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ANNEX

8 Activity Report of the Transport Working Group for the period 2023-2024

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ACTIVITY REPORT OF THE
TRANSPORT WORKING GROUP
FOR THE PERIOD 2023-2024
(BETWEEN THE XVII AND XVIII MEETINGS OF THE ALPINE CONFERENCE)

1. Overview of the mandate given by the XVII Alpine Conference

Summary of the objectives according to the 2023-2024 mandate
In its previous mandate, the Group set out to carry out the following operational tasks: 1. Carry out an in-depth study of the connections between transport and regional development, as endorsed by the 2023-2030 Alpine Convention MAP. For instance, assess socialised remote working modes such as coworking and promote mobility as a service (MaaS) solutions. Assess solutions for the improvement of remote mountain destinations accessibility using integrated transport systems or multimodal mobility. 2. Assess the necessary framework conditions for the creation of emission-free pilot routes for LGVs, HGVs and buses, together with their relevant charging infrastructures, especially relating to ongoing work related to the draft EU-AFIR (alternative fuels infrastructure regulation) regulation and to the Simplon Alliance. 3. Assess the implementation of the energy transition in transalpine logistics, measures and regulations. 4. Assess the potential of combined transport for the modal shift in alpine crossing freight transport. This objective contributes to the implementation of Pathway 1, step 1 of the Alpine Climate Target System.

2. Meetings

Summary of the meetings held (date, place, main topics and milestones)
• 2 February 2023: 51st meeting (online). Division of topic of the current mandate between WG members. • 1 June 2023: 52nd meeting (online). Progress of mandate topics. • 22 September 2023: 53rd meeting (Paris, FR). Joint meeting with Spatial Planning and Sustainable Development Working Group. Change of the Working Group chair from Michel Rostagnat to Michel Pinet. • 8 March 2024: 54th meeting (Nuremberg, DE). Workshop on combined transport, progress of mandate topics. • 18 June 2024: 55th meeting (Ljubljana, SI). Preparation of the 2025-2026 mandate. • 2 September 2024: 56th meeting (Paris, FR). Validation of the 2025-2026 mandate and reports.

3. Activities carried out

Activities carried out with their outputs and results, highlighting their contributions to the relevant priorities of the Multi-Annual Work Programme 2023-2030
• At its 53rd meeting in Paris (FR), the Group organised study visits of the HAROPA Ports of Paris headquarters, a Franprix (supermarket) multimodal river terminal, and of the SNCF Réseau (French railway network public owner) control centre. • 12-13 October 2023 in Innsbruck (AT): Workshop on "Accelerating the Electrification of Road Transport in the Alps/AFIR-Cooperation Stakeholder-Meeting". The two-day workshop addressed current issues surrounding the decarbonisation of alpine road transport. The event was hosted by the state of Tyrol and the BMK and was organised and carried out by OLÉ - Austria's National Competence Centre for E-Mobility. Over 50 participants from Austria, Germany, Switzerland, Italy, and Slovenia, representatives of the European Commission, academia, and industry, gathered in Innsbruck to join expert presentations, workshops and moderated discussions. This allowed to bring together relevant stakeholders to work on solutions, discuss challenges, exchange experiences, and collectively learn from them. The workshop included a study visit of the Brenner Base Tunnel being currently built between Austria and Italy, and a report with the outcome of the workshop and recommendations was prepared. • 7 March 2024 in Nuremberg (DE): Workshop on "Opportunities of Digitalisation for Transalpine Intermodal Freight Transport ". The workshop was hosted by the German Federal Ministry for Digital and Transport and the Bavarian State Ministry for Housing, Building and Transport. The event congregated representatives from various sectors to address the digitalisation of combined transport. Insights on bolstering intermodal transport were shared by German, Bavarian, Austrian, and Italian representatives, highlighting state support and showcasing projects enhancing freight centres and port infrastructures. The workshop included a visit of the multimodal port of Nuremberg and a report with the outcome of the workshop and recommendations was prepared. • A report on the "Decarbonisation of Alpine transport - Assessing the implementation of the energy transition in transalpine logistics - Policies for the decarbonisation of transalpine freight transport" was prepared under the coordination of the Italian members of the Group. • All the above activities contributed directly or indirectly to priority areas 2 and 3 of the Multi-Annual Work Programme 2023-2030. Due to capacity and time limitations, the objective of the previous mandate to carry out an in-depth study of the connections between transport and regional development could not been achieved.

4. Cooperation

Cooperation developed with other Alpine Convention bodies and further relevant partners and processes, and resulting benefits
• 22 September 2023 in Paris (FR): Joint meeting with the Spatial Planning and Sustainable Development Working Group of the Alpine Convention. During a workshop, members of both Working Groups contributed to the Alpine Spatial Planning Perspective (ASPP) with focus on topics of interface between transport and spatial planning / development, with the results to be included in the ASPP synthesis report. • Reciprocal regular observer participation in the meetings of the EUSALP Action Group 4 on Mobility in the Alps

5. Communication

Communication measures and outreach activities carried out, specifying their respective target groups
• Social media campaign: the chairs of the Thematic Working Bodies of the Alpine Convention, in June 2023.

6. Attachments

List of the documents attached to this report, such as papers proposed for approval by the XVIII Alpine Conference (thematic reports, guidelines, statements etc.) and supporting documents (workshop proceedings, survey reports, communication materials etc.).
• *Report: Accelerating the Electrification of Road Transport in the Alps/AFIR-Cooperation Stakeholder-Meeting, Innsbruck* • *Report: Opportunities of Digitalisation for Transalpine Intermodal Freight Transport, Nuremberg* • *Report: Decarbonisation of Alpine freight transport - Assessing the implementation of the energy transition in transalpine logistics - Policies for the decarbonisation of transalpine freight transport*

Accelerating the Electrification of Road Transport in the Alps/AFIR-Cooperation Stakeholder-Meeting Innsbruck

Emission free pilot-routes

Transport Working Group of the Alpine Convention

Mandate 2023-2024

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This report is the result of the Transport Working Group mandate, chaired by France.

The members of the Working Group were:

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- **France**: Guy Poirier, Anke Möller
- **Germany**: Diana Huster, Harry Seybert
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Climate Action, Environment,
Energy, Mobility,
Innovation and Technology

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Executive Summary

The two-day workshop "Accelerating the Electrification of Road Transport in the Alps / AFIR-Cooperation," took place from October 12th to 13th, 2023, to address current issues surrounding the decarbonisation of alpine road transport. The event was hosted by the state of Tyrol and the BMK, and was organised and carried out by OLÉ - Austria's National Competence Center for E-Mobility.

Over 50 participants from Austria, Germany, Switzerland, Italy, and Slovenia, representatives of the European Commission, academia, and industry, gathered in Innsbruck to join expert presentations, workshops and moderated discussions. This allowed to bring together relevant stakeholders to work on solutions, discuss challenges, exchange experiences, and collectively learn from them.

Participants identified battery electric vehicles as a pioneering technology for the decarbonisation of road transport and highlighted the challenges posed in the development of the associated recharging infrastructure, which requires high-quality and up-to-date database as well as orderly and open coordination. Hydrogen infrastructure at national and European level will also need ongoing monitoring of the market and technological progress in order to specify appropriate areas of application.

Recognising the need to intensify stakeholder meetings on specific topics relating to recharging and refuelling infrastructure, a main recommendation stemming from the workshop is the establishment of a coordination and exchange platform to coordinate the necessary expansion of recharging infrastructure in border areas and along the corridors of the Alpine region.

1. Introduction

From October 12th to 13th, 2023, the Innsbruck Landhaus, at the invitation of the State of Tyrol and the Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK), served as the venue for a two-day event addressing current issues surrounding the decarbonisation of road transport. This international working session, titled "***Accelerating the Electrification of Road Transport in the Alps / AFIR-Cooperation***," focused on collaboratively establishing key frameworks for implementing the transition to sustainable mobility on Alpine roads. In addition to the state of Tyrol and the BMK as hosts, the event was organised and carried out by OLÉ - Austria's National Competence Center for E-Mobility, which is based at AustriaTech, the mobility agency owned by the federal government (BMK).

The impetus for hosting the event was a mandate given to Austria within the framework of the Alpine Convention during the XVII. Alpine Conference. This mandate tasked Austria with assessing the necessary conditions for emission-free (pilot) routes for trucks, buses, and their recharging infrastructure. Additionally, the Regulation (EU) 2023/1804 on the deployment of alternative fuels infrastructure (Alternative Fuels Infrastructure Regulation - AFIR), which transitioned into the Official Journal of the European Union in September 2023 and thus requires implementation across all member states, provides the central legal foundation for establishing recharging and refuelling infrastructure for emission-free transportation on the trans-European transport network. This regulation underscores the importance of international cooperation and obliges member states to ensure emission-free transportation across borders (Article 4(9) & Article 6(2)). The event also aimed to lay the groundwork for fulfilling this commitment under AFIR.

The driving force behind regulatory goals and adjustments is the decarbonisation of the transportation sector, crucial for achieving climate neutrality by 2050 in the European Union, given the sector's status as one of the largest CO_2 emitters. In order to achieve this target, CO_2 fleet limits for passenger cars and light duty vehicles have been tightened, with negotiations ongoing for limits on trucks and buses. The issue has also gained considerable momentum in practice in recent quarters: Several manufacturers are now able to offer the first zero-emission trucks as series vehicles and logistics and haulage companies are showing increasing interest in battery electric and fuel cell-powered vehicles. Moreover, an increasing number of member states, especially in the Alpine region, are launching support programs and guidelines to facilitate the transition to emission-free commercial vehicles and the development of corresponding infrastructure. While the decarbonisation of heavy-duty transport holds significant potential due to favourable legal conditions and technological advancements, the urgency of the situation presents substantial challenges. In the following, these challenges are identified based on the contributions of relevant stakeholders from the Alpine countries, industry, and academia, and outline potential solutions and next steps for addressing these challenges.

2. Mandate of the Alpine Convention

One of the tasks of the EUSALP group and a central focus of the Alpine Convention is to work together with the countries of the Alpine Central Region to address the current status and challenges of the ramp-up of emission-free mobility and the necessary steps to achieve climate targets.

The Alpine Convention is an international treaty for sustainable development and protection of the Alpine region. It was signed over 30 years ago by Germany, France, Italy, Liechtenstein, Monaco, Austria, Switzerland, and Slovenia. The convention serves as a legal framework for protecting Alpine ecosystems and enables signatory states to collaborate on transnational issues. In April 2019, the ministers of the Alpine countries adopted the Alpine Climate Target System 2050, aiming to complement national and international goals on climate protection and adaptation to climate change.

A political decision-making body of the Alpine Convention is the biennial "Conference of the Contracting Parties" (Alpine Conference), where goals are discussed, and political measures for implementing the Alpine Convention are developed. The mandates are executed by thematic working bodies (working groups and boards) composed of experts appointed by the contracting parties. The current basis for the work of the working groups is the Multi-Annual Work Programme (MAP) 2023-2030. One of the thematic working groups is the Transport Working Group, which deals with the challenges and promotion of sustainable passenger and freight transport in the Alps.

