UIRR
INTERNATIONAL UNION FOR ROAD-RAIL COMBINED TRANSPORT

ROADMAP

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COMBINED TRANSPORT IN LIGHT OF THE EUROPEAN GREEN DEAL

Executive Summary

The European Green Deals is a political communication about decarbonisation and an aim of zero net emissions by 2050 in the European Union. The transport sector is responsible today for 25% of the CO_2 emissions in the European Union. Combined Transport brings together the best from road and railway, as well as waterborne modes to create a transport-chain for freight, which can significantly contribute to reaching the aims of the European Green Deal. Hence, it calls for action and, to be consistent, the EU Commission should support Combined Transport. These actions can be segmented into four areas: enabling regulatory framework; enhancing customer-driven physical infrastructure; enhancing efficiency and innovation; and support of the regulatory framework.

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1.1 Key facts of the European Green Deal

One of the most pressing problems, which causes an existential threat to planet Earth and Europe is climate change (European Commission, 2021). Hence, countermeasures are necessary to overcome these challenges with the aim of zero net emissions of greenhouse gases by 2050 in conjunction with economic growth (European Commission, 2021). For this purpose, the European Green Deal was announced by the Commission President Ursula von der Leyen in 2019 pursued by the proposal for the European Climate Law, which is expected to be adopted in June 2021. The European Climate Law prescribes a 55% CO_2 emission cut (on the basis of 1990) and complete carbon-neutrality to be achieved.

The European Green Deal describes an action plan to reach higher resource usage efficiency by moving to a clean and circular economy. Furthermore, biodiversity should be restored, and pollution should be cut (European Commission, 2021). While the European Green Deal covers many different areas, as shown in Figure 1, "accelerating the shift to sustainable and smart mobility" is a very important one, as a 90% reduction of greenhouse gas emissions in transport by 2050 is aimed for (Directorate-General for Communication, 2019).

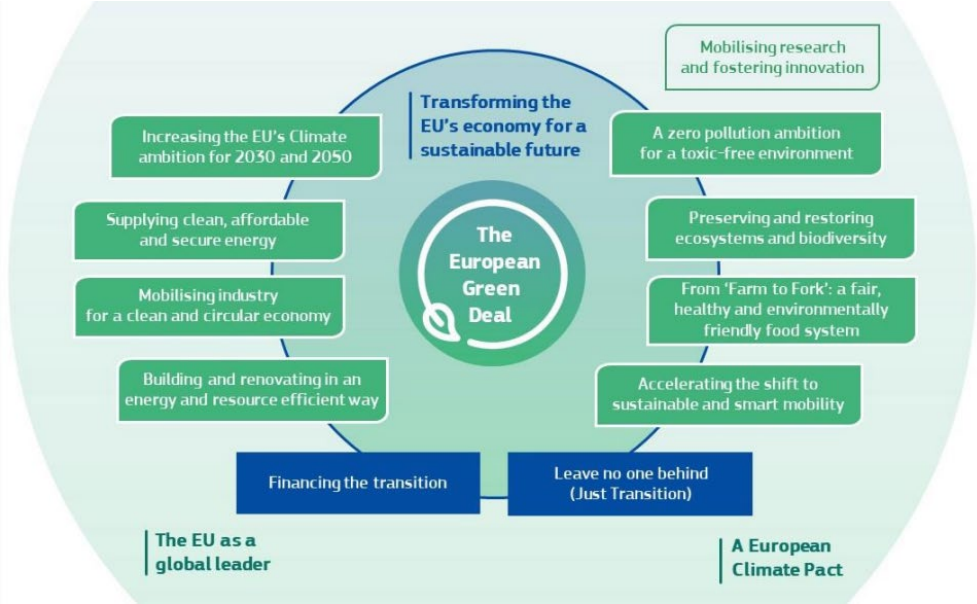

Figure 1: The European Green Deal[1]

1.2 Greenhouse gas emissions in the transport industry: current status

25% of the EU's greenhouse gas emissions can be traced back to transport (European Commission, 2019b). In 2016, road transport caused 72% of the transport-related greenhouse gas emissions (European Environment Agency, 2021). It is often underestimated how massive the impact of freight transport on the environment and society is as the freight sector emits around 275 million tons of CO_2 per year in Europe, accounting for 30% of the total transport emissions, while passenger traffic accounts for 70% (European Commission, 2019a). With this, negative externalities such as pollution and climate change, accidents, congestion as well as noise are caused by freight transport – which is expected to grow considerably (Directorate-General for Mobility and Transport, 2021).

