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# CLIMATE NEUTRAL ALPINE MOBILITY

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## ***REPORT ON POLICIES FOR SUSTAINABLE MOBILITY IN THE ALPS***



**Transport Working Group of the Alpine Convention**

*Mandate 2021-2022*



ALPENKONVENTION  
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## IMPRINT

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## 1. MANDATE GIVEN BY THE ALPINE CONFERENCE

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Based on the mandate of the Working Group on Transport for the period 2021-2022 until the XVII Alpine Conference, the Working Group was entrusted to elaborate policy recommendations based on its previous work in promoting more sustainable transport means to support decarbonization in transport and acknowledging the changing social and economic needs of the Alpine area.

With the rapidly changing traffic and mobility behaviours, in conjunction with the opportunities offered by new transport technologies, there is also a growing need to analyse and forecast the future challenges in this field as well as to conceive and promote appropriate responses. At the same time, there is an urgent need to reduce the environmental impact of different modes of transport.

**Objective No. 2 of the mandate** calls for the Working Group to address the topic relating to policies and measures/instruments for sustainable mobility in the Alpine Area.

### I. Challenges under the aspect of climate change and environmental impact

Transport is a strategic sector for the socio-economic development of our societies. It connects people, cities, countries and economies, fostering growth and employment. Nevertheless, transport remains a major source of environmental pressures in the Alpine region, accounting for more than 1/5 of greenhouse gas emissions and 1/4 of pollutants, most of which are generated by road transport.

Individual and freight traffic as well as air traffic have a negative impact on the climate due to the high levels of pollutant emissions and result in environmental and health damage. Additionally, the noise generated by traffic burdens people and animal species.

Transport infrastructure also takes up significant amounts of land, thus exacerbating land consumption, landscape fragmentation and soil sealing. With its share of an average of 20% on overall greenhouse gas emissions, the transport sector is to be considered as a significant source for climate change. With the critical consequences of climate change, air pollution and the loss of biodiversity, the pressure on all actors to make transport sustainable is increasing.

### II. Specific vulnerability of the Alpine Region

The Alps are at the crossroads of European transport systems and are a highly sensitive area. The geographical and topographical conditions of the Alps are the reason for its diverse ecosystems. At the same time, these circumstances are also the reason for the specific vulnerability of the Alpine space. Climate change is progressing faster in the Alps than in the lowlands.<sup>1</sup> The mountain and valley landscapes make the available space a limited resource. Noise can spread further through the funnel-like valleys or echo-effects, and pollutant loads concentrate in the valleys due to the weather conditions, like inversion. This results in an even more urgent need for action than in other regions.<sup>2</sup>

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<sup>1</sup> Cf. Alpine Convention (2017) Climate Change – How it affects the Alps and what we can do; Climate-neutral and Climate resilient Alps 2050 – Declaration of Innsbruck (2019).

<sup>2</sup> Landschaften und Lebensräume der Alpen: Zwischen Wertschöpfung und Wertschätzung, Leitungsgruppe des NFP 48 (Hrsg.), Zürich: vdf Hochschulverlag, 2007 (PDF); Paesaggi e habitat nell'arco alpino: Tra creazione e percezione di valore, Comitato direttivo del PNR 48 (ed.), Zurigo 2007 (PDF).

### III. Targets for climate-neutral mobility with different time horizons<sup>3</sup>

The urgency of the need for action in the transport sector is also highlighted by the fact that there are numerous targets and measures specific to transport at international, European and national level, but they relate to different time periods. The Alpine Climate Target System 2050 contains four targets for transport. The corresponding pathways, including concrete implementation steps in a period from 2020 to 2035, are contained in the Climate Action Plan 2.0. The European Green Deal<sup>4</sup> includes clear reduction targets for greenhouse gas emissions in the transport sector for the years 2030, 2035 and 2050 and the Mobility Strategy provides for various measures to achieve these goals.

In view of the partly much shorter implementation horizons, the question of achieving a climate-neutral transport sector before the year 2050 is pressing. The Austrian Mobility Master Plan 2030 (see Annex I) for example, supports the goal of achieving climate neutrality in 2040<sup>5</sup>. Germany, in a similar way, recently adopted its climate protection law and aims for climate neutrality by 2045.<sup>6</sup> The Italian Interministerial Committee on the Ecologic Transition (*“Comitato Interministeriale per la Transizione Ecologica”*) proposed the interdiction to sell cars with traditional internal combustion engines within 2035 (2040 for light duty vehicles), only allowing full electric, hydrogen and biofuels technologies.



RhB (Rhaetian Railways) Container Terminal in Samedan (Source: Stephan Tischler, CIPRA Austria)

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<sup>3</sup> See 3.4.1. and 3.4.2.

<sup>4</sup> European Commission - Mobility Strategy and Action Plan.

<sup>5</sup> [https://www.bmk.gv.at/dam/jcr:eaf9808b-b7f9-43d0-9faf-df28c202ce31/BMK\\_Mobilitaetsmasterplan2030\\_EN\\_UA.pdf](https://www.bmk.gv.at/dam/jcr:eaf9808b-b7f9-43d0-9faf-df28c202ce31/BMK_Mobilitaetsmasterplan2030_EN_UA.pdf)

<sup>6</sup> [www.bundesregierung.de/breg-de/themen/klimaschutz/klimaschutzgesetz-2021-1913672](http://www.bundesregierung.de/breg-de/themen/klimaschutz/klimaschutzgesetz-2021-1913672) (20.09.2021).