During the XVII. Alpine Conference in October 2022, the Transport Working Group was tasked with assessing the necessary conditions for creating emission-free pilot routes for trucks and buses, along with the corresponding recharging or refuelling infrastructure. Ongoing activities within the framework of AFIR – Alternative Fuels Infrastructure Regulation and the Simplon Alliance should also be taken into account.

Within the framework of the Alpine Convention and associated implementation strategies, the contracting parties recognise that the challenges facing the Alpine region – including climate, cultural, and demographic change – require a cooperative approach that goes beyond national borders. Consequently, the path of a joint international event was chosen to fulfil the mandate, taking into account the needs of various stakeholders and involving the affected countries in finding solutions. The event "***Accelerating the Electrification of Road Transport in the Alps / AFIR-Cooperation***" was therefore able to build on two impactful international processes as a foundation: creating necessary infrastructures and measures to meet AFIR objectives while strengthening international connectivity, and simultaneously fulfilling the mandate of the Alpine Convention.

3. Summary of the Event

Over 50 participants from Austria, Germany, Switzerland, Italy, and Slovenia, representatives of the European Commission, academia, and industry, gathered at the Landhaus Innsbruck on October 12th-13th, 2023. The programme of the event featured expert presentations and moderated discussion sessions on e-mobility-related key topics on both days. On the first day, the presentations focussed on European, national, and regional perspectives. These perspectives were complemented on the second day by insights from research and industry. Following the presentations, specific topics were explored in greater depth in working groups.

The participants had the opportunity to come together based on their personal expertise and interests, and discuss Electric Road Systems (ERS), the development of recharging infrastructure, hydrogen in mobility, and requirements for the electricity grid under the guidance of an expert. The knowledge and experiences of participants from various countries and sectors were captured and aggregated in the following report. In addition to elaborating on the content of the individual key topics, the overarching goal was to bring together stakeholders who can influence the relevant topics in their daily work, work on solutions, discuss challenges, exchange experiences, and collectively learn from them.

4. Key Findings

The following results have been formulated based on the discussions conducted during the event's breakout sessions, supplemented by scientific insights and literature. Firstly, a comprehensive analysis of the challenges and barriers related to the proliferation of various propulsion systems and their infrastructures is presented from the perspective of stakeholders. Subsequently, potential solutions and next steps are discussed. The sections are subdivided into different alternative propulsion methods, with a focus on battery electric vehicles and their recharging infrastructure, hydrogen vehicles and their refuelling infrastructure, and Electric Road Systems (ERS) and their infrastructure. This emphasis is due to the mandate of the Alpine Convention and the priorities set in the AFIR.

4.1. Challenges & Obstacles

a. Battery Electric Vehicles & Recharging Infrastructure

The AFIR sets comprehensive expansion targets for recharging infrastructure for battery electric vehicles. A total of at least 1.3 kW of capacity provided through publicly accessible recharging stations should be available for every registered electric passenger car (BEV) and every light duty vehicle in the respective member state - plus at least 0.8 kW per plug-in hybrid vehicle (PHEV). As a central requirement, recharging pools including at least one recharging point with more than 150 kW are to be installed every 60 km on both sides of the TEN-T core network by 2025 and every 60 km on both sides of the TEN-T comprehensive network by 2030. For heavy-duty vehicles, the goal is to establish a truck charging pools including at least one recharging point with more than 350 kW every 60 km on both sides of the TEN-T core network and every 100 km on both sides of the TEN-T comprehensive network by 2030. These distance requirements must also be adhered to across borders, requiring coordination between neighbouring countries. In addition to these expansion targets, the AFIR also defines qualitative requirements for this recharging infrastructure, including payment methods, pricing modalities, and accessibility considerations.

In 2023, there are more than 4 million battery electric passenger cars and light duty vehicles (Class M1 and N1) registered in the EU, along with nearly 5,500 battery electric trucks (Class N2 and N3). These numbers show a continuous increase. Additionally, there are over 620,000 charging points along the roads of the EU, as indicated by data from the European Alternative Fuels Observatory (EAFO). Despite the steadily growing inventory, the AFIR targets lead to a significant need for expansion in the coming years.

In order to systematically address this need, two of the event's breakout sessions focused on recharging infrastructure for battery electric vehicles. One session explored expansion scenarios, truck recharging infrastructure, and challenges related to AFIR requirements, while the other focused on organisational questions surrounding necessary frameworks and essential collaborations. A key insight that emerged from both breakout sessions was the

participants' clarity about the development of electromobility. The clear need for expanded recharging infrastructure capacities along the high-level road network and beyond seems to have been recognised as a fact among experts. The goals defined in the AFIR or the current scientific study results were not questioned during the discussions. The results of the two open and dynamic discussion rounds can be divided into four categories:

- Recharging infrastructure for passenger cars:

Charging facilities for cars and light duty vehicles will have to be available at all locations, particularly along the transit corridors, in order to meet the resulting demand by 2030 and beyond. Challenges arise for passenger cars in particular when defining and prioritising the most necessary locations for the first and second phases of the expansion, as well as in the detailed planning around national parks and protected zones, where examination and approval can take many years.

- Recharging infrastructure for trucks:

The Austrian motorway operator ASFINAG raised the complex issue of space requirements for truck recharging infrastructure, particularly for overnight charging. There appears to be a challenging competitive situation between existing parking spaces and the construction of charging areas for recharging battery electric trucks. Especially in the Alpine region, alongside the need to initiate expansions as early as possible with the local available grid capacities, the issue of space appears to play a significant role in the expansion.

- Energy Grids and Connection Capacities:

Initiated by the question of responsibility for initiating suitable platforms for the exchange and cooperation on network topics, the focus shifted strongly to the need for further exchange and the expansion of stakeholders. There is currently still too little usage data, especially for truck recharging, to be able to forecast the route planning and local charging requirements of the emission-free fleet, which is expected to grow significantly over the next decade (ASFINAG expects that by 2040, at least 50% of trucks on Austrian highways will be electrified). This data is crucial for network operators and energy companies, as significant network loads are expected.

- Networks and Partnerships:

Part of the discussion was used to emphasise the need to establish a coordinated exchange platform for the development of infrastructure for zero-emission road transport in the participating member states, operating at regular intervals and in suitable modes. The current lack of such a platform appeared to the participants to be one of the most central obstacles in the current process.

b. Hydrogen & Refuelling Infrastructure

The AFIR also establishes clear expansion goals for hydrogen to ensure minimum coverage with refuelling infrastructure on the European motorway and expressway network. By December 31, 2030, hydrogen refuelling stations, designed for a cumulative minimum capacity of 1 ton/day and equipped with at least one 700 bar dispenser, should be established every 200 km along the TEN-T core road network. Furthermore, within the national strategic frameworks to be developed by the end of 2025, member states are to set a linear roadmap with indicative targets for 2027 and prescribed targets for 2030, ensuring sufficient network coverage in relation to market demand for hydrogen-powered heavy-duty vehicles. The AFIR also determines requirements for hydrogen refuelling stations, such as payment methods or pricing modalities. It is also legally stipulated that distance targets must be met across borders.

In 2023, there are nearly 4,000 hydrogen-powered passenger cars and light duty vehicles (Class M1 and N1) in operation in the EU, along with approximately 60 hydrogen-powered trucks (Class N2 and N3). Additionally, there are currently over 130 hydrogen refuelling stations along the roads of the EU. (Source: EAFO[1])

Due to the novelty of hydrogen technology as an energy carrier, decision-makers direct the use of hydrogen towards specific sectors of industry and mobility. The limited availability and producibility of green hydrogen require efficient utilization. Other non-sustainable forms of hydrogen do not seem conducive to decarbonisation in the longer term. During the breakout session, there was a discussion on whether political interventions at this time contribute to a more efficient use of hydrogen or hinder it.

There are arguments in favour of intervention, especially considering the limited availability of hydrogen. However, there is a risk that uncertainties regarding the role of hydrogen in the mobility transition could lead to the premature exclusion of certain areas, even though the use of hydrogen may prove to be effective at a later date.

Compared to other energy carriers, hydrogen is costly, and the price rises significantly with green hydrogen. There are already initiatives by hydrogen organisations providing financial support to the industry, for example, to bridge the cost difference between the price they can afford for energy and the price of using green hydrogen. The question arises whether similar support should be considered in the transport sector. Widespread adoption of hydrogen trucks is not expected to take place for several years, and planning subsidies is challenging due to uncertainties about the ramp-up. In contrast, planning in the industrial sector is easier due to the foreseeable energy demand and limited substitutable technologies.

The limited substitutability in the industry sector generally poses the challenge that the use of the limited renewable hydrogen available in this sector appears to be a priority compared to mobility, where battery electromobility often provides a viable alternative to the combustion engine.

During the breakout session, hydrogen production was also discussed. Some participants expressed the opinion that large-scale hydrogen production has no future in Europe. To ensure (price) competitiveness, establishing production sites outside Europe, for example, in North

[1] European Alternative Fuels Observatory, https://alternative-fuels-observatory.ec.europa.eu/

Africa, would be necessary. The advantage of this would be that apart from the electricity used to produce hydrogen, unlike electricity, hydrogen can be transported without losses. However, such a relocation of the production site would be associated with uncertainties due to geopolitical developments and new dependencies. After all a fresh water supply would be required.

Finally, there is the possibility that the production and availability of sufficient quantities of green hydrogen for transport could take so much time that battery-powered electric vehicles are already widespread before hydrogen is established as a propulsion method. The introduction of hydrogen as a new emission-free technology in the transport sector would therefore no longer be expedient. It should be considered that the mobility transition is subject to time pressure in order to achieve mid-term climate targets, and thus the window of opportunity for the integration of hydrogen could be limited.

c. Electric Road Systems and other propulsion forms

There are significant uncertainties regarding the adoption of Electric Road Systems (ERS) as a technology in the mobility transition in the Alpine region. Currently, implementation is largely limited to isolated test tracks in Germany and Sweden. Among manufacturers of heavy-duty vehicles, the Swedish company Scania, for example, has shown interest in ERS and is actively involved in constructing such systems in Sweden. Due to the uncertainty, AFIR does not set expansion targets for ERS. However, it stipulates that the European Commission conducts a technology and market readiness report by the end of 2024, which will also delve into ERS technologies and their potential.

A major challenge associated with ERS technology is the associated costs, both in construction and in terms of accompanying grid connections. Although many European countries offer subsidies for zero-emission technologies, including ERS, building the necessary infrastructure poses a significant challenge. Planners require clarity, standards, and guidelines if such an elaborate infrastructure is to be realised on a large scale. This necessitates technology decisions at the policymaker level to establish Electric Road Systems as a viable short-term alternative.

Some participants in the event rule out ERS technology due to high costs and implementation difficulties. They argue that the budget required for it could be better utilized in other areas, such as road and rail renewal or battery electric vehicles.

