
Decarbonizing Value Chains: Transportation

2nd of four events focusing on decarbonizing scope 3 emissions in major industry sectors

Executive Roundtable Summary

Virtual Conference – November 30-December 1, 2021

Background

Eliminating greenhouse gas emissions in a company's supply chain and among its customers—so-called Scope 3 emissions—is the biggest challenge in decarbonizing most businesses. Effective solutions are needed that companies can implement to decarbonize their value chains. Globally, transportation accounts for some 16 percent of global greenhouse gas emissions. Fortunately, technological solutions for passenger vehicles are evolving quickly and innovation in the heavy transport and aviation industries is underway. Still unclear, however, is the overall strategic roadmap for how the transportation sector can reach net-zero emissions by 2050. In this Roundtable, senior business leaders and technical experts discussed practical solutions to eliminate emissions from transportation in corporate value chains. The event was held under the Chatham House Rule and brought together 35 senior sustainability and logistic experts from ten countries, of which 83% came from global companies, and 17% from Think Tanks/NGOs.

Participants

Hosts

 **TOYOTA**

 **Chemours**

 **TRANE**
TECHNOLOGIES

- Scott Tew** – VP Sustainability & Managing Director, Center for Energy Efficiency & Sustainability, Trane Tech.
- Sheryl Telford** - CSO & VP EHS, Chemours
- Kevin Butt** – Director, Env. Sustainability, Toyota North A.

Moderators

- Alexander Cox, ERM
- Glenn Prickett, World Environment Center
- Scott Tew, Trane Technologies
- Sheryl Telford, Chemours

Speakers

- **Agora Verkehrswende:** Urs Maier
- **Boehringer Ingelheim:** Sören Brodowy
- **BNSF Railway:** John Lovenburg
- **Deutsche Post DHL Group:** Mitra Qurban
- **Deutsche Lufthansa Group:** Olof Nittinger
- **Global Maritime Forum:** Kaspar Sjøgaard
- **IBM:** Utpal Mangla
- **Shell:** Simon Denn
- **Siemens Mobility:** Sebastian Schunk
- **Toyota North America:** Kevin Butt
- **VASCOR Transport:** Trey Lyda

Key Points

- (1) An introductory poll** revealed that almost half of the companies have committed to fully decarbonize by 2050 and the majority of companies are currently working on an ambitious strategy to deliver on that goal. However, only 10% of these companies have measures in place for mid-term goals such as reducing absolute GHG emissions from transportation by at least 50% until 2030 or sourcing materials in a way that their emissions from transportation be halved until 2030.

A second poll asked about the major barriers for companies to reduce emissions from transportation quickly. Most participants replied that lack of reliable technological solutions and lack of infrastructure that companies can access are the major concerns. To some extent there is also a concern about the risk of stranded investments if green energy supply is not secured. Less important seems to be the risk of losing customers due to higher transportation cost and lack of a company policy or business strategy.

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(2) Technological solutions to decarbonize transportation are being developed. Global CO₂-emissions from transportation have continuously risen over the past decades. With almost 80%, road transport is by far dominating. In that space *passenger cars, other light vehicles and buses*' share is more than 2/3, the other 1/3 come from medium and heavy trucks. These modes of transport are soon entering a path to decarbonize as electrification seems to be the technology of choice, at least in many industrialized countries where infrastructure development of charging stations and green electricity generation is now a priority.

The technological solution to decarbonize *heavy trucks* may also be electric, however not yet decided. Given that batteries continuously become more powerful, their weight will soon not be the limiting factor anymore as they are not expected to be heavier than the weight of the engine that they replace. It is expected that electrified trucks will be available soon and commercially viable once they run for more than 4 hours and find enough charging stations. Green hydrogen might become the technology of choice for long-haul truck distances over time, though. A clear pathway was not provided during the discussions. On the other hand, it was shown that direct electrification should always be the preferred choice wherever practical, as the overall efficiency to get the green electricity into a powertrain is so much greater in comparison to other technologies (77% with direct electrification, and only 33% with hydrogen, 23% with power-to-liquid, 22% with power-to-methane). Although efficiencies are expected to become greater until 2050, this will not make the choice any different.¹

Ships contribute currently 11% of global emissions from transportation, *aviation* 8%, and *trains* 3%. These heavy vehicles (with the exception of light boats/airplanes as well as trains running through regions equipped with electric lines), are less suitable for direct use of electricity. Therefore, they are likely to compete for green hydrogen with other sectors, such as e.g. the steel industry but may also use Power-to-Liquid technology (PtL) based on plant-based feedstock (which is less efficient, see above).