## 2. INTERNATIONAL AND NATIONAL FRAMEWORKS

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### I. European Green Deal

To overcome the challenges of environmental degradation and climate changes as a threat to Europe and the world, the European Green Deal was initiated by the European Commission.

The **overarching goals** of the European green deal include the following targets for the transport sector:

- 90% reduction of greenhouse gas emissions by 2050;
- 55% reduction of emissions from cars by 2030;
- 50% reduction of emissions from vans by 2030;
- Zero emissions from new cars by 2035.

#### Milestones for a smart and sustainable future<sup>7</sup>:

##### **By 2030:**

- at least 30 million zero-emission cars will be in operation on European roads;
- 100 European cities will be climate neutral;
- high-speed rail traffic will double across Europe;
- scheduled collective travel for journeys under 500 km should be carbon neutral;
- automated mobility will be deployed at large scale;
- zero-emission marine vessels will be market-ready.

##### **By 2035:**

- zero-emission large aircraft will be market-ready.

##### **By 2050:**

- nearly all newly registered cars, vans, buses as well as new heavy-duty vehicles will be zero-emission;
- rail freight traffic will double;
- a fully operational, multimodal Trans-European Transport Network (TEN-T) for sustainable and smart transport with high speed connectivity.

Additionally, the **Sustainable & Smart Mobility Strategy** of the European Commission contains ten Flagship measures which are divided into three chapters<sup>8</sup>:

- Sustainable Mobility - an irreversible shift to Zero-Emission<sup>9</sup> Mobility;
- Smart Mobility - Achieving seamless, safe and efficient connectivity;
- Resilient Mobility - A more resilient single European transport area: For Inclusive Connectivity.

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<sup>7</sup> European Commission, Mobility Strategy and Action Plan: [https://transport.ec.europa.eu/transport-themes/mobility-strategy\\_en](https://transport.ec.europa.eu/transport-themes/mobility-strategy_en)

<sup>8</sup> <https://data.consilium.europa.eu/doc/document/ST-14012-2020-INIT/en/pdf>

<sup>9</sup> Note that a zero-emission heavy-duty vehicle is a vehicle without an internal combustion engine, or with an internal combustion engine that emits less than 1g CO<sub>2</sub>/km. Pure battery electric and hydrogen-powered vehicles are ZEV.

## II. Fit for 55

A further step of the planning picture for the Green New Deal and sustainability in Europe has been defined by the “Fit for 55” Package<sup>10</sup>, a broad legislative package to align existing EU policy with the new emissions reduction goal of 55%, by 2030.

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

“Fit for 55 Package” is based on the following key facts:

### 1. Key targets for 2030

1. Carbon emissions reduction by 55%;
2. Renewable Energy target: 40%.

### 2. Emission Trading System

1. The cap reduces by 4.2% each year (previously 2.2%);
2. Extended to buildings, transport, maritime sectors.

### 3. Carbon Border Adjustment Mechanism

1. Sectors: electricity, cement, fertilizers, aluminium, iron and steel;
2. Importers have to buy CBAM certificates to cover the embedded emissions. Certificate prices are based on the average prices of carbon allowance auctions.

### 4. Mobility sector:

1. Revised Alternative Fuels Infrastructure Regulation (AFIR);
2. Stronger CO2 emissions standards for cars and vans (tailpipe).

## III. Alpine Convention - Transport Protocol

The Transport Protocol 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.

Regarding the current mandate objective No. 2 of the Transport WG, Articles 3 and 7 of the Transport Protocol contain relevant provisions on strategies and measures for sustainable mobility in the Alps.

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<sup>10</sup> [https://ec.europa.eu/commission/presscorner/detail/en/ip\\_21\\_3541](https://ec.europa.eu/commission/presscorner/detail/en/ip_21_3541)

**According to Article 3**, the Contracting Parties shall limit transport-related burdens and risks and take account of environmental, social and economic concerns by means of a coordinated environmental and transport policy. A mandate for a joint strategy for the sustainable development of transport and mobility in the Alpine region can be derived from this.

As a specific measure, **Article 7 lays the foundation for 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 harmonized cross-border transport network.

Such cross-border transport network has to:

- Ensure coordination between different carriers, modes and types of transport and encourages intermodality;
- Optimize 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;
- Recognizes and utilizes the opportunities for reducing traffic volume.

The relevant provisions of the Transport Protocol for "policies" are completed by the **technical measures** contained in Chapter II B) of the Transport Protocol. The following is an excerpt of these measures:

**Public transport (Article 9):**

- Promotion and expansion of customer-friendly and environmentally sound public transport systems.

**Rail transport and shipping (Article 10):**

- Improvement of railway infrastructure by constructing and developing the major transalpine railway routes, including connecting routes and suitable terminals.
- Optimisation and modernisation of railway (cross-border).
- Measures to transfer long-distance carriage of goods to rail and harmonization of transport-infrastructure user charges.
- Intermodal transport systems.
- Increased use of rail and shipping.
- User-friendly synergies between long-distance passenger transport, regional transport and local transport.

**Road transport (Article 11):**

- Refrain from constructing any new, large-capacity roads for transalpine transport.
- Large capacity roads for intra-Alpine transport only under certain conditions.

**Air transport (Article 12):**

- Reduction as far as possible of the environmental damage caused by air transport, including aircraft noise.



- Improvement of public transport systems from airports on the fringes of the Alps to the various Alpine regions.
- Restriction as far as possible of the construction of new airports and any major extension of existing airports in the Alps.

**Tourist facilities (Article 13):**

- Evaluation of the transport impact of new tourist facilities.
- If necessary, implementation of precautionary or compensatory measures to fulfil the objectives of this protocol.
- Creation and maintenance of low-traffic and traffic-free areas.
- Measures to encourage tourists to avoid arriving by car or using cars.