4.2. Solutions and Next Steps

a. Battery electric vehicles & recharging infrastructure

- Recharging infrastructure for cars:

In the discussion, AFIR was seen as a particularly welcomed legislative measure, as it presented clear objectives to all member states for the first time. However, especially for states

with an already high percentage of electric car registrations, it was deemed not ambitious enough to meet the demand for recharging infrastructure by merely achieving the set requirements. A consensus among participants emerged that stakeholders in countries should be informed to plan beyond the goals of AFIR and also beyond the periods defined in the AFIR (until at least 2035). Representatives from Switzerland, Austria, and Germany emphasized the need to continue ensuring sufficient space for the ever-growing charging demand of battery electric cars - even if infrastructure for zero-emission trucks is also planned and installed at transit locations.

- Recharging infrastructure for trucks:

Especially for the initial phase of expanding public recharging infrastructure for heavy duty vehicles, site selection appears to be crucial. Both the costs and efforts related to planning (e.g. space requirements and grid connections) are significantly more complex than with car recharging infrastructure. Resources should therefore be carefully utilised in order to guarantee recharging infrastructure supportive of the ramp-up. Germany (NOW GmbH - National Organisation for Hydrogen and Fuel Cell Technology) mentioned having established a dedicated team for site selection and recommended this to other participating states. Another challenge to be integrated into planning early enough is the space requirements not only for the charging trucks themselves, but also forpossibly larger protective bollards around the recharging stations and for access to and from the charging spaces. Different scenarios and implementation strategies for the tendering of concessions at highway or expressway locations were discussed for both the expansion of car and truck recharging infrastructure. A central message of this complex issue seems to be the importance of a coordinated process and the approach of distributing lots or a bundle of several sites across the entire territory of the state in order to combine different types of location (expected degree of utilisation, region, size, etc.) in one tender.

- Energy networks and connection capacities / Networks and partnerships:

The need for a coordination and exchange platform emerged as the clearest common denominator of the discussion round on the challenges of battery electric mobility, both in the area of cars and trucks. This platform should serve as a basis for the necessary expansion of recharging infrastructure along the most important corridors in the countries of the Alpine region, representing a shared challenge in the European context. This coordination group should include both the respective leading and coordinating bodies of the states, which can also conduct networking activities among themselves, as well as private-sector players. The motorway companies should also play a central role in such a platform. A first step in this process is the definition of roles within the participating states and the registration of the relevant stakeholder organisations at a central point. There should be clearly defined persons responsible for different challenges and subject areas who will drive forward and document central activities during the platform's working phase.

b. Hydrogen & Refuelling Infrastructure

The discussion on solutions for promoting hydrogen as an energy carrier is divided into two opinions. On the one hand, advocates argue in favour of actively promoting hydrogen, as the widespread introduction or penetration of this technology seems unlikely without adequate support. The crucial prerequisite, however, is that renewable hydrogen must ultimately be competitively priced, taking all costs into account, in order to sustainably establish itself in the market. On the other hand, it is argued that the market mechanism itself should determine the role of hydrogen in mobility. According to this view, excessive state intervention could disrupt market equilibrium and hinder innovations or the penetration of the ultimately most appropriate technology.

When discussing the possibilities of implementing hydrogen as a mode of propulsion in transport, the difference between hydrogen internal combustion engines (H2 ICE) and fuel cell electric vehicles (FCEV) must also be taken into account. H2 ICE technology is considered easier to implement as it is based on the existing internal combustion engine. Some manufacturers are therefore focussing on H2 ICE, while FCEVs are expected to find application in specific sectors. The cost-efficient production and widespread use of FCEVs is currently considered challenging, while H2 ICE are seen as a more realistic option for the current market situation.

Despite differences of opinion, there is consensus that a minimum amount of refuelling infrastructure should be available to meet potential demand. A decisive step in the right direction is the implementation of AFIR, which aims to ensure at least a minimum level of hydrogen refuelling infrastructure on highways and expressways as well as in urban nodes. The introduction of hydrogen as a future-oriented technology on the highway and expressway network, especially in the context of heavy-duty vehicles, also requires a strategic roadmap. AFIR calls for the development of a hydrogen refuelling station expansion plan at national level, with indicative interim targets for 2027, taking into account the market development of fuel cell-powered vehicles, and the stipulated targets for 2030. In this context, it seems appropriate to coordinate or discuss these national roadmaps across borders to ensure coherence. The AFIR measures lay the foundation for a gradual implementation of hydrogen technology in the transport sector. It is of great importance to continue monitoring the market attentively in order to make adjustments and further developments in line with market needs. AFIR also stipulates that the European Commission conducts a comprehensive study on hydrogen technology and its market development in 2024. This study serves not only as guidance but also as a basis for a possible further expansion of hydrogen refuelling infrastructure.

Overall, the successful integration of hydrogen as a mode of propulsion in transportation is significantly influenced by price competitiveness, political measures such as possible customs facilitations, and the implementation of AFIR. The focus should be on making the technology not only environmentally friendly but also economically attractive in order to drive the transition towards sustainable mobility solutions.

c. ERS/Overhead lines & other propulsion systems

Many stakeholders completely rule out ERS technology due to feasibility and costs. Others, however, recognise ERS as potentially useful for specific, individual routes. Examples include

heavily trafficked and uphill routes, which have been identified as niche applications where ERS could be effectively employed. A significant advantage of ERS could be its low space requirement compared to conventional fast-recharging infrastructures. The need to extensively redesign or separate existing facilities and spaces is eliminated in this case. In contrast, the space consumption of fast-recharging infrastructure is considered a significant challenge when building the infrastructure for electromobility, especially in already crowded areas such as service stations. This could optimize and redesign spatial planning concepts.

The integration of ERS through combination with other forms of mobility, such as for first and last-mile routes in connection with rail freight transport, is a conceivable implementation. A general connection to rail transport can also be considered. This can prevent ERS systems from becoming a redundant technology, especially if there is already a rail infrastructure in place or planned, as is the case in the Alpine region, for example. This underscores the basic sentiment of participants regarding this propulsion technology, which seems to view ERS technologies more as a complementary technology in specific applications than a fully-fledged option for decarbonising (freight) road transport.

After a critical examination of Electric Road Systems (ERS) in the breakout sessions, most participants overall expressed some scepticism about the future use of ERS on the highway and expressway network. Despite this reservation, one expert raised the possibility that ERS could possibly become viable again in a few years. This highlights the dynamism and willingness for development in this field of technology.

As possible next steps, various options were discussed, including testing ERS for the aforementioned specific niche applications. Targeted application in such contexts could serve as a realistic starting point for evaluating the effectiveness of ERS. In particular, the continuation of research and development into ERS technologies was considered sensible in order to prepare for the existing uncertainty. These R&D activities allow for flexible responses to various developments without incurring high costs or inefficiently using public funds.

Another discussed proposal is the evaluation of ERS technologies in connection with the technology and market readiness report of AFIR in 2024 and the next revision of AFIR in 2026. This could provide a targeted opportunity to assess the progress of ERS and integrate potential adjustments or developments. The planned revision could thus serve as a turning point to pave the way for a broader application of ERS, should the technology prove to be fit for purpose.

5. Summary of Results

In conclusion, the event can be seen as a highly successful initiative, which should be deepened and repeated in the further implementation process. All topics defined on the agenda were addressed, providing new knowledge and points of contact for joint activities. As a result, decisive progress was made in initiating the AFIR implementation process and fulfilling the mandate of the Alpine Convention.

Participants identify battery electric vehicles as a pioneering technology for the decarbonisation of road transport. The challenge here lies particularly in the holistic development of the associated recharging infrastructure, which represents a significant task for all stakeholders. Demand-oriented planning requires a high-quality and up-to-date database as well as orderly and open coordination. Questions regarding technical and legal framework conditions can be answered through international communication, active participation in committees, and an orderly stakeholder process.

Challenges can also be identified in the area of hydrogen infrastructure at national and European level. A central aspect of this process is the ongoing monitoring of the market and technological progress in order to specify the areas of application for hydrogen in heavy-duty transport and find optimal solutions for them.

For the future, solutions should be further developed in suitable formats at the national and international level. The establishment of a coordination and exchange platform to coordinate the necessary expansion of recharging infrastructure in border areas and along the corridors of the Alpine region was initiated during the event. The intensification of stakeholder meetings on specific topics relating to the expansion of recharging and refuelling infrastructure at the national level was recognised as crucial for achieving the goals. Learning from each other through the active exchange of proven formats and successful strategies should be reinforced.

As a concrete output of the event and to initiate the next steps in the process, the event team is asking for the designation of a contact person, including contact details, from all Alpine Convention member states. In the future, these contact persons will serve as points of contact for all member states, and, together with them, the establishment of the platform and the coordination of annual meetings will be promoted. Collaborative efforts on the mobility transition, the exchange of experiences, and the initiation of coordinated processes are to be regarded as central building blocks for the ongoing decarbonisation process.

6. Glossary

AFIR	Regulation (EU) 2023/1804 on the deployment of alternative fuels infrastructure (Alternative Fuels Infrastructure Regulation)
ASFINAG	Austrian motorway operator (*Autobahnen- und Schnellstraßen-Finanzierungs-Aktiengesellschaft*)
BEV	Battery electric vehicle
BMK	Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology in Austria (*Bundesministerium für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie*)
CO_2	Carbon dioxide
EAFO	European Alternative Fuels Observatory
ERS	Electric Road System
EU	European Union
EUSALP	EU strategy for the Alpine region
FCEV	Fuel cell electric vehicle
H_2 ICE	Hydrogen internal combustion engine
MAP	Multi-Annual Work Programme
NOW GmbH	National Organisation for Hydrogen and Fuel Cell Technology in Germany (Nationale Organisation Wasserstoff- und Brennstoffzellentechnologie, Deutschland)
OLÉ	Austria's National Competence Center for E-Mobility @AustriaTech (OLÉ - Österreichs Leitstelle für Elektromobilität)
R&D	Research & Development
TEN-T	Trans-European Transport Network

7. Annex

7.1. Agenda

Thursday 12. October 2023

11.45 Welcome and registration

12.00 Joint lunch with EUSALP Action Group 4

13.00 Opening speeches by the hosts

- State of Tyrol – Landesrat René Zumtobel
- Federal Ministry of Climate Action – Minister Leonore Gewessler (Videomessage)

13.30 Accelerating the electrification – European, national, and regional perspectives

Kai Tullius – European Commission – DG Transport – Unit B.4 (Zoom)	EU Policy Update – Electrification of the road transport sector
Philipp Wieser – National Competence Center for E-Mobility @AustriaTech	Dealing with and learning from the challenges of commercial vehicle electrification in Austria / charging use cases
Christoph Schreyer - Head of Section Energy-efficient Transport, Swiss Federal Office of Energy (SFOE)	Emission-free heavy goods transport in Switzerland: status, opportunities, and challenges
Massimo Santori – Senior Technical Advisor of the Italian Minister of the Environment	Technical and functional effects and advantages of hydrogen for HDVs, among the various carbon neutral "fuels" suitable for decarbonising road freight transport
Johannes Pallasch – Head of the German National Centre for Charging Infrastructure	The initial charging network for HDVs in Germany
Harald Reiterer –Südtiroler Transportstrukturen AG (STA)	Regional approaches in accelerating the electrification in road transport

