needed. These include reducing the number of freight movements, shortening distances travelled by goods or facilitating the shift towards more energy-efficient modes.

Companies, especially shippers and freight forwarders, are progressively emerging as key players of the reduction of freight-related emissions. In particular, corporate commitments to supply chain sustainability have significantly increased since 2020, following growing public pressure for companies to demonstrate greater environmental stewardship and social responsibility.<sup>3</sup> One fifth of the world largest companies included in the Forbes Global 2000 list now have net zero commitments<sup>4</sup> and more and more companies now include scope 3<sup>5</sup> related emissions in their climate strategies, which includes both upstream and downstream freight transport. Moreover, companies hold key levers to drive more systemic transitions not only in the transport systems itself but, more broadly, in the industrial processes and systems which contribute to the decarbonization of freight transport. In other words, reaching zero-emission freight transport by 2050 requires a shift in companies' business models, organizations, as well as in their production, consumption and distribution processes to catalyze the larger spectrum of mitigation options. These transformations are expected to be driven by internal corporate decisions stimulated by changes in public policy such as changing transport prices e.g. cheaper rail services, more expensive aviation services, carbon labelling,

planning rules as well as evolving customer, community and investor expectations.

As a result, the leadership of business actors, and especially of shippers, in defining these business transformations, stating their needs and carrying them out will be crucial. IDDRI and SLOCAT Partnership, with the support of Movin'On have therefore created a business community of interest (See Box 1) in order to facilitate and collectively develop a deep understanding of the required systemic transition of the industrial systems necessary to reach zero-emission freight transport and carbon neutrality and the role of each actor of the transition. Based on exchanges with this community, this *Note* presents three business transformations, which could lead to a systemic transition and affect the structure of transport and logistics systems contributing to reach zero-emission freight transport by mid-century.

## 2. REVISITING EXISTING INDUSTRIAL PROCESSES AND BUSINESS MODELS

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Existing industrial processes and business models have been developed without considering the impacts on environment and climate. This results, for example, in overconsumption of materials, and in current business strategies aiming at selling more such as developing a broad product diversification or planning obsolescence, which in turn contributes to generate unnecessary transport demand. By mid-century, reaching zero-emission freight transport and carbon neutrality will require to consume less materials and to lower the environmental footprint of products<sup>6</sup> while reducing unnecessary freight movements. For a company, this can involve completely overhauling its business model, the design and manufacturing process of its products or service and packaging to become smaller and lighter but also more reusable, recyclable and repairable, and to replace the use of fossil-based with bio-sourced materials. It could also lead to the development of new services oriented towards the reuse, reparability and recyclability of their products.

While some of these product alterations and service innovations require strong innovative abilities and significant investments in research and development or infrastructure adaptation, they may bring long-term benefits in taking a competitive advantage in the run for new growing businesses and avoiding transition risks. For example, hair shampoos are currently often sold in ready to use liquid form and packaged in plastic bottles. Based on the experience of one community member, implementing this strategic thinking in this industry has led some companies, as a first step, to reduce the impact of packaging process by importing blocks of plastics—if possible recycled or bio-sourced—instead of empty plastic bottles. It required to develop the expertise to blow the bottles at the manufacturing plant directly but saved on space and unnecessary upstream

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1 IPCC (2018). Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.

2 ITF (2021). ITF Transport Outlook 2021, OECD Publishing, Paris, <https://doi.org/10.1787/16826a30-en>.

3 Bateman, A. et al. (2021). State of Supply Chain Sustainability 2021. Massachusetts Institute of Technology. <https://sscs.mit.edu/wp-content/uploads/2021/07/State-Sustainable-Supply-Chains-MIT-CSCMP.pdf>

4 Black, R. et al. (2021). Taking Stock: A global assessment of net zero targets, Energy & Climate Intelligence Unit and Oxford Net Zero

5 Indirect emissions resulting from assets not owned or controlled by the reporting organization, but that the organization indirectly impacts in its value chain. See GHG Protocol – Scope 3.

6 Ellen MacArthur Foundation (2021). Completing the picture: How the circular economy tackles climate change

deliveries. This represents a marginal transformation of the product, but such thinking could also lead to a more systemic transformation. Indeed, the second step of transformation has been to rethink the business models and product, removing the packaging and avoid selling bottles completely, selling instead products in bulk with refillable containers at supermarkets, highly condensed liquid refills, or proposing solid shampoo bars to replace liquid products.