**Real costs (Article 14):**

to influence the routing of transport by taking greater account of the real costs:

- Polluter-pays principle.
- Establishment and use of a system to calculate infrastructure costs and external costs.
- Transport-specific charging systems to cover such real costs in an equitable manner.
- Encouragement of the use of the most environmentally friendly modes and means of transport: a more balanced use of transport infrastructure.
- Incentives to make more use of opportunities for the reduction of environmental and socioeconomic costs by means of structural and regional planning measures which have an impact on transport.

## IV. Further International Policies

### Alpine Climate Target System 2050

The Alpine Climate Target System 2050<sup>11</sup> includes, in addition to the two strategic goals "climate-neutral Alps" and "climate-resilient Alps", ten sectoral targets for different fields of activity. For transport, the Alpine Climate Target System 2050 foresees four targets:

**T\_Tr1: Modal shift of Alpine freight transit**

Alpine freight transit transport is shifted to rail wherever possible (ideally for all relations exceeding 300 km), going beyond European modal shift objectives, supported by an ambitious implementation of innovative logistics solutions.

**T\_Tr2 Reduced car- dependency (inner-Alpine and transalpine passenger transport)**

Sustainable mobility solutions such as public transport, shared mobility and non-motorized transport are further developed and supported through an improvement in quality and services (multi- modality, integrated timetables and ticketing, comfort and further “smart” innovative services) so that accessibility in remote Alpine areas is improved and there is a significant increase of the share of public transport and non-motorized transport in the modal split for commuter, leisure and holiday mobility.

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<sup>11</sup> <http://www.alpineclimate2050.org> and [www.alpconv.org/en/home/news-publications/publications-multimedia/detail/climate-action-plan-20/](http://www.alpconv.org/en/home/news-publications/publications-multimedia/detail/climate-action-plan-20/) (17.11.2021).

**T\_Tr3 Reduced transport demand (passenger and freight)**

Transport demand of both freight and passenger transport is reduced through making use of transport saving spatial structures, new working solutions (i.e. telework, taking into account of the economic and public services efficiency), mobility planning integrated in spatial planning procedures to avoid unnecessary transport and lowering the transport demand, pooling of shipments, regional distribution chains and changed mobility and behavioural patterns.

**T\_Tr4 Decarbonised transport fleet**

The road transport fleet is CO<sub>2</sub>-free (heavy goods and light vehicles) through electric mobility and other alternative powertrains (e.g. bio-fuels).

Alpine Climate Action Plan 2.0 of the Alpine Convention

In the **Climate Action Plan 2.0**<sup>12</sup> adopted by the XVI Alpine Conference in December 2020, there are four transport specific pathways, which propose several implementation steps in a timeframe from 2020 to 2035:

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

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

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

<sup>12</sup> [www.alpineclimate2050.org](http://www.alpineclimate2050.org), [www.alpconv.org/en/home/news-publications/publications-multimedia/detail/climate-action-plan-20/](http://www.alpconv.org/en/home/news-publications/publications-multimedia/detail/climate-action-plan-20/) (17.11.2021).

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

## V. National Energy and Climate Plans

The 2030 National Energy and Climate Plans (NECPs) are the framework for EU Member States to outline their climate and energy goals, policies and measures from 2021 to 2030. In the post-Covid recovery package published by the Commission on 27 May 2020, the NECPs recommendations act as eligibility criteria for National “Recovery Plans”.

With the presentation of the European Green Deal and the Fit For 55 package Europe’s climate ambition was set in line with the Paris Climate Accord. Current NECP’s were developed based on levels of ambition agreed upon before the Paris Climate Summit, which is why NECP’s are susceptible for improvement until 30 June 2023.

Until the measures under European Union law enter into force, the NECPs still represent the current plan for climate and energy targets.

On the website of the European Commission, it is possible to find all details for the NECPs of the EU countries<sup>13</sup>. In Annex I to this report, the national strategies for sustainable mobility of Austria, Italy and Switzerland are provided as an example.

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<sup>13</sup> [https://ec.europa.eu/info/energy-climate-change-environment/implementation-eu-countries/energy-and-climate-governance-and-reporting/national-energy-and-climate-plans\\_en](https://ec.europa.eu/info/energy-climate-change-environment/implementation-eu-countries/energy-and-climate-governance-and-reporting/national-energy-and-climate-plans_en)

### 3. SUSTAINABLE MOBILITY IN THE ALPINE REGION

#### I. The pillars of a sustainable transport policy in the Alpine Space

##### Requirements and obligations according to Alpine Convention

According to the Transport Protocol, the contracting states of the Alpine Convention are obliged to adopt a **coordinated environmental and transport policy** to limit transport-related impacts and risks. For this purpose, national, regional and local targets, strategies and measures shall be developed, considering the different environmental, economic and socio-cultural data as well as the different needs to reduce the negative environmental impact of transports through a combination of economic instruments, spatial planning and transport planning measures.<sup>14</sup>

Based on the Transport Protocol of the Alpine Convention, the following environmental, social and economic objectives have to be pursued through a coordinated environmental and transport strategy:<sup>15</sup>

Environment	Population	Economy
Reduced use of natural resources to a level which does not exceed their natural capacity for regeneration.	Accessibility for persons, labour, goods and services, while effectively preserving the environment, saving energy and space and meeting the essential needs of the population.	Increased profitability of the transport sector and internalised external costs.
Reduced harmful emissions to a level which is not detrimental to the absorption capacity of the environments concerned.	Avoid endangering human health and reduce the risks of environmental disasters and the number and severity of accidents.	Optimum use of existing infrastructure.
Limited input of substances into the environment to avoid harming environmental structures and natural materials cycles.		Guaranteed employment in undertakings which are performing well in the various sectors of the economy.