15.00 Coffee break

15.30 Breakout sessions

- Session 1 - The potential of electric roads in the alpine region

Patrick Plötz – Fraunhofer Institut for Systems and Innovation Research (ISI)

- Session 2 - Accelerating the transition by establishing user-friendly charging infrastructure in cross-border cooperative processes

Bernhard Hintermayer – ASFINAG

16.45 Report of the results from the Breakout sessions

17.00 Closing session

17.30 Study visit (Bus trip to the Brenner Base Tunnel (BBT) in Steinach am Brenner, visit of the construction site and presentation in the Tunnel World premises)

19.30 Joint dinner (Invitation of the State of Tyrol) - Hotel Weißes Rössl

Friday 13. October 2023

08.30 Welcome and coffee

09.00 Transport, energy and environment: cross-sectoral frameworks, synergies and challenges

Marie-Theres Holzleitner	Preliminary results of the ZEMPSI study (Zero Emission Mobility Power System Integration) - Austrian Institute of Technology/Energieinstitut der Johannes Kepler Uni Linz/Montanuniversität Leoben

09.20 Accelerating the electrification – Industry perspectives

Fabian Sperka – Transport and Environment T&E (Zoom)	Fully charged for 2030: the AFIR targets and the electricity demand of battery electric trucks
Koen Noyens – Milence	Rolling out a public fast charging network for heavy duty vehicles
Patrick Plötz – Fraunhofer Institut for Systems and Innovation Research (ISI)	Truck stop locations in Europe with implications for truck charging
Jasmine Ramsebner – KEBA Energy Automation GmbH	Integrating e-mobility into the energy system smoothly through intelligent charging solutions – Avoid, Improve, Simplify
Patrizia-Ilda Valentini – Renault Österreich GmbH (Zoom)	Meets AFIR the needs of the e-mobility market in the future?
Jens-Christian Tittel – Daimler Truck Austria GmbH	Alternative propulsion technologies Daimler Trucks
Roland Löffler – Volvo Group Austria GmbH/Niklas Andersson – Volvo Trucks Headquarters	Decarbonization in the heavy commercial vehicle sector

10.45 Coffee break

11.00 Breakout sessions

- Session 1 - Services to make the future of road transport electric

Jasmine Ramsebner – KEBA Energy Automation GmbH

- Session 2 - Making Europe ready for electrification: Potentials of hydrogen technologies in the mobility transition

Massimo Santori – Founder of MS-Italiainvestimenti Istituite

12.15 Report of the results from the Breakout sessions

12.30 Joint lunch

13.30 Closing session/Debriefing

- Austrian Federal Ministry of Climate Action – Hans-Jürgen Salmhofer
- State of Tyrol – Ekkehard Allinger-Csollich

14.00 End of meeting

7.2. Participants

Participants of the Brenner Base Tunnel (BBT) study visit, Steinach am Brenner. 12/10/2023

Opportunities of Digitalisation for Transalpine Intermodal Freight Transport

7 March 2024, Nuremberg

Transport Working Group of the Alpine Convention

Mandate 2023-2024

ALPENKONVENTION
CONVENTION ALPINE
ALPSKA KONVENCIJA
CONVENZIONE DELLE ALPI

IMPRINT

This report is the result of the Transport Working Group mandate, chaired by France.

The members of the Working Group were:

Chair: Michel Pinet (*Inspection générale de l'Environnement et du Développement durable, ministère de la Transition écologique* – General Inspectorate for the Environment and Sustainable Development, Ministry of Ecological Transition)

Contracting Parties:

- **Austria:** Wolfgang Grubert, Hans-Jürgen Salmhofer
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- **Arge Alp:** Martin Gassner
- **Alpine Space Programme:** Aleš Kegl

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- Raphaël Lelouvier

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Contents

Executive Summary

The workshop "Opportunities of Digitalisation for Transalpine Intermodal Freight Transport" congregated representatives from various sectors to address the digitisation of Combined Transport (CT). Insights on bolstering intermodal transport were shared by German, Bavarian, Austrian, and Italian representatives, highlighting state support and showcasing projects enhancing freight centres and port infrastructures.

Presentations from Ministries of the Alpine Region revealed commitments to digitalisation and infrastructure development, with a clear directive towards sustainable freight transport systems. Notably, Austria's strategic initiatives aim to decouple economic growth from freight transport growth.

A panel discussion explored the intricacies of digitalising CT, touching on the multitude of stakeholders involved in freight transport compared to passenger rail, the challenges of data standardisation and transparency, and the critical need for reallocation of rail tracks to establish efficient freight rail networks. The success of dynamic slot management systems, which adapt to fluctuating estimated time of arrival information for trucks and trains, was discussed as a testament to the feasibility of such digital initiatives.

Companies active in CT shared their pioneering digital projects, from data platforms to terminal-truck communications, illustrating a collective drive toward streamlined operations and environmental digitalised stewardship. The discourse underscored the essential role of change management and awareness, with funding programs to promote CT and digital services potentially heightening the acceptance and ease of use for rail freight transport.

Additionally, discussions emphasised the need for trust in digital platform providers, as the sharing of sensitive data such as train capacities might affect market pricing or be misused by competitors. The success of private white-label providers in transport tracking services exemplified the importance of offering clear value propositions to all stakeholders.

The workshop also considered regulatory pressures, such as Austria's mandate to assess the overall viability of rail transport, as a positive influence on the modal split. However, there was a general consensus to maintain a balanced perspective on regulation in the transport market.

Lastly, the workshop highlighted the security risks associated with data sharing and high data transparency, noting the need to safeguard sensitive logistics information within critical infrastructures like ports or along entire supply chains. Despite these concerns, the risk of stifling innovation due to excessive caution was acknowledged, emphasising the importance of exploring and implementing new digital solutions to demonstrate their full potential.

1. Welcome & Introduction

The workshop "Opportunities of Digitalisation for Transalpine Intermodal Freight Transport" by the Transport Working Group of the Alpine Convention took place on March 7, 2024, from 9:30 AM to 5:00 PM, at the Port of Nuremberg. Alongside the members of the Working Group, the German Federal Ministry for Digital and Transport, as the co-organiser (together with the Bavarian State Ministry of Housing, Construction and Transport), invited corporate representatives to identify potentials and challenges within the transport economy for the digitalisation of CT. The outcomes of the workshop will contribute to goal no. 2.4 of the Transport Working Group's 2023-2024 mandate, "Assess the potential of combined transport for the modal shift in alpine crossing freight transport."

The workshop featured a diverse group of experts from several European ministries and organisations associated with transportation and logistics. The workshop opened with welcoming words from Dr. Diana Huster (Federal Ministry for Digital and Transport) and Harry Seybert (Bavarian State Ministry of Housing, Construction and Transport). Representatives from the French Ministry of Ecological Transition included Michel Pinet (chair of the Alpine Convention's Transport Working Group), Anke Möller, and Guy Poirier. The Alpine Convention's Permanent Secretariat was represented by Raphaël Lelouvier. The Austrian Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology was represented by Julia Elsinger and Wolfgang Grubert. The private sector's perspective was provided by Marcus Dober | riverside digital agency, Axel Bagszas | Bagszas LogTech, Felix Czerny | ConRoo and Stephanie Grüneis | LKZ Prien GmbH, while Antonella Scardino | North Adriatic Sea Port Authority, Ingmar Schellhas and Peter Schreyer offered insights from the port and terminal industries. From the logistics and transportation companies, Andrea Condotta and Nicola Boaretti contributed from Gruber Logistics and Consorzio ZAI, and Philipp Radlmair from DB Schenker adding to the discussion. Hannes Sobitsch from SWS PS Power Solutions GmbH and Annamaria Andretta from ITALCAM Camera di Commercio Italo-Tedesca e.V. also participated. TX Logistik was represented by Sebastian Ruckes, while CargoBeamer AG was represented by Natalie Knöchelmann. The logistics sector's presence was further reinforced by Ingrid Rossmeier from iSCM | Institut for Information & Supply Chain Management. Klaus-Uwe Sondermann from DX Intermodal GmbH / KombiConsult GmbH was also in attendance. The workshop was moderated by Dr. Rudolf Aunkofer and Dr. Johannes Kraus, both from CNA e.V. | Think Tank for Mobility, Transport & Logistics.

In the morning, representatives from Germany, Bavaria, Austria, and Italy shed light on government funding opportunities for the digitalisation of CT and presented best practice projects at freight villages and port infrastructures. Participants toured the Port of Nuremberg, the largest trimodal transshipment terminal in Southern Germany. In the afternoon session, companies involved in CT reported on exemplary digitalisation projects ranging from data platforms to communication between terminals and trucks. Alongside presentations, panel discussions provided the opportunity to pose questions to the speakers and delve deeper into specific topics.

2. Regional Insights from Alpine Countries

2.1. Insights on activities to strengthen intermodal transport in Germany

Florian Dirr, Federal Ministry for Digital and Transport & Dr. Jakob Lohmann, Bavarian State Ministry for Housing, Building and Transport

The presentation by **Florian Dirr** outlined significant initiatives aimed at bolstering intermodal transport in Germany. It emphasised the Federal Government's commitment since 1998, highlighting the allocation of over 1 billion euros towards the development and upgrading of over 100 private sector CT terminals.

The presentation detailed the current funding guidelines effective until 31.12.2026, focusing on digitalisation, automation of CT terminals, and financial aid covering up to 80% of eligible components, with a 2024 budget of approximately 77 million euros. Further support measures include reducing track access charges and funding for the "Future of Rail Freight" program, among others.

Regulatory support measures for CT were also discussed, including increased total vehicle weight allowances and tax exemptions for vehicles used in CT. Additionally, the presentation covered the European Commission's proposal for amending the combined transport directive, aligning with the European Green Deal and aiming to foster a supportive framework for intermodal freight transport, currently under discussion within the Council of the European Union.

Dr. Jakob Lohmann's presentation on activities to strengthen intermodal transport in Bavaria added the Bavarian state's comprehensive approach, encompassing infrastructure development, project implementation, and political support within the Bavarian Concept for Freight Transport. It underscored the commitment to standardising and digitalising freight transport, including support for non-craneable trailers and enhancing terminal communications. Financial backing for planning of new terminals and connections, like Straubing and InterFranken, alongside initiatives for standardisation and digitalisation, plays a pivotal role.

The Bavarian Concept for Freight Transport aims at shifting transport to rail, outlines flagship projects like new intermodal facilities and digital traffic management on the Brenner Corridor. It also emphasises the importance of skilled labour recruitment and encourages closer collaboration on local logistics challenges. However, the presentation also addressed the local resistance to new infrastructure, such as railroads and terminals, highlighting the necessity for both political backing and industry support to realise these ambitious objectives for a more sustainable and efficient freight transport system in Bavaria.

