



Annual Report 2021

A new policy pathway to support the implementation of the Combined Scenario



iMONITRAF! Annual Report 2021

A new policy pathway to support the implementation of the
Combined Scenario

INFRAS / Climonomics / Eurac Research with inputs of iMONITRAF! partners

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The iMONITRAF! year 2021 at a glance

iMONITRAF! – The common voice of the most affected transit regions

Impacts of the COVID-19 pandemic impressively highlight the benefits of reducing traffic volumes on the transalpine corridors: while air quality limits were exceeded at five measurement stations along the major transit corridors in 2019, only one station at Brenner saw an exceedance in 2020 – thanks to considerably lower traffic volumes. This insight supports the approach of iMONITRAF! that focuses on modal shift as major rationale for its common policy approach. With iMONITRAF!, the Alpine regions directly situated along the major transit corridors have set up a platform for technical and political exchange and for coordinating policy measures and strategies. Through their common voice, they put considerable efforts in making the Alpine needs and specificities heard in policy making processes at national and European level.

A policy pathway to support implementation of the Combined scenario

Based on the new Policy Scenarios 2030, the iMONITRAF! regions agreed that only the Combined scenario which brings together the benefits of modal shift measures and innovative technologies can guarantee a considerable reduction of transalpine road traffic and environmental nuisances. As the Policy Scenarios only identify first elements of a common policy mix, developing a detailed proposal for a common approach was one major objective of iMONITRAF! activities in 2021. Based on a review of the existing toolbox of targets, measures and strategic approaches, a policy pathway has been developed as strategic orientation for further activities.

Regional measures, often within a regulatory approach, are the baseline for the pathway, push and pull measures which are coordinated between the regions play the central role and further steering instruments are foreseen as fall-back. Compared to the previous iMONITRAF! policy mix, supportive digital solutions and alternative technologies play a more important role as well as the management of new rail infrastructures.

Toll Plus – a European process with mixed results

The revision process of the Eurovignette Directive entered its final phase with trilogue discussions in spring 2021. A compromise proposal was agreed in June 2021, however with some last-minute changes that weakened the overall ambitious approach of the revision process. iMONITRAF! put a lot of energies into convincing Members of the European Parliament that further adjustments are necessary to maintain the ambitious approach of the revision, but unfortunately many loopholes and exemptions remained in the proposal so that its value added to further support modal shift throughout the EU will probably remain limited. Still, some improvements are implemented with the new provisions, especially regarding the possibility to differentiate charges to CO₂-standards and to include a new external cost charge for CO₂.

To meet its ambitious objectives of the Sustainable and Smart Mobility Strategy, the EU Commission will now have to catch up on its ambitions in the frame of further processes. With the large 'Fit-for-55' package in summer and a second batch of legislation in December, including four transport-specific proposals which will have an impact on long-distance rail transport, a whole set of legislative proposals is on the table that will shape the future of transport. iMONITRAF! took advantage of these legislative processes and of the European Year of Rail to gather political representatives from the partner regions, Members of the European Parliament and invited stakeholders for a lunch event Brussels in November 2021. Participants highlighted specific Alpine needs and the crucial role of EU transport policy for developing common solutions. The speakers called on iMONITRAF! to continue its coordination efforts for reducing emissions caused by freight transport – prioritising modal shift as most effective decarbonisation measure

Monitoring update for the year 2020 – analysis of COVID-19 impacts

Due to the COVID-19 pandemic, heavy vehicle volumes in 2020 decreased on all iMONITRAF! corridors. About 21,200 **vehicles per day** (HV/day) crossed the seven major transalpine corridors, a decrease of 11% compared to 2019. The total of **light vehicles** per day (LV/day) was at about 50,700 per day in 2020, a 38% decrease as compared to 2019, which can be explained with the mobility restrictions posed by the COVID-19 pandemic measures in all involved countries. The analysis of monthly data that has been conducted to better explain impacts of COVID-19 on traffic volumes highlights the effects of the two lock-down phases in spring and autumn 2020.

Transported goods on the iMONITRAF! corridors sum up to a total of about 148.6 mio. tons, 100.1 mio. tons by road (67%) and 48.5 mio. tons by rail (33%). The total amount registered in 2020 is by 7% lower than 2019, while the **modal split** road-rail has remained unchanged. Despite the COVID pandemic, modal split on the Gotthard corridor could be further improved to 68% with further potentials when the full benefits of the now fully operational 4m corridor will be realised. The Simplon corridor as rail-dominated connection had the highest modal split for rail of 90% in 2020. On the other corridors, the share of rail is much lower with 31% at Tauern (a constant decrease over the last years), 27% at Brenner, 18% at Fréjus/Mt. Cenis and 3% at Ventimiglia.

The **annual air pollutant concentrations** of NO₂ show a further decreasing trend, accelerated by the decreasing road traffic volumes during the pandemic. In 2020, the annual average values of NO₂ exceeded the EU annual limit value of 40 µg/m³ only for the Bressanone sud/Brixen süd station along the Brenner corridor. This is a meaningful difference compared to 2019, when five stations registered values above the EU annual limit. For PM₁₀ limit values have not been exceeded at any of the stations and **noise levels** slightly decreased due to the lower traffic volumes.