Article 7 of the Transport Protocol additionally stipulates the **obligation to implement a rational and safe handling of traffic in a cross-border coordinated transport network**. The necessary measures need to ensure the protection of transports routes against natural hazards, the protection of persons and of the environment, particularly in areas negatively affected by transport activities, as well the gradual reduction of pollutants and greenhouse gases emissions and noise by all modes of transport, including through the use of the best technologies available. This includes coordinated modes of transport, zero emission and climate-neutral means of transport and traffic types, favouring intermodality, making the best

<sup>14</sup> Article 3 Paragraph 1, 2 Transport Protocol.

<sup>15</sup> Article 3 Paragraph 1 Transport Protocol.

possible use of transport systems and infrastructures, charging external costs and infrastructure costs to the polluter, shifting traffic to more environmentally friendly means of transport and utilizing traffic reduction potentials.<sup>16</sup>

### Implementation on the national level

The implementation of a coordinated environmental and transport policy requires joint efforts and a common orientation. Many national plans of the Alpine countries, like the Austrian “Mobility Master Plan 2030”, published on 16th of July 2021, and the Italian 2019-2023 “Clean Air Dialogue Plan” can be seen as such a policy that meets the requirements of the Transport Protocol and contributes to achieving the Protocol's targets as well as international climate goals (Paris Climate Agreement<sup>17</sup>, Green Deal<sup>18</sup>) and those of the Alpine Climate Target System 2050. A coordinated sustainable mobility strategy requires a common understanding of the requirements of such a strategy. Many national plans of the Alpine Countries represent good practice examples for the development of common core messages and ambitious recommendations towards sustainable and climate-neutral mobility in the Alps.

## **II. Key messages for sustainable mobility in the Alps**

Taking into account the strategies and objectives at international, European and national level, the following key messages addressing the implementation of sustainability in freight and public transport, zero emission and carbon neutral transport on the whole life cycle, tourism and land use are commonly agreed within the Transport Working Group of the Alpine Convention.

### FREIGHT TRANSPORT:

- Due to its inherent advantages such as mass transport capacity, environmental sustainability, safety, energy efficiency the intermodal freight transport shall be the core component of a sustainable Alpine freight transport system. In addition, capillary transport as the last link in logistics shall rely on a well-functioning intermodal system between rail and road.
- Freight mobility will rely on renewable energy: on rail, further electrification of tracks is key in addition to raise the renewable share of electricity supply
- On the road, it is necessary to renew LDV and HDV fleets by zero emission and climate-neutral powertrains. The efficiency-first principle is of particular importance in this regard, from the environmental and socio-economic sustainability point of view.
- Focus on European value chains and efficient goods exchange within Europe will shift flows of goods to the regions, reducing transport distances.

### PUBLIC TRANSPORT:

- Cross-border collaboration on planning, organisation and financing of the alpine railway system to introduce new and convenient night and long-distance trains.
- Integrated range of cross-border public transport services (bus, train, sharing cars and/or bikes) has to be offered at an attractive base price. For example,

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<sup>16</sup> Article 7 Transport Protocol.

<sup>17</sup> <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement> (20.09.2021).

<sup>18</sup> [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en) (20.09.2021).

The Austrian “Klimaticket” and the Italian “Mobilcard” (Südtirol – Alto Adige) could be a role model offering all means of transport with a single ticket<sup>19</sup>.

- Integrating new services into routing and ticketing making full use of digital possibilities will make it possible to use a single ticket with multiple transport providers – from micro transit to long-distance rail transport.
- Bolstering public transport with extensive micro-transit and new types of carsharing and bike-sharing systems towards fully multimodal integrated mobility solutions, including both traffic management and information services made possible through digital means.
- The mobility behaviour of the population in everyday life and for day trips must change, with more journeys being made by bicycle or on foot. Where this is not possible, zero emission and climate-neutral public transport or shared mobility will be used.

#### ZERO EMISSION AND CARBON NEUTRAL TRANSPORT ON THE WHOLE LIFE CYCLE:

- According to the revised Regulation on Alternative Fuels Infrastructure (AFIR), the necessary infrastructure for carbon neutral alternative fuels and 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 mobility system more effectively. The potential and possibilities in the field of traffic management should be better exploited through the use of various digital tools. The electrification of the various means of transport is fuelled from 100% renewable energy. Where direct electrification is not possible, such as for hard – to-abate sectors shipping, and air traffic climate-neutral fuels are developed and used. The strategy for the transitional period of some Member States includes freight transport

#### TOURISM:

- Make sure that touristic destinations and sights can be reached easily by train, by bus, using flexible mobility services and by bicycle and on foot.
- Increase bicycle tourism by expanding bicycle infrastructure and creating attractive options for taking bicycles on public transport and for hiring bicycles and electric bicycles.

Overall tourism offers can be provided through mobile application integrating options for sustainable mobility, leisure and sports/cultural offers with reservation of accommodation.

#### LAND USE:

- Given the limited space available in sensitive Alpine regions, the land used by the transport sector is an important environmental indicator. Natural habitats are often cut off by transport infrastructure, destroying them forever. Land-use planning needs to avoid cutting off natural habitats, adjusting routing to the

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<sup>19</sup> Cf. [www.klimaticket.at/en](http://www.klimaticket.at/en)

landscape when infrastructure is built, promote especially space-saving means of transport and prevent mobility pressures, such as long commutes and distances to shopping opportunities.