[1] Adapted from European Commission (2019b, p. 3).

However, it must be differentiated between the different modes of transportation: According to Figure 2, while road transport accounts for the majority, railways may be considered very environmentally friendly concerning greenhouse gas emissions.

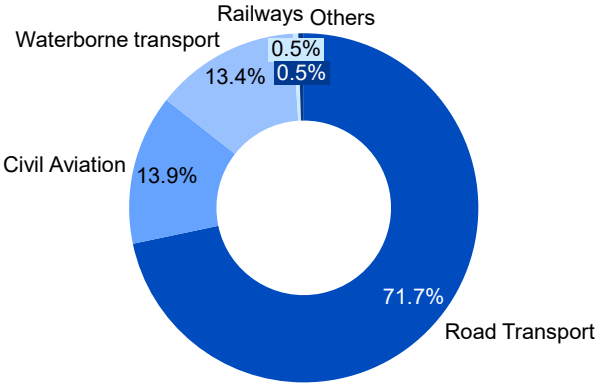

Figure 2: Share of greenhouse gas emissions by mode of transport in 2017[2]

Consequently, from a carbon emission perspective, the use of electric railways for freight transportation must be generally preferred over other transportation modes. Presently, rail freight transport is underrepresented in the share of freight transport in most European countries. While, e.g. in Switzerland, it accounts for 40%, in Austria, it accounts only for 25% of freight transport in 2019 (Allianz pro Schiene, 2020). On average, rail share is about 18% in Europe (UIC/UIRR Report, 2020).

Hence, to achieve the aims of the European Green Deal, a forceful shift from road to rail transport is necessary (European Commission, 2019b). Rail freight is projected to at least double its market share by 2050, which means that intermodal transport must triple its volume at the same time in order to reach the modal shift target – a realistic scenario based on recent growth figures. In fact, Eurostat data shows that intermodal rail transport developed more positively than rail freight transport in general (+49.9% vs. +13.8% from 2009 to 2018 measured in tonnekilometres). This momentum needs to be further developed to achieve a lasting shift towards more and more intermodal transport with the consequence of less greenhouse gas emissions (UIC/UIRR Report, 2020).

1.3 Advantages of Combined Transport compared to other modes of transport

While rail transport, in general, has a significant advantage in terms of energy efficiency and greenhouse gas emissions in comparison to the other transport modes, there are additional advantages of Combined Transport. Generally, Combined Transport brings the best of each mode of transport – rail and road – together, especially in terms of reliability and flexibility. However, the various advantages can be segmented into economic, environmental, and social factors, as displayed in Figure 3.

Economic	Environmental	Social
Cost advantage through mass	Less energy consumption	Less road congestions
High goods security	Less greenhouse gas emissions	Less accidents
Economic usage of transport modes	Less land usage	Less dependency on energy reserves
Low risk for damages of the goods	High growth potential	Less noise
Better plannability due to fixed journeys	Less external costs	Usage for delivery in urban areas

Figure 3: Advantages of Combined Transport[3]

While there is a diverse body of advantages of Combined Transport, in the light of the European Green Deal, especially the environmental advantages stand out. Hence, it needs to be emphasised that it is expected that Combined Transport contributes to decarbonisation by saving up to 40 million tons under the European Green Deal (UIRR, 2021). Consequently, it is necessary to strive for actions that support Combined Transport to achieve the climate goals of the European Green Deal and to mitigate the regulatory advantage of road transport.

[2] Based on Directorate-General for Communication (2019, p. 1).

[3] Based on Posset *et al.* (2020), UIC (2021) and SGKV e.V. (2021).