The analysis of **monthly data to highlight the impacts of the COVID-19** pandemic results in some interesting findings. First, it shows the high price-sensitivity of the road transport market: the decrease of transported tons in 2020 was less evident than the one of travelled heavy vehicles. This suggests that, due to the COVID-19 pandemic and the related restrictions, several road operators have tried to maximise their truck load. Second, it reveals the strong impacts on the costs of fuels: in 2021, a relevant increase of prices has been registered in all involved countries compared to 2020, following the decrease that was registered between 2019 and 2020 due to the first pandemic wave.

Best Practices 2021

Regional measures were further optimised in all iMONITRAF! regions throughout 2021. In Tyrol, the set of driving bans was further developed in a dynamic way with further restrictions during the night and for high-emitting HGV. The Autonomous Province of Bolzano is putting a strong focus on noise reduction measures and on further developing its public transport system. Generally, the support of innovative technologies and digitalisation play an important role on the Brenner corridor in general – all efforts are coordinated under the initiative “Green Digital Brenner corridor”.

In Switzerland, the finalisation of the 4 m corridor with the opening of the Ceneri base tunnel offers some additional insights for further developing modal shift measures after large infrastructure projects are completed. First of all, it became clear that the cost reductions for operators on the overall long-distance trip were lower than estimated. The Swiss Federal Council thus agreed to continue financial incentives for rail transport up to 2023. Also, management and operation of the new infrastructures require further consideration, especially to secure tracks for rail transport.

iMONITRAF! Aktivitäten im Jahr 2021 – Das Wichtigste in Kürze

iMONITRAF! - Gemeinsame Stimme der am stärksten betroffenen Transitregionen

Der Rückgang des Verkehrsvolumens durch die COVID-19-Pandemie verdeutlicht eindrucksvoll den Zusammenhang zwischen Verkehrsaufkommen und Umweltqualität auf den alpenquerenden Korridoren: während im Jahr 2019 noch an fünf Messstationen entlang der großen Transitkorridore die Luftqualitätsgrenzwerte überschritten wurden, kam es aufgrund des deutlich geringeren Verkehrsaufkommens im Jahr 2020 nur an einer Station am Brenner zu einer Überschreitung. Diese Erkenntnis stützt den Leitgedanken des iMONITRAF! Netzwerks, das mit seinem gemeinsamen politischen Ansatz die Verkehrsverlagerung von der Straße auf die Schiene forciert. Mit iMONITRAF! haben die direkt vom Transitverkehr betroffenen Alpenregionen eine Plattform für den fachlichen und politischen Austausch sowie für die Koordination von politischen Maßnahmen und Strategien geschaffen. Sie haben sich zum Ziel gesetzt, mit ihrer gemeinsamen Stimme den alpinen Bedürfnissen und Besonderheiten in den politischen Entscheidungsprozessen auf nationaler und europäischer Ebene stärker Gehör zu verschaffen.

Ein „Policy Pathway“ für die Umsetzung des kombinierten Szenarios

Die erarbeiteten Politikszenerien 2030 verdeutlichen, dass eine erhebliche Reduktion des alpenquerenden Straßengüterverkehrs und dessen Umweltauswirkungen nur über ein kombiniertes Szenario erreicht werden kann. Darin werden die Vorteile von Verlagerungsmaßnahmen und innovativen und umweltfreundlichen Technologien vereint. Bereits im Jahr 2020 haben sich die iMONITRAF! Regionen klar für diesen Ansatz ausgesprochen. Da die Politikszenerien nur erste Elemente eines gemeinsamen Policy-Mixes aufzeigen, stand im Jahr 2021 die Entwicklung eines detaillierten Vorschlags zur Umsetzung des kombinierten Szenarios im Fokus. Basierend auf einer Zusammenstellung des bestehenden Instrumentariums an Zielen, Maßnahmen und strategischen Ansätzen wurde ein „Policy Pathway“ (Umsetzungspfad) als strategische Orientierung für weitere Aktivitäten entwickelt.

Regionale Maßnahmen zur Reduzierung der Umweltbelastung bilden die Basis für diesen Umsetzungspfad. Zwischen den Regionen koordinierte Push- und Pull-Maßnahmen stehen im Zentrum und weitere Steuerungsinstrumente sind als Rückfall-Option vorgesehen. Im Vergleich zum vorherigen iMONITRAF!-Politikmix spielen unterstützende digitale Lösungen für die Verkehrssteuerung und der Einsatz von alternativen Technologien (z.B. neue Antriebssysteme) sowie das Management neuer Schieneninfrastrukturen eine wichtigere Rolle.

„Toll Plus“ - ein europäischer Prozess mit gemischten Ergebnissen

Der Revisionsprozess der Eurovignetten-Richtlinie ging im Frühjahr 2021 mit den Trilog-Verhandlungen in seine letzte Phase. Im Juni 2021 wurde ein Kompromissvorschlag vereinbart, der jedoch einige Änderungen in letzter Minute aufgriff, die den ehrgeizigen Vorschlag des Revisionsprozesses deutlich abschwächten. iMONITRAF! leistete im Verlauf des Jahres viel Überzeugungsarbeit bei den Mitgliedern des Europäischen Parlaments, dass weitere Anpassungen notwendig sind, um für die Alpenregionen zusätzlichen Spielraum durch die Richtlinie zu schaffen. Aber leider blieben viele Schlupflöcher und Ausnahmen im Kompromiss enthalten, so dass sein Mehrwert im Hinblick auf die Verkehrsverlagerung in der gesamten EU wahrscheinlich begrenzt bleiben wird. Dennoch werden mit den neuen Bestimmungen einige Verbesserungen umgesetzt, insbesondere die neue Option zur Differenzierung der Mautgebühren nach CO₂-Standards und eine neue Gebühr für externe Kosten für CO₂.