- Rather than investing in new infrastructure, the existing infrastructure needs to be managed and used in a more efficient way, making full use of the capabilities and prospects of cooperative, connected and automated mobility through the means of digitalisation.

Tax incentives for transport need to be eliminated if they are counterproductive in terms of climate and environmental protection.

### III. Recommendations towards implementation

In order to implement the Transport Protocol, its objectives must be taken into account and the measures set out herein must be realised. The recommendations listed below are taken directly from the requirements of the Transport Protocol. In particular, Articles 1, 3 and 7 contain clear objectives for a common coordinated transport policy:

#### REDUCE TRAFFIC VOLUME:

In accordance with the avoidance principle (cf. Article 1(2) of the Transport Protocol), all possibilities must be explored and utilized to reduce the volume of traffic. In order to achieve this, transport cannot be treated in isolation. Solutions must be sought across all sectors.

A concrete example is provided by the Alpine Convention Climate Action Plan 2.0. with its pathway #2 "*Developing the Alps into a model-region for reduced working mobility*".

#### ENCOURAGE INTERMODALITY:

The coordination of the different modes, means and types of transport is an essential factor for sustainable mobility. Alpine transit must be considered in the context of the EU transport network. For this reason, intermodality must be improved across borders so that the most environmentally friendly means of transport are available for the respective transport purposes. This requires appropriate investments in infrastructural and spatial planning measures.

There is a particular need for action here in freight transport, especially with regard to intermodality between rail and road transport powered by renewable energies.

#### OPTIMIZE THE USE OF EXISTING TRANSPORT SYSTEMS:

The existing transport system must be adapted to changing demands. However, this doesn't mean a constant resource-intensive expansion, but an improved cross-state coordination in the Alps, especially through the use of digital solutions.

In freight and passenger transport, digitization must offer solutions that enable users to quickly and easily find the most environmentally friendly routes. The co-modality and the combination of different means of transport must also be taken into consideration.

#### IMPLEMENT THE POLLUTER/USER PAYS PRINCIPLE:

Optimised use of the existing transport must be supported by the implementation of the polluter/user-pays principle, in which external costs, which put a burden on the general public, and infrastructure costs, which are caused by the users/polluters, are adequately charged to the users/polluters.

Given the central position of the Alps in the European transport network, a common transport policy enforcing an increased implementation of the polluter/user pays-principle can be pursued at EU level.

Within the framework of the Eurovignette Directive, the Alpine states could explore the possibilities for implementing the polluter-pays principle and introduce corresponding mark-ups for the congested Alpine corridors in order to reduce the burden on the local population and environment.

Charging schemes for the means of transport, on the one hand, must adequately reflect the transport-specific real costs (infrastructure and external costs) caused by it and should, on other hand, also incentivise a modal shift (see recommendation 3) (cf. Article 14 Transport Protocol).

Measures to limit HDV-transit on Alpine crossings may take into account various emission factors, including CO<sub>2</sub>-emissions.

#### ENCOURAGE MODAL SHIFT:

The modal shift to more environmentally friendly modes of transport (e.g. from road to rail) to achieve a more balanced use of transport infrastructure is closely linked to the intermodality of the transport system. To promote modal shift, appropriate incentives (e.g. through charging according to recommendation 4) and low-threshold access and digital information and management for passenger and freight transport are needed, especially in cross-border transport.



## 4. CONCLUSIONS AND RECOMMENDATIONS

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The Transport Protocol of the Alpine Convention – together with European policies for sustainable mobility and energy transition – contains clear guidelines for a strategy for sustainable mobility in the Alpine region. From today's point of view, these targets have to be considered in the light of the challenges of climate change and pollution. The numerous climate targets at international, EU and national level share the goal of climate neutrality, but the underlying time frame varies from 2040 to 2050.

In order to make transport in the Alpine Space sustainable and climate neutral, a **clearly defined transport policy for the Alpine region is needed**, accompanied by a jointly coordinated strategy for sustainable transport and mobility in the sense of the Transport Protocol. 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 of the Alpine region and its vulnerability in the European context are sufficiently taken into account.

To this end, the Working Group **recommends developing a joint Alpine-wide strategy for sustainable transport and mobility** that meets the requirements of the Transport Protocol (Article 3 and Article 7). The goals of the Alpine Climate Targets 2050 can serve as a vision for sustainable mobility in the alps and with the Climate Action Plan 2.0, there are already implementation paths that directly address transport and mobility.

### I. Recommendations for action

#### **FREIGHT TRANSPORT:**

1. Evaluate existing and needed terminals to increase the intermodality of freight transport.
2. Develop sustainable strategies for regional CO<sub>2</sub>-neutral freight transport.
3. Advocate for a coordinated Alpine Toll plus<sup>20</sup> system within the frame of the Eurovignette Directive for transalpine freight traffic on the roads in order to promote a shift to rail.
4. Realize infrastructures for recharging and refilling and encourage the renewal of the fleet of light and heavy commercial vehicles promoting zero emission and climate-neutral technologies powered by renewable energy.

#### **PUBLIC TRANSPORT:**

5. Expand and intensify cross-border transport projects for low-threshold access to public transport for short and long distances.
6. Link multimodal cross-border traveller information services and potentially ticketing systems for the Alpine region<sup>21</sup>.
7. Support projects for integrated and shared mobility services, including their digital integration across administrative and regional borders.
8. Establish co-working spaces in municipal centres to reduce the daily work commute. Start with first pilot regions in 2023.