2.2. Insights on activities to strengthen intermodal transport in Austria

Julia Elsinger, Federal Ministry Republic of Austria Climate Action, Environment, Energy, Mobility, Innovation and Technology

Julia Elsinger's presentation provided insights into Austria's strategic efforts to enhance intermodal transport. It underscored Austria's commitment to decoupling economic growth from freight transport growth, aiming for a modal shift towards more sustainable and energy-efficient modes like rail and inland waterways. The presentation detailed the Austrian Mobility Master Plan 2030, which includes a focus on rail growth and moderate growth for waterways, intending to achieve a targeted modal split of 34% to 40% for rail, aligning with EU objectives.

Key Austrian support measures for intermodal and combined transport were highlighted, including financial incentives for rail freight transport, investment in railway sidings and terminals, and a program supporting CT infrastructure. The emphasis on digitalisation was evident, with initiatives like the ÖBB framework plan 2024-2029 for rail infrastructure digitalisation, Project TARO for automated railway operation, and efforts towards the European Train Control System (ETCS) implementation and digital automatic coupling (DAC).

These efforts demonstrate Austria's proactive approach to fostering sustainable freight transport solutions, aiming for climate neutrality by 2040 while supporting economic growth.

2.3. Opportunities of CT and digitalisation in port areas

Antonella Scardino, North Adriatic Sea Port Authority

Antonella Scardino's presentation detailed the strategic positioning and innovations at the Port of Venice to enhance intermodal transport and address Alpine crossing challenges. The Port of Venice, integral to the TEN-T Network, aims to optimise the Alpine crossings' capacity and modal share amidst rising trade volumes and traffic limitations.

Highlighting the port's comprehensive rail network and traffic growth, Scardino outlined the SIMA integrated rail traffic system as a key innovation, enhancing efficiency and reducing CO2 emissions. Future strategies include infrastructure enhancements, a new intermodal hub, and leveraging digitalisation for improved multimodal transport.

These developments signify the port's proactive approach in capturing increasing transalpine trade flows, especially considering the anticipated traffic doubling in the next 15 years. The presentation underscored Venice's potential as a significant European logistical node, aligning with broader goals for sustainable and efficient freight movement across the Alps.

2.4. Opportunities of CT and digitalisation in freight village areas

Nicola Boaretti, Consorzio ZAI

Nicola Boaretti's presentation showcased Interporto Quadrante Europa di Verona's role in enhancing intermodal transport across the Brenner Pass and leveraging digitalisation within freight village areas. Verona, pivotal on the ScanMed Corridor, facilitates sustainable freight

transport, handling significant volumes through the Brenner, Europe's most frequented Alpine pass.

The presentation highlighted digital innovations like a Safe and Secure Truck Parking Area (SSTPA), a new, more efficient Terminal Operating System (TOS), and projects funded by the Connecting Europe Facility (CEF) for ICT infrastructure enhancements. Future plans include a comprehensive project under Italy's Recovery and Resilience Plan, focusing on cybersecurity, traffic management, and safety within the freight village, aiming for improved logistics integration and environmental impact reduction.

These efforts underscore the strategic importance of digitalisation in managing and optimising intermodal freight flows through critical Alpine crossings, to reduce carbon footprint and impact of environmental pollution on people in Alpine countries.

2.5. Digitalisation Activities in Logistics

Marcus Dober, riverside digital Agentur / Axel Bagszas, Bagszas LogTech

The keynotes on Digitalisation Activities in Logistics by **Marcus Dober** and **Axel Bagszas** delved into the transformative potential of digitalisation in optimising intermodal freight transport across the Alps, focusing on terminal operations and the integration of regional logistics platforms. Dober outlined a vision for the digital future of freight terminals, emphasising the importance of reliable ETA data for train operations, improved terminal side operations through digitally optimised yard management and slot management, and the pivotal role of digital tools in managing terminal inflow to enhance efficiency and reduce environmental impact.

Bagszas' presentation complemented this by discussing the ReVeLa project, which aimed to create regional loading platforms utilising peripheral CT terminals to optimise resource allocation both economically and ecologically. This project intends to lower entry barriers for CT users, promote information exchange, and ensure a collective approach to information adoption and release through a cross-location information platform.

Both presentations underscored the critical need for digital integration and collaboration across the logistics chain to manage the complex demands of intermodal transport, from terminal operations to regional logistics networking. By leveraging digital technologies, the goal is to achieve higher throughput, greater efficiency, and sustainability in transalpine freight movements, with a particular focus on enhancing the capacity and operational efficiency of terminals and fostering the growth of combined transport through improved regional logistics platforms.

2.6. Panel Discussion | Complexity of Digitalisation

The panel discussion delved deeper into the topics initiated by the presentations, illustrating the complexity of challenges in CT.

It highlighted the significantly higher number of stakeholders in freight transport compared to passenger rail transport, making it challenging to align the system towards a clear "end customer" among shippers, forwarding agents, terminals, logistics service providers, and truckers. This complexity hinders initiatives aiming to establish a one-stop solution for rail freight. Data exchange is complicated by the lack of standardised data formats and differing interests in data transparency, while track availability remains a bottleneck for increasing CT. A fundamental reallocation of tracks or dedicated time slots could potentially create more efficient rail networks that integrate the various end points of these networks in a more demand-oriented manner.

Specifically, the complexity was discussed in the context of slot management systems. Many terminals currently lack information on the arrival times of trains and trucks. Since, unlike at seaports, goods are usually transferred directly from train to truck (vice versa), only dynamic slot systems are practical. These systems flexibly relay changing Estimated Time of Arrival (ETA) information to the collecting truckers. The growing establishment of slot systems at seaports and large warehouses, which increasingly implement slots for delivery and collection through financial or regulatory incentives, demonstrates that such initiatives are feasible.

Thus, digitalisation through platforms and other technologies is not primarily a matter of technology availability but of change management and awareness. Funding programs to disseminate information about the use of CT and digital services can help increase the acceptance and user-friendliness of rail freight transport.

Connecting these discussion outcomes with the presentations from Dirr, Lohmann, Elsinger, Scardino, Boaretti, Dober, and Bagszas, it's evident that each addresses distinct facets of these broader challenges. From the promotion of intermodal transport and digitalisation efforts to specific operational improvements like slot management and the integration of digital platforms, these initiatives collectively aim to enhance the efficiency, transparency, and sustainability of CT. They reflect a concerted effort to navigate the complexities of the intermodal transport landscape, promoting a more integrated, digitally enabled, and user-friendly future for freight transport.

3. Industry Insights | Challenges for Digitalisation in CT

3.1. Operator driven digital data exchange

Klaus-Uwe Sondermann, KombiConsult GmbH

The presentation by **Klaus-Uwe Sondermann** demonstrated the imperative and transformative potential of digitalisation in the intermodal transport sector. Sondermann introduced the KV4.0 Data Hub initiative by KombiConsult, focusing on the consolidation and real-time sharing of data across the intermodal supply chain. This approach aims to harmonise electronic interfaces, ensuring data is accessible and usable for all stakeholders, thus enhancing supply chain transparency.

The initiative involves a broad partnership including logistic service providers, intermodal operators, and railway undertakings, utilising a central electronic data hub for communication. This hub avoids the traditional platform view in favour of direct, API-based data exchange, supporting both PUSH and PULL data delivery methods. By employing a uniform XML standard and ensuring data sender control, the KV4.0 Data Hub promises significant improvements in operational efficiency and planning accuracy for intermodal transports.

Combining insights from discussions as well as presentations underlines the sector's movement towards integrated, digital solutions to streamline operations, improve environmental performance, and enhance the competitiveness of intermodal transport against road freight. This collaborative effort towards digitalisation marks a pivotal step in addressing the logistical complexities and data-sharing reluctances that have traditionally challenged the intermodal transport domain.

3.2. Rail operation optimisation by Match2Rail

Sebastian Ruckes, TX Logistics/Shift 2030

Sebastian Ruckes' presentation on shift2030 and the MATCH2RAIL platform showcased a non-profit initiative aimed at bolstering rail freight to meet the EU's 2030 climate targets. Ruckes highlighted the collaborative open network approach, involving railway undertakings, freight forwarders, CT operators, and shippers, all aimed at increasing rail freight's market share by 2030.

MATCH2RAIL was introduced as a key tool to provide visibility and opportunities for shippers and LSPs, facilitating easy identification of intermodal services for specific freight flows. By enabling shippers to upload demand and match it with existing intermodal services, and by accumulating unmatched flows into "virtual trains" to initiate new connections, the platform seeks to expand intermodal options and contribute significantly to modal shift and GHG reduction efforts.

This initiative represents a proactive step towards leveraging digitalisation to enhance the efficiency and sustainability of intermodal transport.

3.3. Forwarders' point of view

Andrea Condotta, GRUBER Logistics S.p.A.

Andrea Condotta's presentation highlighted the company's proactive measures towards creating a more sustainable logistics system. Emphasising the urgency of action today for a better future, the presentation showcased Gruber Logistics' commitment to integrating alternative fuels into their fleet, with 40% of their vehicles operating on LNG/BIOlng, biodiesel, and HVO. The addition of electric vehicles marks a significant step towards reducing emissions, with an anticipation of fleet expansion.

Furthermore, the company aims to double its shipments along the Brenner route in the next three years, leveraging intermodal shipments to achieve 30% of its transport modalities and optimising cargo to avoid empty mileage.

Through IT applications for cargo and network optimisation, Gruber Logistics is dedicated to enhancing efficiency and sustainability in freight transport, embodying their core values and contributing actively to the modal shift and GHG reduction.

3.4. Push and pull for digitalisation in CT – innovative ideas from a startup

Felix Paul Czerny, CONROO GmbH

Felix Czerny's presentation introduced CONROO, a new solution designed to digitise the trucking industry, gate handling and terminal interactions.

Founded in 2021, CONROO seeks to eliminate common inefficiencies faced by truck drivers, such as unnecessary queuing and the reliance on physical trucker cards, by implementing an intuitive mobile app and web platform. This digital approach connects all stakeholders in the container terminal ecosystem, offering features like geofence-enabled navigation, AI-powered slot management, and enhanced port security compliance.

Already operational at over 30 sites since its introduction, CONROO has demonstrated significant potential in saving terminal staff hours, reducing CO2 emissions, and conserving trucker capacity. The solution is not only a step towards optimising terminal planning but also a move towards sustainable logistics, aligning with environmental goals by streamlining operations and minimising idle times.

Czerny's initiative exemplifies a pragmatic leap forward in leveraging technology to address logistics challenges, promising widespread benefits for the sector.

3.5. Panel Discussion | Challenges for Data Exchange

The afternoon presentations primarily focused on leveraging digital platforms for cooperation among various actors in CT to exchange data and optimise capacity utilisation. The discussion delved into the practical challenges arising from cross-company collaboration.