Um die ehrgeizigen Ziele der „EU Sustainable and Smart Mobility Strategy“ zu erreichen, wird die EU-Kommission ihre Ambitionen nun im Rahmen weiterer Prozesse nachholen müssen. Mit dem großen "Fit-for-55"-Paket im Sommer und einem zweiten Paket von Rechtsvorschriften im Dezember, einschließlich vier verkehrsspezifischer Vorschläge mit großer Relevanz für den Schienenfernverkehr, liegt eine ganze Reihe von Legislativvorschlägen auf dem Tisch, die die Zukunft des Verkehrs prägen werden. iMONITRAF! nutzte diese Politikfenster und das Europäische Jahr der Schiene, um politische Vertreter aus den Partnerregionen, Mitglieder des Europäischen Parlaments und eingeladene Stakeholder zu einem Lunch Event in Brüssel im November 2021 zusammenzubringen. Die Teilnehmenden unterstrichen die spezifischen Bedürfnisse des Alpenraums und die entscheidende Rolle der EU-Verkehrspolitik bei der Entwicklung gemeinsamer Lösungen. Die Redner:innen forderten die iMONITRAF! Partner auf, ihre Koordinierungsbemühungen zur Verringerung der negativen Auswirkungen des Güterverkehrs fortzusetzen und dabei der Verkehrsverlagerung als wirksamster Klimaschutzmaßnahme klare Priorität zu geben.

Monitoring Update für das Jahr 2020 - Analyse der COVID-19 Auswirkungen

Aufgrund der COVID-19-Pandemie ging das Schwerverkehrsaufkommen im Jahr 2020 auf allen iMONITRAF!-Korridoren zurück. Rund 21.200 **Fahrzeuge pro Tag** (SGF/Tag) querten die sieben großen alpinen Korridore, ein Rückgang von 11 % im Vergleich zu 2019. Die Gesamtzahl der **leichten Fahrzeuge** pro Tag lag 2020 bei etwa 50.700, ein Rückgang um 38 % im Vergleich zu 2019, der mit den Mobilitätseinschränkungen durch die COVID-19-Pandemiemaßnahmen in allen beteiligten Ländern erklärt werden kann. Eine im letzten Jahr zusätzlich durchgeführte Analyse monatlicher Daten beleuchtet die Auswirkungen von COVID-19 auf das Verkehrsaufkommen im Detail und zeigt insbesondere die Auswirkungen der beiden ‚Lock-down‘ Phasen im Frühjahr und Herbst 2020.

Die auf den iMONITRAF!-Korridoren **transportierten Güter** beliefen sich auf insgesamt 148,6 Mio. Tonnen, davon 100,1 Mio. Tonnen auf der Straße (67%) und 48,5 Mio. Tonnen auf der Schiene (33%). Das im Jahr 2020 transportierte Gütervolumen lag um 7 % niedriger als 2019, während der **Modal Split Straße-Schiene** unverändert geblieben ist. Trotz der COVID-Pandemie konnte der Modal Split auf dem Gotthardkorridor auf 68 % weiter verbessert werden – mit Potential nach oben, wenn die Vorteile des nun voll funktionsfähigen 4-Meter-Korridors mit der Inbetriebnahme des Ceneri-Basis Tunnels voll zum Tragen kommen. Der Simplon-Korridor als bahndominierte Verbindung wies im Jahr 2020 mit 90 % den höchsten Modal Split für die Schiene auf. Auf den anderen Korridoren lag der Schienenanteil mit 31 % am Tauern (rückläufig in den letzten Jahren), 27 % am Brenner, 18 % am Fréjus/Mt. Cenis und 3 % an der Ventimiglia deutlich tiefer.

Die **jährlichen Luftschadstoffkonzentrationen** von NO₂ zeigen einen weiteren rückläufigen Trend, der durch das sinkende Straßenverkehrsaufkommen während der Pandemie beschleunigt wird. Die Jahresmittelwerte von NO₂ überstiegen den EU-Jahresgrenzwert von 40 µg/m³ im Jahr 2020 nur an der Station Brixen Süd entlang des Brennerkorridors. Dies ist ein bedeutender Unterschied im Vergleich zu 2019, als fünf Stationen Werte über dem EU-Jahresgrenzwert registrierten. Die PM₁₀-Grenzwerte wurden an keiner Station überschritten, und die Lärmbelastung ging aufgrund des geringeren Verkehrsaufkommens leicht zurück.

Die Analyse der monatlichen Daten zur Analyse der Auswirkungen der COVID-19-Pandemie führt zu einigen interessanten Ergebnissen: Erstens zeigt sie die hohe Preissensitivität im Straßengüterverkehr: Der Rückgang der beförderten Tonnen im Jahr 2020 war weniger deutlich als derjenige der schweren Güterfahrzeuge. Dies deutet darauf hin, dass die Straßentransportunternehmen aufgrund der COVID-19-Pandemie und der damit verbundenen Beschränkungen versucht haben, ihre Lkw-Auslastung zu maximieren. Zweitens werden die starken Auswirkungen auf die

Kraftstoffkosten deutlich: Im Jahr 2021 wurde in allen beteiligten Ländern ein erheblicher Preisanstieg im Vergleich zu 2020 verzeichnet, nachdem zwischen 2019 und 2020 aufgrund der ersten Pandemiewelle ein Rückgang zu verzeichnen war.