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<sup>20</sup> [https://www.tirol.gv.at/fileadmin/themen/verkehr/verkehrsplanung/Carole/Dokumente/Toll\\_Plus\\_2014.pdf](https://www.tirol.gv.at/fileadmin/themen/verkehr/verkehrsplanung/Carole/Dokumente/Toll_Plus_2014.pdf)

<sup>21</sup> Based on the approaches defined in the Linking Alps project <https://alpine-space.org/projects/linkingalps/en/home>

**ZERO EMISSION TRANSPORT:**

9. Prioritize the optimization of pedestrian and cycling infrastructure in order to improve the use of active mobility in daily life.
10. Convert private, freight and public transport to 100% renewable green energy. This should be achieved by clear zero emission registration targets beginning with 2030 and depending on the type of vehicle.
11. Adapt and optimise the existing transport infrastructure to the requirements of carbon neutral and zero emission technologies without additional land consumption.
12. Deploy cooperative, connected and automated mobility services throughout the Alpine region towards a fully integrated multimodal transport system.
13. Establish Alpine-wide standards regarding the required infrastructure (e.g. charging stations, filling stations) to guarantee 100 % renewable green energy.

**TOURISM:**

14. Create and communicate special offers for tourists travelling by public transport, paying particular attention to the first and the last mile. This also includes improving the possibilities for transporting and travelling with bicycles (communication of existing routes, parking facilities, rental options, etc.), as well as public transport and shared mobility concepts at the tourist destinations facilitated by mobile applications for sustainable tourism.
15. Develop guidelines for climate-neutral touristic destinations, including concepts for active and shared mobility and the promotion of slow-travelling, focusing on relaxation and mindfulness and thus also influencing the choice of transport means.
16. Provide multimodal traveller information services targeted for tourists through digital means in the alpine region.

**LAND USE:**

17. Create combined residential and transport development plans to reduce land consumption and individual transport, and producing synergies through development poles.
18. Favour the use of transport infrastructure for the generation of renewable energy (photovoltaics), rather than exploiting untouched nature.
19. Instead of building new infrastructure in the Alpine Region, develop cross-border multimodal traffic management applications, including cooperative, connected and automated mobility services, towards a more efficient use of the existing infrastructure.

## ANNEX I – EXEMPLARY NATIONAL STRATEGIES FOR SUSTAINABLE MOBILITY

### I. AUSTRIAN MOBILITY MASTERPLAN 2030

#### Approach and methodology

In this section, the methodology of the Austrian Mobility Masterplan 2030 is described. It represents one of the several examples of national planning aimed at implementing the European policies for sustainable mobility and energy transition as well as the Alpine Transport Protocol.

#### Common understanding regarding approach, methodology and overall objectives

The three guiding principles of sufficiency (mobility behaviour and well-considered freight transport usage), consistency (shift to more environmentally friendly modes of transport) and efficiency (reduce energy use) define the core of the coordinated policy.

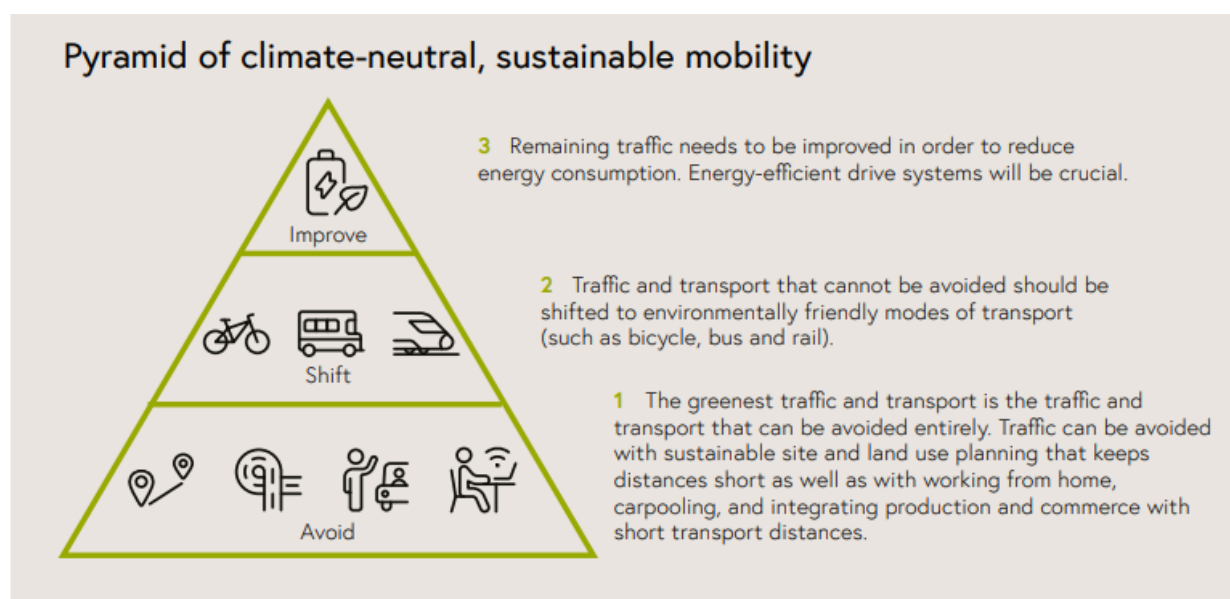
As the most environmentally friendly traffic and transports are the ones that can be avoided, altogether the principle of sufficiency has to be given priority, followed by consistency and efficiency. For the greatest possible impact, as well as the avoidance of secondary effects such as the rebound effect, the joint realization of all three principles is required.