2. The imperative for actions to support Combined Transport to achieve the climate goals

Despite the various advantages Combined Transport offers, the intermodal sector faces a diverse body of challenges. Market potential could be much higher if a number of shortcomings were solved. These regard insufficient geographical coverage, frequency of trains, and quality performance – predominantly when expressed in terms of timetable punctuality. The frequency of intermodal trains is demand-driven, it is also influenced by the lower prices offered by trucking, which is advantaged through the biased regulatory framework. The inadequate punctuality of intermodal trains is primarily attributable to the prioritisation of rail passenger traffic. Adequate infrastructure capacity plays a crucial role in all of these issues.

Furthermore, transport companies that use Combined Transport solutions must initiate significant organisational and operational investments. This includes the use of intermodal loading units and the organisation of pre- and post-run by truck, e.g. via local branches or partners, the establishment of a Combined Transport dispatching, and the necessary changes to company IT-systems. Also, they need to understand and comply with a different regulatory framework in place throughout the European Union Member States.

A substantial explanation for the disadvantage suffered by Combined Transport can be attributed to the insufficient internalisation of external costs of road transport. Combined Transport will naturally grow as soon as a level regulatory playing field is in place. Combined Transport has the capability to further grow above average compared to the whole transport market, which leads to desired greenhouse gas emissions saving. Hence, these observations lead to the identification of a need for action to support Combined Transport. For achieving an accelerated growth of Combined Transport, several actors need to take action. These actors and possible actions are presented in Figure 4.

Actor	Possible actions
Policy makers	▪ Investments in infrastructure ▪ Reduction of cost of track access charges and/or the introduction of distance-based road tolls with total cost covering toll levels ▪ Introduction of subsidies ▪ Support of innovation
Infrastructure managers	▪ Development of high quality infrastructure ▪ A fair allocation of trains paths between freight and passenger on the basis of greater social utility ▪ Support of high specification train operations: long and heavy trains that use the entire available loading gauge
Railway undertakings	▪ Restructuration and modernisation ▪ Automation, telematics and digitisation ▪ Asset standardisation
Intermodal operators	▪ Enhancement of digitalisation ▪ Investment in wagon technology ▪ Investment into rolling stock / intermodal wagons ▪ Investment in market development

Figure 4: Combined Transport actors and possible actions[4]

[4] Based on UIC/UIRR Report (2020, p. 26).

Based on these considerations described above, four areas of action can be derived to support the growth of Combined Transport, which ultimately contributes to the achievement of the targets specified in the European Climate Law and the European Green Deal. This is displayed in Figure 5. The four areas of action are discussed in further detail in sections 2.1 to 2.4. Each area of action for different actors consists of various measures sorted from achievements that can be reached in short-term and long-term solutions.

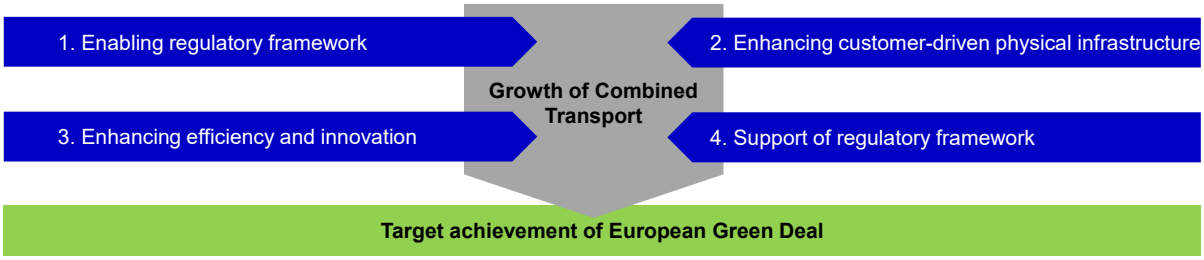

Figure 5: Areas of action to support Combined Transport

2.1 First area of action: Enabling regulatory framework for a fair level playing field rail/road

Figure 6 provides an overview of the first area of action and associated measures.