„Best Practices“ 2021

Regionale Maßnahmen wurden im Jahr 2021 in allen iMONITRAF!-Regionen kontinuierlich optimiert. Im Land Tirol wurde das Instrumentarium der Fahrverbote dynamisch weiterentwickelt, mit weiteren Einschränkungen in der Nacht und für Lkw mit hohen Emissionen. Die Autonome Provinz Bozen legt einen starken Fokus auf Lärmschutz-Maßnahmen und auf die Weiterentwicklung des öffentlichen Nahverkehrs. Generell spielt die Förderung von innovativen Technologien und Digitalisierung auf dem Brennerkorridor eine wichtige Rolle - alle Bemühungen werden im Rahmen der Initiative "Green digital Brenner corridor" koordiniert.

In der Schweiz liefert die Fertigstellung des 4-Meter-Korridors mit der Eröffnung des Ceneri-Basistunnels einige zusätzliche Erkenntnisse für die Weiterentwicklung von Verlagerungsmaßnahmen: Zunächst einmal wurde deutlich, dass die Kostenreduktionen für die Betreiber auf der gesamten Fernverkehrsstrecke geringer ausfielen als angenommen. Der Bundesrat hat daher beschlossen, die finanziellen Anreize für den Schienenverkehr bis 2023 fortzusetzen. Auch das Management und der Betrieb der neuen Infrastrukturen bedürfen weiterer Optimierungen, insbesondere zur Sicherung der Trassen für den Schienenverkehr.



iMONITRAF! nel 2020: L'essenziale in breve

iMONITRAF! - La voce comune delle regioni di transito maggiormente colpite

Gli impatti della pandemia COVID-19 evidenziano in modo impressionante i benefici della riduzione dei volumi di traffico sui corridoi transalpini: mentre i limiti di qualità dell'aria sono stati superati in cinque stazioni di misurazione lungo i principali corridoi di transito, solo una stazione al Brennero ha visto un superamento nel 2020 - grazie a volumi di traffico notevolmente inferiori. Questo dato supporta l'approccio di iMONITRAF! che si concentra sul trasferimento modale come logica principale per il suo approccio politico comune. Con iMONITRAF!, le regioni alpine situate direttamente lungo i principali corridoi di transito hanno creato una piattaforma per lo scambio tecnico e politico e per il coordinamento di misure e strategie politiche. Attraverso la loro voce comune, hanno compiuto notevoli sforzi per far sentire le esigenze e le specificità alpine nei processi decisionali a livello nazionale ed europeo.

Un percorso politico per sostenere l'attuazione dello Scenario combinato

Sulla base dei nuovi Scenari Politici 2030, le regioni di iMONITRAF! hanno concordato che solo lo Scenario combinato, che riunisce i benefici delle misure di trasferimento modale e delle tecnologie innovative, può garantire una considerevole riduzione del traffico stradale transalpino e dei disturbi ambientali. Poiché gli Scenari Politici hanno identificato solo i primi elementi di un mix di politiche comuni, lo sviluppo di una proposta dettagliata per un approccio comune era uno dei principali obiettivi delle attività di iMONITRAF! nel 2021. Sulla base di una revisione degli strumenti esistenti di obiettivi, misure e approcci strategici, è stato sviluppato un tracciato politico che funge da orientamento strategico per ulteriori attività.

Le misure regionali, spesso all'interno di un approccio normativo, sono il punto di partenza di per tale tracciato, le misure *push* e *pull* che sono coordinate tra le regioni svolgono un ruolo centrale e ulteriori strumenti di guida sono previsti come *fall-back*. Rispetto al precedente mix di politiche iMONITRAF!, le soluzioni digitali di supporto e le tecnologie alternative giocano un ruolo più importante in questo caso, così come la gestione delle nuove infrastrutture ferroviarie.

Toll Plus - un processo europeo con risultati eterogenei

Il processo di revisione della direttiva Eurovignette è entrato nella sua fase finale con discussioni a tre nella primavera del 2021. Una proposta di compromesso è stata concordata nel giugno 2021, seppur con alcuni cambiamenti dell'ultimo minuto che hanno indebolito l'approccio ambizioso generale del processo di revisione. iMONITRAF! ha speso molte energie per convincere i membri del Parlamento europeo del fatto che siano necessari ulteriori aggiustamenti per mantenere l'approccio ambizioso della revisione, ma purtroppo molte scappatoie ed esenzioni sono rimaste nella proposta, rendendo il suo valore aggiunto per sostenere ulteriormente il trasferimento modale in tutta l'UE tendenzialmente limitato. Tuttavia, alcuni miglioramenti sono stati attuati con le nuove disposizioni, in particolare per quanto riguarda la possibilità di differenziare gli oneri per gli standard di CO₂ e di includere un nuovo costo esterno per la CO₂.