#### **Example 1: Transport Target Nr. 1 of the Alpine Climate Target System:**

*Modal shift of Alpine freight transit - Alpine freight transit transport (> 300km) is shifted to rail, going beyond European modal shift objectives, supported by an ambitious implementation of innovative logistics solutions.*

#### **Example 2: Transport Target Nr.4 of the Alpine Climate Target System:**

*Decarbonised Transport Fleet - The road transport fleet is CO2-free (heavy goods and light vehicles), through electric mobility and other alternative drive trains.*



Pyramid of climate-neutral, sustainable mobility. Source: Austria's Mobility Master Plan 2030

Following the Mobility Master Plan 2030, the use of a **backcasting approach** for the development of a coordinated environmental and transport policy is recommended. This approach is based on a sensible combination of avoiding traffic, shifting traffic and improving the efficiency of each mode of transport. It starts from a predefined future scenario and works back from this starting point to the present to identify strategies and measures. A vision of sustainable mobility in the Alpine Space, such as the Transport Targets Nr. 1 and 4 of the Alpine Climate Targets System (ACTS) for a certain target date must be developed.

In the pursuit of sustainable mobility and its climate neutrality, the following **limiting factors must be considered** in the elaboration of the backcasting results:

- Limited construction capacities;
- Long lead times for infrastructure projects;
- Limited availability of renewable energy.

In the Austrian Mobility Masterplan 2030, the following backcasting results were elaborated and can be used as a good practice:

**Backcasting result 1:** *We need to reverse the trend away from current growth in passenger and freight transport. Freight transport growth must be decoupled from economic growth.*

**Backcasting result 2:** *We must continue to prioritize shifting traffic to rail and public transport and must leverage existing potential to shift traffic. Additional capacity and better-quality services in both passenger and freight transport will enable more traffic to be shifted. We can expect rail services to improve in the coming years as a result of various innovative measures (digitalization, automation and digital automatic coupling).*

**Backcasting result 3:** *Technology needs to achieve maximum efficiency, as the amount of renewable energy available is limited. The necessary zero-emission infrastructure must be available in time, and a clear roadmap is needed.*

Of course, the results refer to a detailed evaluation limited to Austrian territory. However, the application of this backcasting approach offers the possibility to **create a generally applicable strategy for sustainable mobility for the Alps**. Such an Alpine-wide strategy for sustainable mobility can be the basis for a coordinated transport policy to achieve the climate targets in the transport sector.

## Targets

### **Avoid – Transitioning to less traffic, more regionalism and better quality of life**

#### **2.1 Targets**

Over the last two decades, the volume of transport in the form of passenger-kilometres required to cover mobility needs has increased by more than 30 per cent, while the volume of freight transport has increased by over 70 per cent. To maintain similar levels in the next 20 years, we will need to pursue the following targets.



##### **Passenger transport**

- The volume of passenger transport must be kept nearly constant. Due to population growth, this would mean a slight reduction in the volume of transport per person per day from 13.8 kilometres currently to roughly 12.3 kilometres.

##### **Freight transport**

- Economic growth must be decoupled from the volume of freight transport. With the economy expected to grow 40 per cent by 2040, the aim is for the volume of freight transport to increase only moderately, by no more than 10 per cent.

(Source: Austria's 2030 Mobility Master Plan, page 21)

## Shift – Switching to efficient, environmentally friendly and space-saving modes of transport is inexpensive, creates room and capacity, and promotes good health



### 3.1 Targets

All potential needs to be leveraged to shift traffic to energy-efficient eco-mobility, such as electrified rail and active mobility. We will pursue the following targets by improving infrastructure, improving the quality of services offered and creating the right frameworks:

#### Passenger transport

- The share of the volume of transport accounted for by eco-mobility must increase by around half, from 30 per cent to 47 per cent.
- Currently some 60 per cent of distances are travelled by car. This ratio essentially needs to be reversed, and 60 per cent of distances need to be travelled using eco-mobility.
- Cycling's share of distances travelled must double to 13 per cent by 2030.
- Private motorised transport's share needs to drop to 42 per cent, with shared mobility and micro-mobility expanded on a large scale.

#### Freight transport

- Rail's share of the modal split must be increased to 40 per cent (equivalent to some 35 billion tonne-kilometres) with the right European collaboration.
- Austria alone can achieve only a moderate increase (34 per cent).

(Source: Austria's 2030 Mobility Master Plan, page 26)

## Improve – The transition to renewable energy in the transport sector is an essential component of reaching climate-neutrality by 2040



### 4.1 Targets

Existing vehicles need to be retrofitted with zero-emission drive systems in time for us to achieve climate neutrality in 2040. This will mean the following new zero-emission registration targets for road transport:

#### Passenger transport: road

- 100 per cent of all new car and two-wheel registrations will be zero-emission beginning no later than 2030. If CO<sub>2</sub> emission standards can consistently be tightened even further at the European level, this could happen sooner.
- 100 per cent of all new bus registrations will be zero-emission in 2032.

#### Freight transport: road

- 100 per cent of all new light commercial vehicle registrations will be zero-emission no later than 2030. If CO<sub>2</sub> emission standards can consistently be tightened even further at the European level, this could happen sooner.
- 100 per cent of all new heavy goods vehicle registrations (vehicles under 18 tonnes) will be zero-emission in 2030.
- 100 per cent of all new heavy goods vehicle registrations (vehicles over 18 tonnes) will be zero-emission in 2035.

The vehicle rampup and nationwide expansion of the infrastructure will happen simultaneously. This means that the necessary infrastructure for zero-emission operation of all types of vehicles must be put in place, in stages, by no later than 2035.