(3) A scientific study² showcasing Germany made clear how a strategic roadmap to decarbonize the transportation sector on the ground could look like, at least for densely populated countries or regions. Until 2030 GHG emission from transportation in Germany can realistically be reduced by 50% with

- 4 of 5 newly released automobiles running on green electricity (making up 55% of the CO₂-reductions)
- one third of newly released trucks being electric and charged with renewables (16% of reductions)
- doubling public, non-motorised transport and collaborative mobility (22% of reductions)
- shifting a substantial part of freight from road to rail (7% of reductions).

The other 50% could be reduced until 2050 through measures such as:

- almost all cars running on green electricity (making up 43% of the CO₂-reductions)
- complete truck electrification (34% of reductions)
- a continued shift to public, non-motorised transport & collaborative mobility (16% of reductions)
- a continued shift to more freight from road to rail (7% of reductions)

This transition must be accompanied by the generation and provision of renewable electricity. At the same time transportation with ships and aircrafts must also be decarbonized.

¹ All data in this paragraph have been presented in a keynote during the event. If interested in detail, please reach out to WEC.

² Agora Verkehrswende et al (2021): Towards a Climate-Neutral Germany by 2045.

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- (4) Vehicle operators and manufacturers have started to accelerate their decarbonization strategies** and reacting to requests from scientists, governments, and business partners. To foresee pathways for each mode of transport all actors need to understand what the highest use of a constrained unit of CO₂-free energy across these transport modes is, as governments are likely to make decisions accordingly.

The automobile industry is now decarbonizing with electrification. However, a challenge must not be underestimated: the human factor in remote or poor regions that do not provide a dense grid of charging stations fed by green electricity. Car owners may be hesitant to drive electric if the grid is less reliable than the good old gas station which may soon also offer green hydrogen. Furthermore, the huge demand for rare earth metals needed to produce the hundreds of million of batteries poses another sustainability challenge. Given these risks not all manufacturers are going all-electric but keep developing technologies based on hydrogen. Collaborative efforts to solve these challenges are needed and perhaps possible.

Logistics companies that operate heavy trucks have begun searching for the best technological solutions to decarbonize. Demand from customers urging them to provide low-carbon solutions is forcing them to innovate in collaboration with the manufacturers of their trucks. The Roundtable discussion revealed that this process is in its early stages although innovation is already taking place at the large truck manufacturers.

It is a common standard to electrify **railway systems** in populated regions as well as small and medium-sized countries, as commonly practiced in Europe. However, crossing a large country like the US is done with diesel-electric engines, while poor nations are generally unable to invest at all in electrifying their railroad systems. That's why other solutions to decarbonize are used, such as lowering the carbon intensity of fuels by adding renewable diesel and retrofitting existing locomotives to battery-electric. That way the 2030s will see regional locomotives equipped with available batteries. Through the 2040s solid state batteries & charge on the move can be expected, in addition to trains being fuelled with hydrogen.

The major airlines are using most of their fuels for long-haul traffic, but a significant amount for short-haul traffic, too. The latter is easier to decarbonize, e.g. with the expected technology to electrify aircrafts used for shorter distances in the near future, and also through collaboration with railways. Flying these short distances is heavily debated in the public and with governments e.g. in Europe, and they are less important to airlines' business models. In fact, as stated in the event their major driver is to provide their customers a reliable and comfortable feeder to reach their long-distance connection. Biofuels are only available on a limited scale and much more expensive. However, in practice it is possible for airlines to reduce emissions by as much as 30% until 2030 with the technology already available, as the plan for a Science Based Target of an airline representative suggests. A severe challenge is the fact that aircrafts are operated in long cycles, typically 20-30 years after they have been put into operation. Even if technological solutions evolve over the next decade, airlines will hardly be able to replace their entire fleet with zero-emission aircrafts until 2050. Therefore, compensation schemes for passengers willing to at least fly carbon neutral might still be needed as much as today.