Per raggiungere gli ambiziosi obiettivi della Strategia di Mobilità Sostenibile e Intelligente, la Commissione europea dovrà ora recuperare le sue ambizioni nel quadro di ulteriori processi. Con il grande pacchetto "Fit-for-55" in estate e una seconda serie di atti legislativi a dicembre, tra cui quattro proposte specifiche per i trasporti che avranno un impatto sul trasporto ferroviario a lunga distanza, si è raggiunta una serie di proposte legislative che plasmeranno il futuro dei trasporti. iMONITRAF! ha approfittato di questi processi legislativi e dell'Anno Europeo delle Ferrovie per riunire i rappresentanti politici delle regioni partner, i membri del Parlamento europeo e gli stakeholder per un pranzo-evento a Bruxelles nel novembre 2021. I partecipanti hanno evidenziato le

esigenze specifiche alpine e il ruolo cruciale della politica dei trasporti dell'UE per lo sviluppo di soluzioni comuni. Gli oratori hanno invitato iMONITRAF! a portare avanti gli sforzi di coordinamento per ridurre le emissioni causate dal trasporto merci - dando priorità al trasferimento modale come misura di decarbonizzazione più efficace.

Aggiornamento del monitoraggio per l'anno 2020 - analisi degli impatti del COVID-19

A causa della pandemia da COVID-19, i volumi di veicoli pesanti nel 2020 sono diminuiti su tutti i corridoi iMONITRAF! Circa 21.200 **veicoli al giorno** (HV/giorno) hanno attraversato i sette principali corridoi transalpini, con una diminuzione dell'11% rispetto al 2019. Il totale dei **veicoli leggeri** al giorno (LV/giorno) è stato di circa 50.700 al giorno nel 2020, in calo del 38% rispetto al 2019, un calo che può essere spiegato dalle restrizioni alla mobilità imposte dalle misure pandemiche da COVID-19 in tutti i paesi coinvolti. L'analisi dei dati mensili che è stata condotta per spiegare meglio gli impatti del COVID-19 sui volumi di traffico evidenzia gli effetti delle due fasi di blocco in primavera e autunno 2020.

Le **merci trasportate** sui corridoi iMONITRAF! sono corrisposte a un totale di circa 148,6 milioni di tonnellate, 100,1 milioni di tonnellate su strada (67%) e 48,5 milioni di tonnellate su ferrovia (33%). La quantità totale registrata nel 2020 è stata del 7% inferiore rispetto al 2019, mentre la **ripartizione modale** strada-ferrovia è rimasta invariata. Nonostante la pandemia da COVID-19, la ripartizione modale sul corridoio del Gottardo è stata ulteriormente migliorata fino al 68% con un ulteriore potenziale per quando si realizzeranno tutti i benefici del corridoio da 4 metri ora pienamente operativo. Il corridoio del Sempione, in quanto collegamento dominato dalla ferrovia, ha il più alto split modale per la ferrovia: 90% nel 2020. Sugli altri corridoi, la quota della ferrovia è molto più bassa con il 31% ai Tauri (in diminuzione costante negli ultimi anni), il 27% al Brennero, il 18% al Fréjus/Mt. Cenis e il 3% a Ventimiglia.

Le **concentrazioni annuali di inquinanti atmosferici** di NO₂ mostrano un'ulteriore tendenza alla diminuzione, accelerata dalla diminuzione dei volumi di traffico stradale durante la pandemia. Nel 2020 i valori medi annuali di NO₂ hanno superato il valore limite annuale europeo di 40 µg/m³ solo per la stazione di Bressanone sud/Brixen süd lungo il corridoio del Brennero. Si tratta di una differenza significativa rispetto al 2019, quando cinque stazioni hanno registrato valori superiori al limite annuale europeo. Per il PM₁₀ i valori limite non sono stati superati in nessuna delle stazioni e i **livelli di rumore** sono leggermente diminuiti a causa dei minori volumi di traffico.

L'analisi dei **dati mensili per evidenziare gli impatti della pandemia da COVID-19** porta ad alcuni risultati interessanti. In primo luogo, mostra l'alta sensibilità ai prezzi del mercato del trasporto stradale: la diminuzione delle tonnellate trasportate nel 2020 è stata meno evidente rispetto a quella dei veicoli pesanti trasportati. Questo suggerisce che, a causa della pandemia da COVID-19 e delle relative restrizioni, diversi operatori stradali hanno cercato di massimizzare il carico dei loro mezzi. In secondo luogo, l'analisi rivela i forti impatti sui costi dei carburanti: nel 2021, in tutti i paesi osservati, è stato registrato un notevole aumento dei prezzi rispetto al 2020, dopo il calo registrato tra il 2019 e il 2020 a causa della prima ondata pandemica.

Migliori Pratiche 2021 e possibili opportunità a livello europeo

Le misure regionali sono state ulteriormente ottimizzate in tutte le regioni iMONITRAF! per tutto il 2021. In Tirolo, i divieti di circolazione sono stati ulteriormente sviluppati in modo dinamico con ulteriori restrizioni durante la notte e per i mezzi pesanti ad alta emissione. La Provincia Autonoma di Bolzano ha puntato e sta puntando molto sulle misure di riduzione del rumore e sull'ulteriore sviluppo del suo sistema di trasporto pubblico. In generale, il supporto di tecnologie innovative e

la digitalizzazione gioca un ruolo importante per il corridoio del Brennero - tutti gli sforzi sono coordinati per mezzo dell'iniziativa "Green Digital Brenner corridor".