A key concern was the motivation for different stakeholders in the transport process to share data on platforms, given the risk that publishing information like train load capacities could drive down prices or be exploited by competitors, potentially even by the platform provider themselves. This necessitates a certain level of trust in platform providers. Private white-label providers, such as those offering transport tracking services, have found success, indicating a clear value proposition is necessary for all parties. Other industries, like GS1's Global Trade Item Number (GTIN) in retail, demonstrate the success of similar initiatives although the resulting additional costs are seen as very critical for the industry.

Another option discussed was applying pressure through the client – the shipper. While they typically delegate the execution of transport services to their service providers, they set the terms of the transport process through tenders, thus facilitating or hindering the use of CT. With a keen interest in sustainable transport execution, they are open to arguments for sustainability. Therefore, for CT initiatives like shift 2030, it's crucial to inform shippers (and logistics service providers) about the benefits of CT in terms of operational conditions and sustainability.

Another push factor mentioned was regulatory pressure. The example of Austria shows that mandatory checks on whether transports can be conducted by rail improve the modal split in favour of rail. However, there remains a critical view of overly strict regulation of the transport market.

Finally, the security risks of too much data transparency were highlighted. While current freight information does not disclose the contents of container shipments, the widely discussed digital freight information contain comprehensive information about the content, characteristics, loading times, and condition of cargoes, making them far more sensitive than previously shared analogue data. Given that logistics infrastructures like ports are critical infrastructures, this issue must always be considered. Nevertheless, there's also a risk that excessive security concerns could nip the trial and implementation of innovative digital solutions in the bud before their benefits can be demonstrated.

4. Conclusions and Recommendations

The outcomes of the workshop highlighted the necessity of a robust political framework to catalyse the digitalisation of CT. Attendees reached a consensus on the need for harmonisation of digital standards, which is seen as a pivotal step towards simplifying the complex web of stakeholder interactions, from freight forwarders to terminal operators. Governmental roles are to be re-evaluated; while state-driven initiatives have previously shown mixed results, there is a call for policies that support private innovation and facilitate information exchange across borders and sectors.

The example of Austria implementing mandatory checks to evaluate the viability of rail transport over road has proven to be a successful regulatory approach, encouraging a shift towards more sustainable modalities. Such policies could serve as best practice, demonstrating that strategic governmental interventions can significantly impact the industry's modal split.

To maintain momentum in CT digitalisation, it is suggested that political efforts should not only direct funding towards infrastructure but also towards fostering an environment that encourages data sharing, with adequate safeguards for security and competitive interests. This includes investment in technologies that facilitate real-time data exchange and dynamic slot management systems, both crucial for improving the flexibility and reliability of CT operations.

Moreover, policymakers are encouraged to play a facilitative role in change management within the sector, helping to alleviate resistance from traditional logistics networks. Educational programs and awareness campaigns could be instrumental in increasing the uptake of digital solutions by elucidating the operational and environmental benefits of CT.

The discussions also indicated a need for a delicate balance between regulation and innovation. While the security concerns related to increased data transparency cannot be ignored, particularly with logistics infrastructure considered critical, overly cautious regulations could hinder the development and trial of new technologies that hold the potential to revolutionise CT.

In conclusion, the workshop advocated for a multi-faceted political strategy that supports the digital transformation of CT with clear regulations, incentivises stakeholder participation, invests in future-oriented technologies, and ensures a secure yet open environment for data exchange to enhance the industry's efficiency and sustainability.

Decarbonisation of Alpine freight transport

Assessing the implementation of the energy transition in transalpine logistics

Policies for the decarbonisation of transalpine freight transport

Transport Working Group of the Alpine Convention

Mandate 2023-2024

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Permanent Secretariat of the Alpine Convention, September 2024

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1. Mandate of the XVII Alpine Conference

Based on the mandate of the Transport Working Group for the period 2023-2024 until the XVIII Alpine Conference, the Working Group was entrusted to elaborate policy recommendations based on its previous work in promoting more sustainable transport means to support decarbonisation while acknowledging the changing social and economic needs of the Alpine area.

With new opportunities are offered by new transport technologies, there is a growing need to analyse and forecast future challenges in this field as well as to conceive and promote appropriate responses into an approach based on technological plurality. At the same time, there is an urgent need to promote solutions that accelerate the decarbonisation of transport, in order to achieve the CO2 emission targets set by the Contracting Parties of the Alpine Convention.

Objective No. 3 of the Mandate calls for the Working Group to "*Assess the implementation of the energy transition in transalpine logistics, measures and regulations*".

I. The challenge of decarbonising transalpine freight transport

The Alps are at the crossroads of European transport systems and are a highly sensitive area. The geomorphological layout of the Alps explains its many ecosystems, and at the same time, induces specific vulnerabilities.

Temperatures are increasing almost twice as quickly in the Alps as in the rest of the northern hemisphere. Mountain and valley landscapes make available space a limited resource and pollutant loads concentrate in valleys due to certain weather conditions, such as temperature inversion. This results in the need to promote specific policies that fit the characteristics of the Alps, taking into account economic and social functions of trade and logistics activities involving the Alps.

The Alpine Convention is addressing climate change mitigation and adaptation as an integrated, transversal topic. There are solutions to tackle climate change that can contribute to a sustainable future and high quality of life in the Alps.

II. Targets for climate-neutral transport

The Alpine Climate Target System[1] aims to contribute to achieve the decarbonisation targets (and pollution reduction) set by the Contracting Parties of the Alpine Convention.

[1] Alpine Climate Target System, Permanent Secretariat of the Alpine Convention (2019), https://www.alpconv.org/en/home/news-publications/publications-multimedia/detail/climate-neutral-and-climate-resilient-alps-2050/

Particularly, a legislative EU benchmark is the Renewable Energy Directive (RED III), increasing the EU target for renewables in transport from 14% to 29% by 2030 in energy terms, compared to the previous RED II, and adopted a parallel target of a reduction in the carbon intensity of transport fuels of 14.5%.

The European Green Deal includes clear reduction targets for greenhouse gas emissions in the road transport sector for the years 2030, 2035, 2040 and 2050, even if is scheduled a possible revision of sectorial Regulations deriving from the Green Deal Programme within the next 3 years.

These targets will frame the policies for a future sustainable transalpine transport system.

2. International frameworks

III. EU Renewable Energy Directive – RED III[2]

In 2023, the EU increased its 2030 target for renewables in transport from 14% to at least 29% renewable energy in the final consumption of all energy used in transport or a minimum of 14.5% reduction in greenhouse gases (GHG) compared to emissions that have been created by fossil fuel use instead.

Additionally, a combined target of 5.5% for advanced biofuels and renewable fuels of non-biologic origin (RFNBOs) with a minimum share of 1% for RFNBOs was set.

As in RED II, RED III allows multipliers for certain fuels and use cases, when they comply with the energy targets.

This incentivises these options and puts them on a level playing field with others. Member States need to ensure that fuel suppliers meet the objectives for the transport sector. However, they have a degree of flexibility in national implementation and can, for example, set higher targets for fuel suppliers.

A few key points of RED III for the transport sector are the following:

1. It will be required to increase all vectors and fuels able to decarbonise the transport system, taking into account well-to-tank CO2 emissions.
2. Electricity in road transport will play a key role in achieving the overall EU transport target for 2030. Member states shall establish an e-ticketing system allowing fuel suppliers to account credits which are created by using renewable electricity for charging electric vehicles.
   The production of advanced biofuels and RFNBOs must be significantly increased by 2030 to fulfil the 5,5% combined sub target.

IV. The Green Deal Industrial Plan

[2] Directive (EU) 2023/2413 on the promotion of energy from renewable sources, http://data.europa.eu/eli/dir/2023/2413/oj

The Green Deal Industrial Plan[3] contains four keywords: openness, innovation, inclusiveness, sustainability.

The Green Deal Industrial Plan was developed to improve the competitiveness of Europe's net-zero industry and support the fast transition to climate neutrality.

The plan aims to provide a more supportive environment for the scaling up of the EU's manufacturing capacity for net-zero technologies and products required to meet the EU's ambitious climate targets.

The plan builds on previous initiatives and relies on the strengths of the EU Single Market, upgrading the European Green Deal and the REPowerEU Program.

It is based on four pillars:

1. a predictable and simplified regulatory environment
2. speeding up access to finance
3. enhancing skills
4. open trade for resilient supply chains

The second pillar of the plan is the strategic pillar for the technological transition in the field of transport.

It will speed up investment and financing for clean technology production in Europe. Public financing, in conjunction with further progress on the European Capital Markets Union, can unlock the vast amounts of private financing required for the green transition.

Under competition policy, the European Commission aims to guarantee a level playing field within the Single Market while making it easier for Member States to grant necessary aid to fast-track the green transition.

V. The Net-Zero Emission Industry Act

The Net-Zero Emission Industry Act[4] defines the strategic net-zero technologies implementing the Green Deal Industrial Plan.

[3] A Green Deal Industrial Plan for the Net-Zero Age, COM/2023/62 final

[4] Proposal for a Regulation on establishing a framework of measures for strengthening Europe's net-zero technology products manufacturing ecosystem (Net Zero Industry Act), COM/2023/161 final

The Net-Zero Industry Act identifies goals for net-zero industrial capacity and provides a regulatory framework suited for its quick deployment, ensuring simplified and fast-tracked permitting, promoting European strategic projects, and developing standards to support the scale-up of technologies across the Single Market.

Below is a list of enabling technologies implementing the strategies of Net-Zero Industry Act.

Solar photovoltaic and solar thermal technologies
Onshore wind and offshore renewable technologies
Battery/storage technologies
Heat pumps and geothermal energy technologies
H2 - Electrolysers and fuel cells
Sustainable Biogas/Biomethane technologies
Carbon Capture and storage (CCS) technologies

VI. Fit for 55 – CO2 Target Emission HDV Regulation

A further step of the planning picture for the Green New Deal has been defined by the Fit for 55 Package, a broad legislative package to align existing EU policy with the CO2 emissions reduction goal of 55% by 2030 (all sectors).

The “Fit for 55” Package” sets a framework within which national policies and measures for a sustainable mobility will be developed.

For the transport sector, the Fit for 55 Package includes the following key policies:

- Alternative Fuels Infrastructure Regulation (AFIR)[5]
- Tailpipe CO2 emission standards for cars/vans and heavy-duty vehicles[6]

The regulation establishes sub-groups of heavy-duty vehicles (HDV) based on the Vehicle Energy Consumption Calculation Tool (VECTO). For each sub-group there are CO2 emission reduction targets that can be summarised as follows:

[5] Regulation (EU) 2023/1804 on the deployment of alternative fuels infrastructure, PE/25/2023/INIT

[6] Regulation (EU) 2024/1610 on strengthening the CO2 emission performance standards for new heavy-duty vehicles and integrating reporting obligations, PE/29/2024/REV/1

Category	Baseline reference	CO2 emission targets			
		2025 - 2029	2030 - 2034	2035 - 2039	From 2040
Heavy lorries and tractors	2019	15%	43%	64%	90%
Rigid lorries and tractors with special axle configuration	2021	0%	43%	64%	90%
Vocational vehicles	2025	0%	0%	64%	90%
Coaches and regional busses	2025	0%	43%	64%	90%
Urban busses	2025	0%	90%	100%	100%
Drawbar trailers	2025	0%	7.5%	7.5%	7.5%
Semi-trailers	2025	0%	10%	10%	10%

Every European manufacturer who registers more than 100 vehicles per reporting period in the regulated categories receives a specific tailpipe emissions reduction target for the different reporting periods. The specific emissions reduction target is the sum over the vehicle sub-groups that are included in the given reporting period.