This business transformation could limit the amount of energy and materials needed during the initial phase of production, and reduce the number of products and packaging manufactured in the medium to long term as their lifespan will increase. All these materials not consumed, as well as the space or weight saved in vehicles can reduce the need for deliveries and their related energy consumption, emissions and costs.

### **3. REVAMPING INDUSTRIAL FACILITIES AND SUPPLIERS**

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Over the last few decades, choosing the locations of both suppliers and manufacturing facilities has been the result of complex tradeoffs between business parameters like reducing costs and ensuring both quality and availability for the targeted markets. But climate or emission reductions have long stayed out of the equation. Due to increasing tensions with competitors benefiting from less stringent social and environmental norms and lower production costs, many companies decided to both procure raw materials and to locate manufacturing sites (both for semi-finished and finished products) across the world if cheaper. This resulted in very long and scattered supply chains. In the decades to come, carbon neutral economies will have shorter and less fragmented, meaning both more resilient and socially responsible, supply chains.<sup>7</sup> Companies will need to rethink the localisation of their industrial facilities and suppliers throughout their products' entire value chain. For most products, production and consumption could be reorganised in regional hubs, sourcing raw and recycled materials locally and setting up entire industrial processes closer to customers.

This profound transformation will require first to review all the different steps of processes and reconsider the location of facilities and suppliers depending on their market locations. While such transformations could potentially result in an increase in costs and require ensuring an adequate social transition for factory employees, they could also increase supply chain resilience, benefit regional employment and economies and enhance customers' acceptability. For example, Europe experienced paracetamol production interruptions because the deliveries of the active substance, coming outside of Europe, stopped during the COVID crisis. As a reaction, companies

producing this active substance for main European pharmaceutical groups planned to open factories in the European Union in 2023.

In some cases, moving one single step of the industrial process will not be possible, and more fundamental changes will be required in the industrial processes and business model itself. For example, in the agro-food businesses, food can mostly be sourced locally, but not necessarily the exact same products. It therefore requires finding alternatives, like offering more seasonal, and potentially offering less diversified products. In other industries, this would mean finding new bio-sourced, recyclable and local alternative materials and intermediate products and could imply a transformation of the whole production process.

Those business transformations require strong regional planning and incentives, but could shorten and reduce the fragmentation of supply chains and reduce the amount of kilometers travelled by (both finished and semi-finished) goods and related freight traffic. This directly enables avoiding energy consumption and related emissions, but it could also help reduce the dependency on maritime transport and aviation (which may be expensive to fully decarbonize and entails many technological uncertainties), and facilitate the use of terrestrial modes of transport and their electrification.

### **4. CHANGING LOGISTICS ORGANIZATIONS AND LOWERING TRANSPORT SERVICE LEVELS**

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Most companies rely on just-in-time logistics organizations, thus reducing stock and internal logistics costs, but increasing service standards in terms of flexibility and speed of transport deliveries. In many industries, the average size of shipments has been reduced, but their frequencies increased, dramatically increasing the number of smaller deliveries, reducing load factors and increasing vehicle kilometers driven. This has been enabled by low transport prices compared to the quality of service delivered and the lack of integration of all social and environmental externalities and costs related to these smaller, faster and more flexible deliveries. In a zero-emission transport world, the cost of deliveries will include socio-environmental impacts, including carbon emissions and congestion, and efficiency measures will be incentivized. Companies will therefore need to use more efficiently alternative modes to road freight and vehicles, which will require revising their logistics organizations and changing their transport and logistics service levels.

This transformation could require expanding the quantity of stock and losing a bit in flexibility, both of final products and intermediate goods in the production chain, as well as changing the industrial process planning and increasing the number of warehouses a company works with or at least adapting their size and location. For instance, one community member with an important customer located thousands of miles away from the factory requiring weekly deliveries done by air, decided to use

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<sup>7</sup> Zhan J. *et al.* (2020). Global value chain transformation to 2030: Overall direction and policy implications <https://voxeu.org/article/global-value-chain-transformation-decade-ahead>

another warehouse closer to customers, to adapt the production planning and move its products by rail or road instead of aviation. This solution was finally more cost-effective and less-carbon intensive. In other cases, the change in the overall logistics costs will depend on the costs of the different transport modes, of storage and capital asset.