In Svizzera, il completamento del corridoio da 4 metri con l'apertura della galleria di base del Ceneri offre nuovi spunti per sviluppare ulteriormente le misure di trasferimento modale dopo il completamento dei grandi progetti infrastrutturali. Innanzitutto, è emerso che le riduzioni dei costi per gli operatori sul tragitto complessivo a lunga distanza sono stati inferiori alle stime. Il Consiglio federale ha quindi deciso di prolungare gli incentivi finanziari per il trasporto ferroviario fino al 2023. Inoltre, la gestione e l'esercizio delle nuove infrastrutture richiedono ulteriori riflessioni, soprattutto per assicurare l'uso dei binari per il trasporto ferroviario.



L'année 2020 d'iMONITRAF en un coup d'oeil

iMONITRAF! – la voix collective des régions de transit les plus impactées

L'impact de la pandémie de Covid-19 a mis en lumière de façon impressionnante les bénéfices de la réduction des volumes de trafic sur les corridors transalpins : alors que les seuils de qualité de l'air ont été franchis sur cinq stations de mesure sur les principaux corridors alpins en 2019, une seule station était hors limite en 2020, celle du Brenner – du fait de volume de trafic considérablement réduits. Cet aperçu conforte la logique d'iMONITRAF! qui fait du report modal le fondement d'une approche politique commune. Avec iMONITRAF!, les régions alpines situées à proximité directe des corridors de transit ont mis en place une plate-forme commune destinée aux échanges politiques et techniques ainsi qu'à la coordination des mesures et des stratégies. A travers cette voix collective, elles ont déployé des efforts considérables pour que leurs besoins et leurs spécificités soient pris en compte dans les processus décisionnels nationaux et européens.

Une voie politique pour soutenir la mise en œuvre du Scénario combiné.

En se basant sur les nouveaux Scénarios de Politiques Publiques 2030, les régions iMONITRAF! se sont accordées sur le fait que seul le scénario combiné qui concilie bénéfices du report modal et innovations technologiques peut garantir une réduction considérables du trafic routier transalpine et des nuisances environnementales. Les Scénarios de Politiques Publiques n'identifiant que les premiers éléments d'un mi politique commun, développer une proposition détaillée en vue d'une approche commune a été l'un des principaux objectifs poursuivis à travers les activités d'iMONITRAF! en 2021. Basé sur une révision de la boîte à outils des cibles, mesures et approches stratégiques, une voie politique a été développée en tant qu'orientation stratégique de prochaines activités. Les mesures régionales, souvent intégrées à une approche réglementaire, sont un référentiel pour trouver cette voie. Les politiques « de la carotte et du bâton » qui sont coordonnées entre les régions jouent un rôle central et d'autres instruments de pilotage sont envisagés pour servir de recours. Comparé aux précédents mix politique d'iMONITRAF!, les solutions numériques de soutien et les technologies alternatives jouent un rôle plus important, tout comme la gestion des Nouvelles infrastructures ferroviaires.

Toll Plus – un processus européen aux résultats mitigés

Le processus de révision de la Directive Eurovignette est entré dans sa phase finale avec des discussions tripartites du printemps 2021. Une proposition de compromis a permis un accord en juin 2021, mais les changements de dernière minute ont affaibli l'approche globale ambitieuse du processus de révision. iMONITRAF! a déployé beaucoup d'énergie pour convaincre les députés européens que de nouveaux ajustements étaient nécessaires pour sauvegarder une approche ambitieuse de la révision, mais malheureusement, plusieurs failles et exemptions demeurent dans la proposition dont la valeur ajoutée en faveur du report modal restera probablement limitée. Cependant, quelques améliorations seront mises en œuvre grâce à la nouvelle proposition, notamment la possibilité de différencier les coûts selon les standards de CO² et d'inclure de nouveaux coûts externes.

Pour atteindre les objectifs ambitieux de la Stratégie pour une mobilité durable et intelligente, la Commission européenne va maintenant devoir être à la hauteur de ses ambitions dans le cadre d'autres processus. Avec le Paquet "Fit-for-55" dévoilé l'été dernier et une deuxième série de mesures légales en décembre, comprenant quatre propositions spécifiques en faveur du transport qui auront un impact sur le transport ferroviaire longue distance, toute une série de propositions législatives sont sur la table et façonneront l'avenir du transport. iMONITRAF! a profité de

ces processus législatifs et de l'Année européenne du rail pour rassembler des représentants politiques des régions partenaires, des membres du Parlement européen et des parties prenantes invitées lors d'un déjeuner à Bruxelles en novembre 2021. Les participants ont souligné les besoins spécifiques des Alpes et le rôle crucial de la politique européenne des transports dans le développement de solutions communes. Les intervenants ont appelé iMONITRAF! à poursuivre ses efforts de coordination pour réduire les émissions causées par le transport de marchandises - en donnant la priorité au report modal comme mesure de décarbonisation la plus efficace.

Mise à jour du suivi d'observation pour l'année 2020 - analyse des impacts du COVID-19

En raison de la pandémie de COVID-19, les volumes de véhicules lourds ont diminué en 2020 sur tous les corridors iMONITRAF! Environ 21 200 véhicules par jour (VL/jour) ont traversé les sept principaux corridors transalpins, soit une diminution de 11 % par rapport à 2019. Le nombre total de véhicules légers par jour (VL/jour) était d'environ 50 700 par jour en 2020, soit une diminution de 38 % par rapport à 2019, qui s'explique par les restrictions de mobilité imposées par les mesures de lutte contre la pandémie COVID-19 dans tous les pays concernés. L'analyse des données mensuelles qui a été menée pour mieux expliquer les impacts de COVID-19 sur les volumes de trafic met en évidence les effets des deux phases de confinement au printemps et à l'automne 2020.