The setup of a passenger-number weighting factor ensures that emission reductions in sub-groups with higher payloads and higher mileages are weighted more. A HDV that emits less than 3gCO2/(t.km) or 1gCO2/(p.km)[7], such as vehicles with batteries, fuel cells, or hydrogen combustion engines or e-trailers are considered zero-emission heavy-duty vehicles. OEMs and member states are obliged to carry out strict monitoring of newly registered heavy-duty vehicles and report this to the European Commission.

The regulation further includes an objective for urban buses of 90 % of sales of zero emission vehicles in 2030 and 100% by 2035.

By 31 December 2025 the Commission will have to elaborate a report with a comprehensive analysis of the need to further incentivise the uptake of advanced biofuels and biogas and renewable fuels of non-biological origin in the HDV sector and an appropriate framework of measures to achieve this uptake, including financial incentives, in line with the ongoing Green Deal Industrial Plan and the Net-Zero Emission Industry Act (art. 1-18).

By 2027, a revision of the regulation (art. 1-18 p,1) is scheduled, by a new proposition of the European Commission, based on 15 factors. The more relevant factors are the following:

[7] tailpipe emissions (tank-to-wheel)

- trends of registrations of electric (EV) and fuel-cell-electric (FCEV) HDV and relevant infrastructure
- impacts on employment and the total cost of ownership of companies
- assessment by the Commission of the role of a carbon correction factor in the transition towards zero emission mobility in the HDV sector

VII. Simplon Alliance - Towards net-zero emissions in the transport sector in the Alps

The Simplon Alliance, launched in Brig (Switzerland) on October 2022, is an action plan signed by the environment and transport ministries of the Alpine countries.

The fact that "*transport is one of the largest emitters of greenhouse gases in the Alpine region, accounting for almost 30% of all greenhouse gas emissions*", as it states in its introduction, shows that problems are manifold.

The document signed in Brig pursues the goal of "*making mobility in the Alpine region climate-neutral and climate-resilient by 2050*".

Its main points are the following:

- Eurovignette meets Swiss HVF1 - launch of a dialogue about road tolls for HDV, by taking into account the measures of the revised Eurovignette Directive
- Differentiation of toll systems. strengthening the model character of the Alpine transit corridors by differentiating toll systems for heavy goods vehicles based on CO2 emissions
- Common approach towards promoting combined transport and related infrastructure (base tunnels, terminals, ITS, digitalisation)
- Incentives for vehicles and infrastructure for zero-emission and carbon neutral fuels drive systems, in order to decarbonise the road freight transport
- Coordinated approach towards capacity management in the Alpine transit corridors, in particular to make full use of the new railway base tunnels

VIII. The Alpine Convention – Transport Protocol

The Transport Protocol, elaborated in 1991, is the binding basis for sustainable transport in the Alps. Its preamble states that the Contracting Parties are "*aware that transport is not without an environmental impact and that the environmental damage it causes produces increasing negative effects on and risks to the ecology, health and safety, which need to be tackled through a common approach".*

Article 1 of the Transport Protocol breaks down the following objectives:

- Reduce the effects of and risks posed by intra-Alpine and trans-Alpine traffic to a level which is not harmful to people, flora and fauna and their environments and habitats
- Shift traffic to the railways, especially freight traffic, by means of suitable infrastructures and market-based incentives

- Increase the effectiveness and efficiency of transport systems
- Promote environmentally friendly and resource-conserving modes of transport at economically viable costs
- Ensure fair competitive conditions among the individual modes of transport

As a specific measure**,** Article 7 promotes a general transport policy strategy according to which the Contracting Parties shall, in the interest of sustainability, promote a rational and safe transport management in a harmonised cross-border transport network.

Such a cross-border transport network has to:

- ensure coordination between different carriers, modes and types of transport and encourages intermodality
- optimise the use of existing transport systems and infrastructures in the Alps, including the use of electronic data transmission and charges external and infrastructure costs to polluters in line with the damage caused
- encourage, by means of structural and regional planning measures, the transfer of the carriage of passengers and goods to more environmentally friendly means of transport and to intermodal transport systems
- recognise and utilises the opportunities for reducing traffic volume

IX. Alpine Climate Action Plan 2.0 of the Alpine Convention

In the Climate Action Plan 2.0, adopted by the XVI Alpine Conference in December 2020, there are four transport specific pathways, which include several implementation steps in a time frame from 2020 to 2035, with focus on rail transport:

Pathway 1: Strategies for decarbonisation of Alpine freight transport	
Preliminary step	Lobbying for Toll Plus (2020)
Step 1	Support innovative technologies rail/CT (2021-2022)
Step 2a	Kick-start regional strategies for regulating further use of ICE vehicles (2022-2025)
Step 2b	Support for implementing a Toll Plus system (2022-2025)
Step 3	Alpine Crossing Exchange (2035)

Pathway 2: Developing the Alps into a model-region for reduced working mobility	
Step 1	Follow-up of activities of cross-border project and transfer to pilot regions (2022-2025)
Step 2a:	Set-up of network of regional mobility coordinators (2025)
Step 2b	Pilot projects for location-flexible work solutions (2025-2030)
Step 3	Recommendations for Alpine companies on decentralised work & living solutions (2030)

Pathway 3: Developing an alpine-wide approach towards integration and decarbonisation of public transport	
Step 1a	Extension of Youth Alpine Interrail tickets (2021-2027)
Step 1b	Completion and addition of Alpine-wide information & ticketing system (2025)
Step 2a	Integration of information & ticketing system into local and regional mobility plans (2027)
Step 2b	Support of new mobility tickets - further development of Alpine Interrail (2027)
Step 3	Coordination of Alpine funding schemes for low-carbon public transport fleet (2030)

Pathway 4: Developing the Alps into a model region for shared mobility	
Step 1	Set-up of an Alpine-wide information system to link Apps for shared mobility solutions (2021-2022)
Step 2a	Develop a label and award for shared mobility solutions in the Alps (2022-2025)
Step 2b	Support to pilot projects (2025-2030)
Step 3	Coordination of funding programs for set-up of shared mobility stations (2030)

3. National frameworks

I. National Energy and Climate Plans (NECPs)

The National Energy and Climate Plans (NECPs) were introduced by the Regulation on the governance of the energy union and climate action[8], agreed as part of the Clean energy for all Europeans package which was adopted in 2019.

The national plans outline how the EU countries intend to address the 5 dimensions of the energy union:

- decarbonisation
- energy efficiency
- energy security
- internal energy market
- research, innovation and competitiveness

Each country must submit a progress report every 2 years, according to the structure, format, technical details and process set out in the Implementing Regulation. The Commission will, as part of the state of the energy union report, monitor the EU's progress as a whole towards achieving these targets.

[8] Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action, PE/55/2018/REV/1

By 30 June 2023, Member States were due to submit their draft updated NECPs in line with article 14 of the Governance Regulation.

Details on all NECPs of EU Member States can be found on the website of the European Commission[9].

II. Alpine national policies for a transition of transport and logistics

In this report, the main policies on freight transport decarbonisation of Contracting Parties are presented briefly.

GERMANY

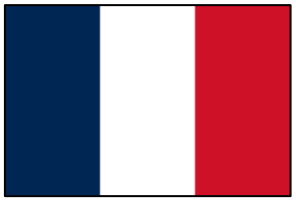
Key measures in the transport sector include the revision and updating of the EU CO2 emission standards for new cars and vans, the increase and extension of the GHG quota and, at national level, the BEHG (Emission Trading System in the sectors heating and transport), and the CO2 differentiation of HGV tolls.

The German policy for decarbonisation of freight transport and logistics is synthetised from the following pillars:

- Modernise the rail network (*investment needs of around EUR 45 billion next 20 years)*, funds partially from the HGV toll. Rail freight to reach a market-share of 25% by 2030
- Increase and extension of the BEHG (*German Fuel Emissions Trading Act*)
- Around 1/3 of mileage for freight transport be electric or based on electricity-based fuels by 2030
- Increase the share of vehicles with “alternative and environmentally friendly” propulsion technologies in 40% by 2025 and 100% by 2030. This includes BEV, FCEV, PHEV and vehicles which can be shown to be running 100% on BioLNG/Biomethane
- Incentives for investment from the sector in transshipment facilities, digitalisation, automation and vehicle technology in freight transport
- Master Plan Charging infrastructure II which includes ten measures on electric commercial vehicles, including the rollout of fast charging infrastructure for heavy goods vehicles

[9] https://ec.europa.eu/info/energy-climate-change-environment/implementation-eu-countries/energy-and-climate-governance- and-reporting/national-energy-and-climate-plans_en

FRANCE



The roadmap “decarbonisation of the value chain of heavy-duty vehicles (HDV), art.301 of Climate Resilience Act” sets a target of 50% of registration of zero-emission heavy duty vehicles by 2030.

The “COI - Committee of Orientation of Infrastructures” has drawn up proposals on transport investment priorities It considered necessary to substantially amplify investments in rail freight in order to meet the national 2030 decarbonisation targets. In road freight transport, the COI works on the deployment needs of charging stations for HDV.

The National Strategy for the development of rail freight (SNDFF) foresees the following milestones:

- Doubling of rail modal share from 9% (2020) to 18% (2030)
- 73 measures restoring viability of rail freight operator’s services and business model, improving rail quality of services, investing in infrastructures to enable the growth of rail freight and increasing the coordination with ports and waterways

“Ecological Planning” (a cross-cutting method adopted by France at highest political level) defines the following approach regarding the freight transport and logistics sector:

- Determine prospects for the evolution of the demand for freight transport in tons/km, then in vehicles/km by economic sector, taking into account to the impact of decarbonisation and the reindustrialisation of the economy
- Linking the evolution of demand with the evolution of the supply of the logistics system (= infrastructure sizing)

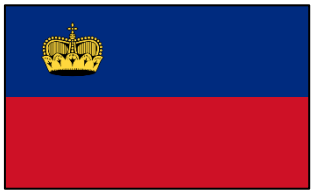
ITALY

As regards the deployment of renewable energy in the transport sector, the Italian policies for the transition of freight transport and logistics follow the targets of RED III, promoting the use of multiple energy carriers, by aiming to release for consumption a quantity of renewable fuels of non-biological origin (HVO) and to make a contribution from the use of advanced biofuels.