Maritime ship transport has the technology to decarbonize completely by 2050 through hydrogen and power-to-liquid technology. The challenge is commercial viability at scale. A tipping point is expected once zero emission fuels make up 5% of the international shipping fuel mix by 2030. A lot of action is already underway, e.g. through the [Getting to Zero Coalition](#), but more companies need to get involved with their full value chains. The most ambitious project aims at establishing "commercially viable" zero

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emission shipping routes by 2030, supported by several major retailers in the [COZEV](#) Initiative (Cargo Owners for Zero Emission Vessels). At the COP26 the [Clydebank Declaration](#) was agreed upon, with government signatories from 22 nations, amongst them the US, Japan, Australia and many European countries, who want to support the establishment of green shipping corridors – zero-emission shipping routes between 2 ports. In practice this means that signatories to the Declaration identify and take steps with relevant willing ports, operator(s) and others along the value chain to decarbonise specific shared maritime routes. This might be the needed signal that business can invest in several things that must be provided at the same time such as zero-carbon vessels, the infrastructure, and the fuel supply.

- (5) Collaboration is key and best made by industry sectors across the value chain** to make sure the infrastructure needed is available in the right place and at the right time. A few examples of what’s currently being built by just one major company and its business partners:
- ① 0.5 million charge points for EV;
 - ② by 2025 a 1200 km corridor for hydrogen powered trucking with the hydrogen filling stations needed;
 - ③ by 2030 an upgrade of the production of Sustainable Aviation Fuels from 1% of the current supply to 10%.

Such investments bear business risks, as they assume the customer is willing to pay an extra cost. The roundtable participants had different opinions as to whether business customers would be willing to do so. Another idea brought up was asking business customers who are shipping goods to put a carbon price on their products to pay the extra cost of zero-emission freight – that way the consumer would be paying for zero-emission shipping. Several participants also mentioned that a global carbon tax of at least \$80 and/or clear government communication about meeting climate targets or facing the consequence of strict regulation would be the only effective measure. Such action would help first movers to stay competitive.

- (6) Company approaches to reduce scope 3 emissions has led to supplier engagement programs.** This process starts, e.g. through the [Ecodesk](#) platform, with questionnaires about supplier’s programs, their ability to measure and disclose data, and their emission reductions. Only with primary data can the targets to reduce scope 3 emissions be set and implementation measures discussed. Classifying suppliers according to their ambition and data is another step to prepare a supplier engagement program. Those suppliers that are below expectations or just meet the basics are often those with whom an engagement process starts, since the goal is not to lose them but support them to succeed. On the other hand, the engagement process opens up opportunities for the suppliers to share their innovations and new transport solutions.

Although funds are often available to support better performance of suppliers, accounting frameworks such as [Book & Claim](#) also offer opportunities to contribute carbon credits that were purchased elsewhere in the system (e.g. Sustainable Airline Fuels are physically fed into the system near their production facility, but can be claimed by the purchaser in a different location or setting). More use of such accounting frameworks, including a global registry, was highlighted as a major step to initiate climate-friendly action.

However, for companies it is a challenge to invest in innovative technological solutions if the infrastructure to operate e.g. electric vehicles or hydrogen trucks is not available fast enough. That is why company experts continuously talk to government representatives, making them aware that they depend on fast

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government action. It was mentioned that many companies welcome ambitious regulation such as the [EU Fit for 55 Legislation](#) as it supports the strategies that companies have now developed.

(7) Integrated Mobility Systems are not yet where we need them and where they may be in a few years.

Digital solutions providers are experimenting with predicting traffic patterns, using artificial intelligence to minimize pollution, automating systems to reduce the cost, and developing infrastructure such as electric vehicle charging points according to predicted demand. Smarter transportation initiatives are underway, depending on ecosystems in which the participants in the value chains come together and collaborate. However, concrete solutions that enable reductions in CO₂-emissions by integrating transport modes in complex value chains (or for passenger needs) according to where both lowest emissions and customer/passenger satisfaction can be found are still under development. As a starting point it has been identified that clear, measurable, and consistent KPI's must be developed to get everybody aligned on the same goals. And although developing green energy sources for transportation is much discussed, an important advice was provided: improving energy efficiencies has been the most valuable resource in the past decades and it must stay on top of the agenda – smart digital solutions are helping in that space.