#### Rail, waterway and air transport

Our aim for rail, waterway and air transport is also to become climate-neutral by 2040. Rail transport will accomplish this primarily with electrified lines. Climate-neutral fuels from renewable sources will be used in waterway navigation and air transport, in other words, the areas where zero-emission technologies cannot currently cover all uses:

- 100 per cent of rail transport will be climate-neutral by 2040, with most decarbonisation completed by 2035.
- 100 per cent of inland waterway vessels will be climate-neutral by 2040.
- 100 per cent of aircraft will be climate-neutral by 2040.

(Source: Austria's 2030 Mobility Master Plan, page 36)

## II. ITALY'S NATIONAL ENERGY AND CLIMATE PLAN (NECP)

- 2030 targets for RES energy in road transport (0.379 Mtoe) and rail transport (0.314 Mtoe).
- Eur759 bn investment needs identified for RES energy in transport sector - Funding programme 2019-2033 for replacement of public bus fleet – BEV-CNG-PHEV buses.
- Mandatory purchase of alternative fuel vehicles by public bodies (including LPT and waste collection trucks) at least 30 % by 2022, at least 50 % by 2025 and 85 % by 2030 of powered by methane and hydrogen, and electricity and methane in the case of buses.
- Incentives to purchase low&zero emission vehicles (e.g. Eur300 mln for 0-125 g/Km CO<sub>2</sub> emission cars and vans) - Future review of the tax system on transport (tolls, registration tax, ownership tax, excises) .

- Charging points (public and private) for electric vehicles (BEV and Plug-In) from the current 2,900, approximately, up to at least 6,500 in 2022. Tax deductions for the purchase and fitting of infrastructure for charging electric vehicles, until Dec 2021 (= 50 % of expenses covered).
- Incentives for purchasing commercial vehicles with alternative propulsion (e.g. 2021-22: Eur100 mln to incentivise the LDV-HDV fleet renewal by BioC/LNG-HEV-BEV vehicles.
- The Municipalities imposing limits on access to LTZ permit free access only to electric and hybrid vehicles.

### III. SWITZERLAND'S NATIONAL ENERGY AND CLIMATE PLAN (NECP)

Switzerland (no EU member State) defined in the energy strategy 2050<sup>22</sup> e.g. moduls for the mobility sector to reach the climate relevant targets for CO<sub>2</sub>-emission reduction and elaborated a planning instrument very similar than the EU NECP, named "Federal Long-Term Climate Strategy"<sup>23</sup>, showing the following milestones:

- Land transport does not generate any more greenhouse gas emissions in 2050, with few exceptions.
- In 2050, 90% of all new Cars and LDV will be BEV, the remaining 10% will be FCEV.
- HEVs are relevant during the transitional phase, they will be replaced quickly by BEV starting to 2030.
- Almost half of the drive energy required in transport sector will be provided by renewable electricity-based and biogenic fuels which are used in combustion engines.
- New HDV will account for most FCEV – Electricity-based or Biogenic renewable fuels are only used for road transport if they are not required for other purposes for which fewer alternatives exist. Bio-Gas and Bio-LNG could play a relevant role for HDV in transition period. Electric vehicles are mainly used in LPT Buses
- Inclusion of lifecycle emissions in the regulation on fleet emissions.
- The shifting from road to rail makes the major contribution to reducing greenhouse gas emissions and ensuring climate-compatible spatial development, if the (additional) power used is produced in a renewable and sustainable way.
- Digitalization and Home-Working will give a relevant contribution to reduction in the number of kilometres travelled and therefore lower energy consumption and emissions.
- Fast charging stations for e-vehicles on the Swiss highway network are promoted<sup>24</sup>.

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<sup>22</sup> [Energy Strategy 2050 \(admin.ch\)](#)

<sup>23</sup> [Climate protection: Federal Council adopts Switzerland's long-term climate strategy \(admin.ch\)](#)

<sup>24</sup> [Ausschreibung und Vergabe von Rastplätzen für den Bau von Schnellladestationen \(admin.ch\)](#)

In the sector of hydrogen mobility, the so-called H2 – mobility association is promoting the Hydrogen-mobility and refuelling infrastructure for hydrogen-vehicles <sup>25</sup>. Thanks to this association a huge project of hydrogen – trucks could be launched and is still running, up to 1000 Fuel Cell trucks from Hyundai are involved.<sup>26</sup>

In Switzerland the long-term policy in the mobility sector is, since decades, focused on developing public transport systems, both for passengers and freight. Further huge investments in stepwise rail development until 2035 and beyond are planned or are already being implemented and under construction<sup>27</sup>.

A special focus is also put on electrification of public transport by road (buses)<sup>28</sup> covering a wide network especially in Alpine Regions and the multimodal mobility approach with the establishment of a federal Mobility Data Infrastructure (MODI) <sup>29</sup> providing data exchange in order to network government stakeholders, mobility providers, developers and managers of digital customer solutions like applications, as well as other players in research and development supporting an overall substitution of individual motorized transport.

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<sup>25</sup> Förderverein H2 Mobilität Schweiz (h2mobilitaet.ch)

<sup>26</sup> [Wasserstoff in der Praxis: Mit dem Brennstoffzellen-Lkw unterwegs \(nzz.ch\)](#)

<sup>27</sup> [Federal Office of Transport FOT Expansion step 2035 \(admin.ch\)](#)

<sup>28</sup> [210421\\_KS\\_LITRA\\_PrixLitra\\_Publikation\\_DE.pdf](#)

<sup>29</sup> Federal Office of Transport FOT Data for an efficient mobility system (admin.ch)