The following pillars are strategic:

- 30,7% of mileage from Renewable Energy in 2030, according the RED III targets
- development of electrification for new cars/vans/buses in urban mobility: 4,3 million of BEV / 2,2 million of HEV
- Development of Carbon Neutral Fuels for new trucks / existing vehicles: 10% by Bio-LNG/Biomethane / 10% by Biofuels / 2% by H2/RFNBO
- Incentives to Technological Innovation – EUR 1 billion (« Ecobonus »)
- until EUR 25.000 per year for investments in C/LNG, HEV, BEV and Biofuels haulage trucks
- Financial Bonus to foster the road-ship and road-rail intermodality (“ferrobonus / marebonus”)
- Hydrogen Valleys - 7 new H2 stations for trucks (also) in Alpine Regions
- Bio-Fuels incentives - Measures to boost Bio-fuels (in particular, Bio-CNG and HVO) production and distribution for transport
- Increasing regional LTZ to limit Euro 5 trucks transit
- Highway toll benefits for last generation trucks

LIECHTENSTEIN



The Liechtenstein policy on the transition of freight transport and logistics is based on:

Heavy-duty vehicle levy (LSVA)

- Heavy-duty freight vehicles >3.5 t domestic and abroad must pay a duty, based on the Euro emission standards and Ton/Km (fee cap = EUR 325). The levy system is similar to the Swiss system, as Liechtenstein is part of the customs union with Switzerland.

Temporary ban on freight transport (Verkehrsrecht Liechtenstein)

- Night travel ban on HDV - All day between 22:00 and 5:00.

Tax exemption for Biofuels

- Fuels with a favourable life cycle assessment - such as bio-LNG, Bio-NG, Bioethanol and Biodiesel - have been exempted from mineral oil tax

AUSTRIA

The policies on the transition of transport and logistics are presented in the 2030 “Masterplan Freight Transport”, which is based on the principles of the “Mobility Masterplan 2030[10]”: Avoid, shit and improve.

This plan includes the following milestones:

- Shift towards energy-efficient modes of transport, primarily rail, waterways
- Improvement primarily focuses on road freight transport by promoting a transition to zero-emission propulsion technologies
- 2030 timeframe with the goal of achieving climate neutrality by 2040
- Multistage Monitoring Process (including annual stakeholder events)

Defining measures for all 4 modes of transport (rail, road, air, inland waterways, aviation) – 32 measures were developed, for example:

- Rail: Continuation and expansion of existing fundings for Austrian rail freight, including operations, terminals, equipment, and other projects like the introduction of a modal shift coach or a rail-siding index
- Road: Fleet conversion to zero-emission commercial vehicles and construction of the necessary charging and refuelling infrastructure
- Inland waterways: Advancement of ship technologies and digitalisation

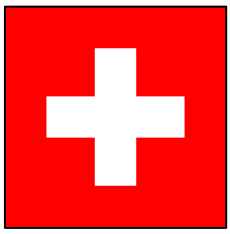
In addition, Austria implemented certain measures in terms of road pricing for heavy vehicles:

Since 2017 in addition to infrastructure charges also external cost charges for traffic-based air and noise pollution are levied on the Austrian motor- and expressway network. Since 2024 also external charges for traffic-based CO2-emissions are levied

Brenner Corridor: There is a mark-up for cross financing the Brenner Base Tunnel (rail), but due to restrictions in Eurovignette directive until 2024 no charges for external costs could be levied there. Since 2024: application of both mark-up and external cost charges (air and noise pollution and CO2-emissions) also on the Brenner corridor.

[10] https://www.bmk.gv.at/dam/jcr:eaf9808b-b7f9-43d0-9faf-df28c202ce31/BMK_Mobilitaetsmasterplan2030_EN_UA.pdf

SWITZERLAND



The Suisse policy on the transition of freight transport and logistics is based on the following pillars:

STEP - Strategisches Entwicklungsprogramm Bahninfrastruktur

- Extend the railway network after 2030

Heavy-duty vehicle levy (LSVA)

- Heavy-duty freight vehicles >3.5 t domestic and abroad must pay a duty, based on the Euro emission standards and Ton/Km (fee cap = EUR 325)

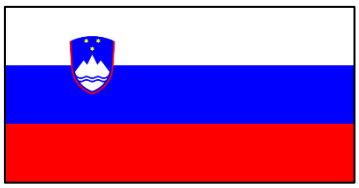
Temporary ban on freight transport (*Verkehrsrecht Schweiz*)

- Night travel ban on HDV - All day between 22:00 and 5:00.

Tax exemption for Biofuels

- Fuels with a favourable life cycle assessment - such as bio-LNG, Bio-NG, Bioethanol and Biodiesel - have been exempted from mineral oil tax

SLOVENIA



The key general objectives for the 2030 identified in the NEPN are:

- reducing the total greenhouse gas emissions by 36%,
- at least a 35% improvement in energy efficiency, which is higher than the target adopted at EU level (32.5%),
- at least a 27% share of renewable energy sources; due to the relevant domestic circumstances, Slovenia had to agree to a lower target than that of the EU (32%), but will strive to increase this ambition in the next NEPN update (2023/24),
- 3% of GDP to be spent on R&D, of which 1% of GDP will be public funds.

The implementation of the NEPN leads to the reduction of the dependency on fossil fuels and supports, among other things, sustainable solutions in transport, in buildings and in industry.

The basic directions of NEPN are the need to increase freight transport by rail in both segments (freight and passengers) and to accelerate the introduction of alternative fuels.

The above-mentioned orientations are reflected in the activities, which are grouped into the following thematic areas in the working proposal for measures:

Integral measures in the sector of freight transport and logistics:

- Measures to reduce the number/duration of journeys: the most important segment of activities is related to spatial planning, including activities to improve the digitisation
- Measures to make freight transport more efficient
- Measures reducing vehicle emissions: alternative fuels will make an important contribution to reducing emissions and their deployment will require a number of activities, as most of them will require infrastructure and vehicle replacement.

The Act on Infrastructure for Alternative Fuels and Promotion of Transition to Alternative Fuels in Transport, implemented in 2023, establishes the legal framework for the development, expansion, and deployment of infrastructure for alternative fuels in transport (Electricity, H2, CNG, LNG, LPG) with the primary goal of building a dense network of fast and ultra-fast electric charging stations for cars and HDV.

4. Key messages for the transition of transport and logistics in the alps

Taking into account the strategies and objectives at European and national level, the following are key messages addressing the implementation of policies and measures to decarbonise freight transport and logistics in the Alps.

I. FREIGHT TRANSPORT and LOGISTICS SYSTEM

- Due to its inherent advantages such as mass transport capacity, environmental sustainability, safety, and energy efficiency, intermodal freight transport is a key component of a sustainable Alpine freight transport system. Infrastructure and service quality should be upgraded to efficiently implement intermodal transport.
- Freight transport will rely on renewable energy:
    - on rail, further electrification of tracks is key in addition to raising the renewable share of electricity supply
    - on road, it is necessary to replace LDV and HDV fleets with vehicles powered by carbon neutral energy. The principles of technological diversity and energy efficiency are particularly important in this context to ensure environmental and socio-economic sustainability.
    - Improving local value chains and trade within Europe will lead to a reduction in overall transport needs and a regionalisation of the transport system.
- Advocate for improved and better coordinated road charging systems within the frame of the Eurovignette Directive for transalpine freight transport.

II. TECHNOLOGICAL SOLUTIONS

- Crossing the Alps implies the adoption of technologies compatible with long haul distances, high ranges, high weight intensities, high level performance to overcome the slopes safely. Last but not least, the competitiveness and positive TCO of transalpine logistics represents an essential pillar for transport operators
- Battery electric and H2 fuel cells vehicles are crucial technologies for the transition to decarbonise HDV fleets and reach zero emissions, given the decarbonisation targets of electricity generation in the EU. Combustion engines powered by renewable fuels can also contribute to the decarbonisation of road transport taking into account their availability and well-to-wheel CO2 emissions.
- According to the revised Regulation on Alternative Fuels Infrastructure (AFIR), the necessary infrastructure for carbon neutral alternative fuels and net-zero emission operation of all types of vehicles needs to be developed while protecting the environment
- Higher levels of cooperative, connected and automated mobility need to be deployed in order to integrate transport modes fostering modal shift and to manage the freight transport system more effectively, above all in the intermodal system. The potential and possibilities in the field of traffic management should be better exploited through the use of digital tools.
- Regular analyses of the adequacy of existing standards with the observed decarbonisation of the sector should be conducted. As required by the regulation on CO2 targets for HDVs[11], it is important to assess the role of a carbon correction factor, (Art. 1.18) that recognises a strategic role for all energy carriers that decarbonise the transport system

5. Conclusions and recommendations

The European programmes for the energy transition and decarbonisation and the specific planning dedicated to the Alpine Space contains strategic guidelines to define concrete measures for the governance of the energy and technological transition of freight transport and logistics in the Alpine region.

In order to make transport in the Alps sustainable and climate neutral, a clearly defined transport policy for the Alpine region should be defined, in the framework of a future revision of regulations concerning the CO2 emission targets in the automotive sector.

In fact, Alpine transit is significantly shaped by European transport policy and the related legal acts of the European Union. Joint efforts are needed to ensure that the specific requirements

[11] Regulation (EU) 2024/1610 on strengthening the CO2 emission performance standards for new heavy-duty vehicles and integrating reporting obligations, PE/29/2024/REV/1

of the Alpine region, its environmental vulnerability and its strategic role for the trans-European trades and competitiveness in the European context are sufficiently taken into account.

To this end, the Working Group recommends developing a joint Alpine-wide strategy to implement the transition of freight transport and logistics, in the framework of the requirements of the Transport Protocol and Climate Action Plan 2.0.

Recommendations:

1. **Promote an approach to achieve the decarbonisation of freight transport and logistics based on the principle of technological plurality, in order to use every opportunity to achieve the European net-zero emission targets, while making sure to favour the most efficient and affordable technology for each use**
2. **Accelerate the production of electric energy by renewable sources in order to foster a concrete contribution for the decarbonisation targets by the electrification of road and rail transport**
3. **Position intermodal freight transport at the core component of a sustainable Alpine freight transport system, improving the rail network and the quality of services**
4. **Promote battery electric and H2 fuel cell vehicles, which are crucial technologies for the transition to decarbonise HDV fleets and reach zero emissions, given the decarbonisation targets of electricity generation in the EU**
5. **Promote combustion engines powered by renewable fuels for HDVs as contributing to the decarbonisation of road transport taking into account their availability and well-to-wheel CO2 emissions**
6. **Advocate for improved and better coordinated road charging systems within the frame of the Eurovignette Directive for transalpine freight transport**
7. **Foster the implementation of the Alternative Fuels Infrastructure Regulation (AFIR) and its objectives, in particular through cross-border cooperation in the development of the necessary charging infrastructure**
8. **Deploy cooperative, connected and automated transport services throughout the Alpine Region towards a fully integrated multimodal transport system**
9. **Incentivise the fleet renewal with last generation vehicles in order to achieve climate neutrality in road transport as soon as possible, with priority given to BEV and FCEV**
10. **At EU level: a regulatory upgrading on timing and promoting technologies and fuels will be essential, taking into account to the sectorial real market needs and trends, in line with EU rules and acts on Renewable Energy**