Area of action	Measures
1. Enabling regulatory framework	▪ Reduction of differences in internalisation of external costs ▪ Reduction of the Track Access Charges (TACs) ▪ Reduction of administrative costs ▪ Establishment of a burden-sharing of safety cost ▪ Revision of passenger priority rules and timetables ▪ Establishment of an open data policy ▪ Reduction of access barriers to intermodal transport

Figure 6: First area of action and associated measures

This area of action is concerned with regulatory measures to ensure a fair level playing field regarding rail and road. Hence, the following measures need to be implemented by Member State governments and the European Commission:

- *Reduction of differences in internalisation of external costs*: Every mode of transport causes external costs for society and the environment, e.g. through greenhouse gas emissions, pollution, congestion or accidents. Road freight causes about six-time higher external costs than rail freight (European Commission, 2019a). So far, this discrepancy has not been adequately addressed. Therefore, policy makers should establish a regulatory framework that is based on the 'polluter pays principle'. This principle needs to be harmonised on European level to ensure equal treatment across EU Member States' borders. This requires transport taxes harmonisation at European level.
- *Reduction of the Track Access Charges (TACs)*: Track access charges are collected by the infrastructure managers. While TACs have been waived in 2020 due to the COVID-19 pandemic by some EU Member States for a certain period (e.g. France, Italy, Belgium, Germany, Netherlands), their consistent waiver should be considered on a European level as long as the road tolling schemes are not up to par. Such a waiver should be considered not only to enforce conformity between the modes of transport (road and waterways are subject to tolls only in some European states) but also to ensure a positive impact on rail freight and Combined Transport's competitiveness. Policy makers must resolve this on EU level.
- *Reduction of administrative costs*: Rail freight and Combined Transport deal with various administrative costs, e.g. for authorisation procedures for wagons and locomotives that cost more than for trucks, unnecessary large overhead structures, or differences regarding e-customs procedures. Since these burdens hinder the growth of rail freight transport, policy makers should reduce these administrative costs efficiently. This will lead to an eased shift to rail freight for all types of clients as the main challenges for rail and Combined Transport growth are costs and productivity.

- *Establishment of a burden-sharing of safety costs*: In general, rail freight is considered 85-times safer than road transport (Railfreight Forward, 2020). Nevertheless, rail freight has to finance a disproportionally high share of its safety investments, while the latter does not yield any business benefits. Policy-makers should establish a burden-sharing of safety costs to compensate affected parties proportionally, at least until the safety-related spending and safety performance of the competing modes do no match that of rail. A regulatory framework for this circumstance has to take a long-term perspective to promote rail freight and investments in it in the long run.
- *Revision of passenger priority rules and timetables*: Passenger trains are presently prioritised over rail freight transport in all European countries. Hence, rail freight transport in general and Combined Transport in particular, are constricted by this circumstance. It leads to a shortfall in efficiency and flexibility and a general decrease in the train paths made available to freight trains among the passenger train timetable. Therefore, it is necessary to revise the passenger priority rules on a European level to establish a homogenous regulatory framework where rail freight transport can grow in interaction with passenger transport.
- *Establishment of an open data policy*: It is necessary to regulate the establishment of an open data policy to ensure the interoperability of various railway undertakings, Combined Transport Operators, and logistics service providers. With an open data policy, specific data must be collected by any participant in Combined Transport and shared to ensure transparency and a straightforward collaboration between the involved parties. This will lead to significant gains in terms of efficiency for the entire Combined Transport-chain, and thereby it enables further growth. Regulation of an open data policy contributes to achieving these gains. In addition, *general interfaces for data sharing need to be established and promoted.* Today, data sharing is expensive and cumbersome due to individual setups between the single parties. A regulatory framework for data sharing and the support of industry standards such as EDIGES can further contribute to these objectives.
- *Reduction of access barriers to intermodal transport:* While containers are perfectly intermodal and can be easily transferred from road to rail and vice versa, swap-bodies and mainly semi-trailers, the dominant loading unit type in continental traffic, require special equipment to be transferred on trains. Horizontal transhipment technologies have been developed for non-craneable semi-trailers, the compatibility of the loading unit with rail being crucial. With few technical arrangements, semi-trailers can be made craneable and therefore access standard intermodal transport without technical obstacles. Policy makers should make sure that craneability becomes standard for most of the semi-trailers within a reasonable period of time. In the meantime, politics should subsidise retrofitting of today's non-craneable semi-trailers.