Les marchandises transportées sur les corridors iMONITRAF! représentent un total d'environ 148,6 millions de tonnes, dont 100,1 millions de tonnes par route (67 %) et 48,5 millions de tonnes par rail (33 %). La quantité totale enregistrée en 2020 est inférieure de 7% à celle de 2019, tandis que la répartition modale route-rail est restée inchangée. En dépit de la pandémie de COVID, la répartition modale sur le corridor du Gothard pourrait encore être améliorée (68%), avec un potentiel supplémentaire lorsque tous les avantages du corridor 4m, désormais pleinement opérationnel, seront réalisés. Le corridor du Simplon, en tant que liaison à dominante ferroviaire, présente la répartition modale la plus élevée pour le rail, soit 90 % en 2020. Sur les autres corridors, la part du rail est beaucoup plus faible : 31 % à Tauern (une diminution continue au cours des dernières années), 27 % à Brenner, 18 % à Fréjus/Mt. Cenis et 3 % à Vintimille.

Les concentrations annuelles de polluants atmosphériques de NO₂ montrent une nouvelle tendance à la baisse, accélérée par la diminution des volumes de trafic routier pendant la pandémie. En 2020, les valeurs moyennes annuelles de NO₂ ont dépassé la valeur limite annuelle de l'UE de 40 µg/m³ uniquement pour la station de Bressanone/Brixen sud, le long du couloir du Brenner. Il s'agit d'une différence significative par rapport à 2019, où cinq stations ont enregistré des valeurs supérieures à la limite annuelle de l'UE. Pour les PM₁₀, les valeurs limites n'ont été dépassées dans aucune des stations et les niveaux de bruit ont légèrement diminué en raison de la baisse des volumes de trafic.

L'analyse des données mensuelles destinées à mettre en évidence les impacts de la pandémie de COVID-19 aboutit à des résultats intéressants. Tout d'abord, elle montre la grande sensibilité au prix du marché du transport routier : la diminution des tonnes transportées en 2020 était moins évidente que celle des véhicules lourds parcourus. Cela suggère que, en raison de la pandémie de COVID-19 et des restrictions qui en découlent, plusieurs opérateurs routiers ont essayé de maximiser la charge de leurs camions. Deuxièmement, l'étude révèle les forts impacts sur les coûts des carburants : en 2021, une augmentation significative des prix a été enregistrée dans tous les pays concernés par rapport à 2020, après la baisse enregistrée entre 2019 et 2020 en raison de la première vague de pandémie.

Meilleures pratiques 2021 et fenêtres d'opportunité au niveau de l'UE

Les mesures régionales ont été optimisées dans toutes les régions iMONITRAF! en 2021. Dans le Tyrol, l'ensemble des interdictions de circuler a été développé de manière dynamique avec des restrictions supplémentaires pendant la nuit et pour les poids lourds à fortes émissions. La province autonome de Bolzano met l'accent sur les mesures de réduction du bruit et sur le développement de son système de transport public. De manière générale, le soutien aux technologies innovantes et à la transformation digitale joue un rôle important sur le corridor du Brenner - tous les efforts sont coordonnés dans le cadre de l'initiative "Green Digital Brenner Corridor".

En Suisse, la finalisation du Corridor 4m avec l'ouverture du tunnel de base du Ceneri offre quelques indications supplémentaires pour développer les mesures de report modal après l'achèvement de grands projets d'infrastructure. Tout d'abord, il est apparu que les réductions de coûts pour les opérateurs sur l'ensemble des trajets longue distance étaient inférieures aux estimations. Le Conseil fédéral suisse a donc accepté de maintenir les incitations financières au transport ferroviaire jusqu'en 2023. Par ailleurs, la gestion et l'exploitation des nouvelles infrastructures nécessitent des réflexions supplémentaires, notamment pour sécuriser les voies de transport ferroviaire.



1 Background and objectives

iMONITRAF! network – The common voice of the Alpine regions

iMONITRAF! is the network gathering the Alpine regions along the major transit corridors. Individual policies have shown limited success in reducing negative impacts of transalpine traffic. Hence, the Alpine regions have acknowledged the need to work together, to develop and implement a coordinated transport strategy. iMONITRAF! enables policy makers and technical representatives to jointly discuss political challenges and to support and implement common solutions – based on insights of the common monitoring system which has become the most comprehensive data source on interregional, transalpine traffic. Launched under the Alpine Space Programme in 2005, iMONITRAF! can be seen as good practice project on cross-border regional governance: financed by the regions themselves, iMONITRAF! is the common voice of the most affected transit regions with a clear common rationale.

Objectives 2021 – Developing a policy pathway towards the Combined Scenario

During their last roundtable meeting, political representatives of the iMONITRAF! regions have recognized that the Combined Scenario, as proposed in the iMONITRAF! Policy Scenarios 2030, shall be the leading scenario for upcoming iMONITRAF! activities. The combined approach that brings together both modal shift and technological change is the right way forward as it focuses on the avoid-shift-improve approach. However, the Policy Scenarios themselves provided only starting points for further developing the policy framework to reach the respective scenarios.