In a similar situation, another community member decided to slow down and reduce the number of deliveries to consolidate flows without changing the industrial processes. This has required changes in relationships with customers, product availability, strategy and stocks. In business-to-business markets, first offers and contracts are starting to explore these efficiency solutions.

Changing logistics organization and lowering transport service levels could create favorable conditions to facilitate collaboration among players and the consolidation of flows. Logistics and transport service providers could therefore offer new options to decarbonise freight transport, such as modal shift towards rail or the development of efficient intermodality services and a better use of vehicle capacities to increase load factor, reduce empty running and overall reduce emissions and external impacts of transport.

## **5. PERSPECTIVES TOWARDS THE GLOBAL STOCKTAKE: INCREASING COOPERATION**

For companies with high transport emissions, implementing structural transformations will be critical to achieve their net-zero commitments and thrive in a decarbonized economy. For all of them, it is a requirement to contribute to the global efforts towards global carbon neutrality and to get prepared to the transformations of our societies and economies and their consequences on production factors and transport costs. In other words, anticipating such transformations and risks is not only their corporate responsibility, but also critically conditions their medium to long-term prosperity.

However, even if companies are at the forefront of these structural changes, their choices are embedded in local and global market rules and specific economic, social, geographical and political national contexts. For instance, revising their industrial processes and business models towards a more circular economy which reuses, repairs and recycles, and increases the lifespan of products is possible, but is currently complex to implement when customers are expecting lower prices and more and more customization and diversification of products. This requires changes both in customer preferences and industrial processes, which could only be accelerated and implemented at scale with adequate public policy providing a well-suited and faire business environment with constraints and incentives.

Companies can play a major role in the identification of the barriers and solutions to reduce freight movements, develop shorter and less scattered supply chains and facilitate modal shift and logistics optimization, as key inputs for the elaboration of coordinated actions with other actors of the transition.

Transport conversations, creating a space for companies to share these challenges, opportunities and enabling conditions with public authorities and customers, could be a practical way to advance the design of a coherent and cost-effective strategy to deliver the systemic transformations demanded by carbon neutrality. This approach in sectoral conversations could help identify priority areas of cooperation and key levers of change in support of more ambitious targets and actions. It could notably be a useful practical approach during the momentum for collective reflection and action created by the perspective of the UNFCCC Global Stocktake in 2023 and the future revision of NDCs by 2025.

### **BOX 1. MOVIN'ON COMMUNITY OF INTEREST ON HOW THE BUSINESS COMMUNITY CAN SUPPORT TRANSPORT DECARBONIZATION THROUGH THE REVISION AND IMPLEMENTATION OF NATIONALLY DETERMINED CONTRIBUTIONS (NDCS)**

This business community was created in early 2021 by IDDRI and SLOCAT Partnership on Low Carbon Transport with the support of Movin'On to drive global conversations about the future of supply chains compatible with carbon neutrality. Based on the understanding of zero carbon supply chains, this community builds common messages to contribute to increase the ambition and accelerate the sectoral implementation of the transition.

In the coming months, the community will continue to:

- Analyse the required business transformations, motivations, consequences and conditions of feasibility to reach zero emission freight transport and carbon neutrality;
- Establish sectoral conversations with policy makers and other stakeholders around these analyses to increase the cooperation and coordination of actions;
- Create different opportunities to raise a clear business voice in national and international climate communities.

[Link to the Movin'On Community of Interest webpage](#)

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Citation: Harry-Villain, L., Briand, Y., Waisman, H., Major, M., Castillo, L., Companies and carbon neutrality, a story of systemic transformations and cooperation: Illustration on the freight transport sector, Iddri, *Note*, November 2021.

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This work has received financial support from the French government in the framework of the programme “Investissements d’avenir” managed by ANR (French National Research Agency) under the reference ANR-10-LABX-14-01. In addition, the transport sector analyses of the Deep Decarbonization Pathways (DDP) initiative are supported by the Michelin Corporate Foundation, by the International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) and the European Union’s Horizon 2020 Research and Innovation Programme under grant agreement No 101003866.

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The co-authors want to thank all the members of the Movin’On community, those who accepted bilateral interviews and acknowledge the assistance provided by the Smart Freight Center and SupplyChain4Good.

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