2.2 Second area of action: Enhancing customer-driven physical infrastructure

Figure 7 provides an overview of the second area of action and associated measures.

Area of action	Measures
2. Enhancing customer-driven physical infrastructure	▪ Upgrade and extension of existing infrastructure ▪ Speeding-up of planning and construction ▪ Establishment of standardisation of technical rules and specifications ▪ Supplement of terminal capacity via extension and construction ▪ Usage of alternative handling systems in existing vertical systems

Figure 7: Second area of action and associated measures

This area of action concerns measures that enhance the physical infrastructure necessary for further Combined Transport growth. These measures aim for higher productivity and quality of Combined Transport services in general and must be enforced primarily by infrastructure managers:

- *Upgrade and extension of existing infrastructure*: For Combined Transport to grow above average, it is necessary to facilitate consistent investments into the physical infrastructure, taking into account the specific requirements of intermodal transport. In order to increase productivity and to achieve the desired modal shift, the European rail network needs to be upgraded to the P400 loading gauge – fit for the 4-meter height of semi-trailers – and a train length of 740 meters. In the meantime, a temporary compensation for the lost productivity due to the "underlength" of trains should be considered. In addition, bottlenecks need to be eliminated, additional high-quality capacity and redundancies are to be created, rail freight corridors must be interconnected for better network effects, and parking tracks need to be available in sufficient quantity (see also UIRR Position paper (2021)).
- *Speeding up of planning and construction*: For a fast extension of the infrastructure capacity mentioned above, it is necessary to speed up the planning and construction process of the specific measures, including railways and terminals. Hence, it is required to introduce suitable project management processes and an eased regulatory framework. Lastly, it is mandatory to procure sufficient and predictable funding for the approved development projects.
- *Establishment of standardisation of technical rules and specifications*: Finally, it must be focused on the standardisation of technical rules and specifications for all of Europe by infrastructure managers. So far, e.g. locomotive drivers and locomotives often have to be exchanged at the border between the EU Member States due to different standards and requirements in many countries (Allianz pro Schiene, 2020). Hence, it is necessary to overcome these burdens by standardisation across Europe. The European Railway Agency needs to be strengthened, and the roll-out of the European Railway Train Management System for the entire rail network used by freight trains should be consistently implemented. Only through the network harmonisation and the abolishment of national specificities, Combined Transport can grow supranationally.
- *Supplement of terminal capacity via extension and construction*: Decision-makers also need to invest in the terminal infrastructure to create the access for freight to the rail network – a prerequisite for further Combined Transport growth. While not only the pure quantity of terminals in Europe needs to be increased, it is also necessary to invest in the capacities and productivity of existing terminals, e.g. to establish more trimodal terminals, and especially 740m-trains suitable tracks.
- *Usage of alternative handling systems in existing vertical systems*: Alternative handling systems may also be used especially for the transshipment of non-craneable semi-trailers. Solutions exist and may be deployed in the terminals. Their usage will enhance Combined Transport as an interim solution before achieving the craneability of all semi-trailers as a standard.

2.3 Third area of action: Enhancing efficiency and innovation

Figure 8 provides an overview of the third area of action and associated measures.

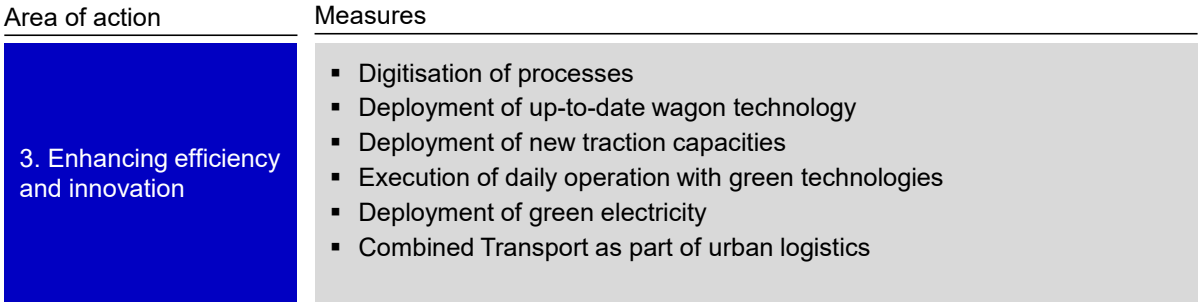

Figure 8: Third area of action and associated measures

This area of action deals with measures that enhance efficiency and streamline the establishment of new of Combined Transport services. These measures should aim to ensure and enhance competitiveness in general. Thus, mainly railway undertakings, intermodal operators, infrastructure managers and authorities need to implement the following measures:

- *Digitisation of processes*: There are not only innovations in rolling stock, but also for Combined Transport in general, using digitalisation of operational processes. For example, information on traffic, capacities, the availability of infrastructure, vehicle positioning, or end-to-end shipment tracking and the estimated time of arrival (ETA) can be made transparent by digital solutions and algorithms. This allows better usage of this information for an increased planning and control quality. In addition, maintenance intervals can be optimised through digital innovations. Furthermore, digital platforms as a standardised solution for booking processes can also contribute to a considerable efficiency gain in Combined Transport, leading to more attractive services. Authorities that play a role in the operation and oversight of Combined Transport must also digitize their IT systems so as to become capable of receiving information in a digital form – making paper-based administration unnecessary (see also UIRR (2019)).
- *Deployment of up-to-date wagon technology*: Many different innovations are available for upgrading the existing rolling stock. For intermodal transport, the main focus lies on silent brakes, disk brakes, and technical solutions to increase the loading capacity and lower life-cycle costs. In addition, the digital automatic coupling might be useful in the long run if adequate funding is available. All these innovations contribute to making Combined Transport more competitive and more productive than unimodal alternatives. This will help to get more goods transported with an intermodal approach.
- *Deployment of green traction capacities*: To ensure further gains in terms of sustainability, railway undertakings and intermodal operators must deploy up-to-date equipment, especially locomotives for mainline and shunting. Innovations such as hybrid locomotives that incorporate batteries, e.g. by a hybrid power train, where an environmentally friendly diesel engine charges batteries, which in turn provide energy for the traction motors can be deployed. Hence, it is required to establish a structured investigation process of such innovations by the actors mentioned above to stay contemporary in terms of their traction stock.
- *Execution of daily operations with green technologies*: The sustainability of Combined Transport can be further enhanced by the execution of daily operations with green technologies, including measures such as additional network electrification, deployment of lightweight constructions, more energy-efficient power trains, or resource-saving increases in the efficiency degree. Generally, a modernisation of the utilised fleet of wagons with a long-term planning horizon is required. These innovations need to be deployed by railway undertakings and intermodal operators in a consistent and unified manner to ensure interoperability.
- *Deployment of green electricity*: Combined Transport processes must be boosted by the deployment of green electricity, the cost of which should not be higher. Not only operational processes such as the actual transport can be run based on green electricity, but also administrative processes of the respective actors. This contributes to the sustainable image of Combined Transport, a further reduction of negative externalities, and ultimately to the aims of the European Green Deal. Hence, railway undertakings, intermodal operators and terminal managers must be active and rearrange their energy supply step by step as soon as possible.
- *Combined Transport as part of urban logistics*: Railway undertakings and intermodal operators need to enlarge the deployment of Combined Transport into new fields. The supply of urban areas based on innovative urban logistics solutions can be one such new area. In combination with so-called periphery hubs, Combined Transport can contribute to a sustainable supply of urban areas in all of Europe. Hence, the actors mentioned above need to get engaged and encourage the exchange with local authorities and other local companies that establish urban logistics solutions. Combined Transport in combination with e.g. zero-emission-trucks can contribute to a zero-emission supply of urban areas. Terminals could ideally provide truck charging or alternative refuelling services. This can lead to a gain in public perception of Combined Transport.

2.4 Fourth area of action: Support of regulatory framework

Figure 9 provides an overview of the fourth area of action and associated measures.

Area of action	Measures
4. Support of regulatory framework	▪ Review of TEN-T Guidelines Regulation ▪ Review of Rail Freight Corridor Regulation ▪ Revision of Energy Taxation Directive ▪ Revision of the Combined Transport Directive ▪ Revision of Weights and Dimensions Directive ▪ EU road haulage rules in Combined Transport

Figure 9: Fourth area of action and associated measures

This area of action is concerned with measures that support the various directives Combined Transport is based on. Therefore, these measures aim to strengthen and enhance Combined Transport's usage within Europe. Hence, primarily European policy makers need to put effort into the following measures, but infrastructure managers, railway undertakings, and intermodal operators need to support with their practical expertise:

- *Review of TEN-T Guidelines Regulation*: As mentioned in the European Commission's Communication on the European Green Deal, it is planned to submit a legislative proposal to review the TEN-T Guidelines. The proposal is scheduled to be proposed in the third quarter of 2021, while the legislative adoption should not take longer than a year. It is necessary to strengthen the European Commission's role and that the EU Member States fulfil their obligations. The TEN-T network must be completed by 2030, but by 2050 it is required that rural areas are integrated as well to achieve a stronger Combined Transport in the long term (see also UIRR Position paper (2021)).
- *Review of Rail Freight Corridor Regulation*: Regulation 913/2010 is considered of crucial importance for EU rail freight, it is foreseen to be revised in convergence with the TEN-T Guidelines, resulting in a view for passenger and freight traffic by the end of 2022. The European Parliament stated that the existing corridor capacity is unsatisfactory. Only with sufficient coordination between passenger transport and rail freight, the aims to transfer more freight to rail and Combined Transport solutions can be achieved. Consequently, this must be considered during the review.
- *Revision of the Energy Taxation Directive*: This directive provides the European framework for fossil fuel taxation. Besides the aim of the preservation of the EU single market, it is necessary to align taxation to achieve the aims of the European Green Deal through a revision. This revision must be used to introduce direct or indirect incentives for European companies to transport their freight by rail and Combined Transport.
- *Revision of the Combined Transport Directive*: As part of the European Green Deal action plan, it is scheduled to propose a new revision the Combined Transport Directive 92/106, with the aim to shift a further considerable amount of freight away from road transport. The proposal of the EU Commission is foreseen to be unveiled by mid-2022, with the adoption of the revised legislation by 2024. This opportunity needs to be seized to define incentives applicable for whole Europe to shift to Combined Transport. Furthermore, it is required to establish support measures, clear definitions, and up-to-date provisions within the revised directive. Especially intermodal operators are called to get actively involved.
- *Revision of the Weights and Dimensions Directive*: Directive 719/2017 outlines the maximum authorised weights and dimensions of road vehicles in national and international traffic within the European Union. Last amended in 2017, the European Green Deal action plan foresees another revision to begin in 2022. This revision must focus on a harmonised development of transport systems regarding their weights and dimensions to ensure interoperability in the long term. Hence, this revision is of high importance to achieve the necessary further shift to Combined Transport, contributing to the European Green Deal.

- *EU road haulage rules in Combined Transport*: If the new EU road haulage rules are completely implemented, including the application of the optional provision of the suspension of Article 4 of the Combined Transport Directive, an 8% decline in Combined Transport is expected by 2030 due to the nearly doubling costs for short-distance trucks (UIRR, 2021). Hence, it is necessary that the EU Member States refrain from the optional suspension of Article 4 of the Combined Transport Directive. Furthermore, the European Green Deal and the 'polluter pays principle' should be used as driving principles of transport policymaking. A related revision of the EU road haulage rules may be necessary.

3. Concluding remarks

Finally, it must be noted that these areas of action are interdependent. Hence, all named actors need to play together to achieve the support of the European Green Deal from a Combined Transport perspective.

While the areas of action mentioned above are most pressing for a considerable growth of Combined Transport, the actions are not exhaustive. Further measures can contribute significantly to achieve green, zero carbon emission Combined Transport, e.g. the usage of green electricity for all related logistical activities, investments in the terminal structure, or the integration of Combined Transport into smart urban logistics concepts, where Combined Transport can contribute to cleaner cities in Europe. Consequently, it is of high importance to constantly encourage dialogue between many different actors to achieve that Combined Transport is ready for the future.

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