Developing such a policy pathway towards the Combined Scenario was thus a major objective of this year's iMONITRAF! activities. The group first discussed the role of different types of measures and targets for such a scenario and then illustrated them in form of a pathway to show their interaction. As the policy pathway closely depends on the policy framework developed at European level, iMONITRAF! organised a roundtable discussion in Brussels with Members of the European Parliament, representatives of NGOs and associations that are closely aligned to the iMONITRAF! objectives and regional politicians of the iMONITRAF! regions to discuss opportunities and needs for iMONITRAF! to get involved in legislative processes at EU level.

Activities related to monitoring in the year 2021

The COVID-19 pandemic offers specific insights with respect to monitoring transalpine freight transport and its impacts. Especially the lock-down situations in the year 2020 had impacts on global production and global trade and thus also on freight transport volumes across the Alps. In addition, travel restrictions implemented in the different Alpine countries and at regional level had impacts on freight transport, but also with even stronger effects on passenger transport. These situations offered opportunities for checking the sensitivity of environmental data with respect to changes of road traffic volumes but also to gain insights on how the transport sector reacts to external pressures and restrictions. To better interpret the effects of the COVID-19 pandemic, monitoring activities included a review of monthly data for some key indicators – results and interpretations are highlighted in this Annual Report.

New dynamics at EU level and other Alpine networks

Dynamics at both EU level and within the Alpine Convention to support the transformation of the transport sector towards climate-neutrality have considerably accelerated in 2021 – providing

many new windows-of-opportunities for iMONITRAF! to make the Alpine voice heard. The European Commission in 2021 approved the first implementation packages on the EU Green Deal, with the large 'Fit-for-55' package in summer and a second batch of legislation in December, including four transport-specific proposals which will have an impact on long-distance rail transport (new TEN-T regulation, Action plan for long-distance and cross-border rail transport, Directive on Intelligent Transport Systems and Urban Mobility plans). At Alpine level, a specific window-of-opportunity arises from the parallel presidencies of Switzerland for both the Alpine Convention and the Follow-up Zurich process. It is foreseen to closer align those two processes and two ministerial meetings are planned for 2022 to give new impetus to the alpine-wide cooperation. In 2021, iMONITRAF! could already contribute to developing a first set of thesis that will guide the first ministerial discussion.

Annual Report 2021 – overview on main iMONITRAF! activities

The Annual Report 2021 provides an overview on iMONITRAF! activities as well as on recent developments in the Alpine regions, on national as well as on European level. Its target groups are policy makers at the different political levels as well as the broader network acting on transalpine transport policy.

The report includes the main activities of the year 2021. It starts out with an illustration of the new policy pathway and its discussion during the EU Year of Rail (chapter 2) and an overview on developments at EU level with a focus on the Eurovignette revision process and how iMONITRAF! contributed in 2021 (chapter 3). Chapter 4 presents networking activities with EUSALP AG4 and other relevant Alpine-wide institutions, initiatives and projects. In chapter 5, an update of monitoring results is presented, including an interpretation of monthly data for some selected indicators to better interpret the impacts of pandemic measures that affected both freight and passenger transport in 2020. Chapter 6 presents the update of Best Practice, including information on all iMONITRAF! policy pillars. Finally, the report includes an outlook on the following two years.



2 Policy pathways and EU Year of Rail Event

2.1 The need for developing a new policy pathway

Recognising changing political priorities and adjustments in the European and national framework, the iMONITRAF! network has developed a new set of policy scenarios. The scenarios are summarized in the Annual Report 2020 and the dedicated brochure provides detailed information.

The evaluation of these scenarios illustrates that only a scenario combining ambitious modal shift measures and innovative technologies guarantees a considerable reduction of traffic and environmental nuisances according to the iMONITRAF! aims. They also highlight the need for an ambitious policy approach, coordinated between and along the transalpine transit corridors. The new rail infrastructures will need additional efforts and measures to be put in place, otherwise transport related negative environmental and social impacts will continue to rise.

Why a “policy pathway”?

The Policy Scenarios only identify first elements of a common policy mix to accelerate both modal shift and technological change. Detailed proposals for a common approach and how the Alpine regions can contribute to their implementation were not included. Closing this gap was thus a major objective of iMONITRAF! activities of this year. The following elements were reviewed:

- Target system: The Combined Scenario re-confirms the general rationale of iMONITRAF! and puts a strong focus on modal shift. However, specific transport or environmental targets were not defined in the Policy Scenarios.
→ One element of discussion thus focused on the potentials of developing a more specific target system for the Alpine corridors, based on previous targets as defined in the iMONITRAF! transport strategy of 2012 and the relevant EU and national frameworks.
- Toolbox: iMONITRAF! is already working with a broad toolbox of measures and instruments. The common strategy of 2012 has defined a set of common measures and the annual exchange of good practices provides continuous information on how these measures are implemented in the iMONITRAF! regions.
→ The review of the toolbox had the aim to highlight gaps with respect to new policy objectives and to identify measures that could be further developed in a common approach, in addition to the Toll Plus focus of the last years.
- Approach: Different approaches, reaching from a more market-based approach with incentives and support to more regulatory approaches can be used to implement the Combined Scenario. Elements of the different approaches are already implemented in the iMONITRAF! regions, so that it was agreed that a mixed approach should be the way forward.

Based on the review, a policy pathway has been developed by the network as strategic orientation for further activities – also including activities at EU and national level to ensure that needs of the Alpine regions are recognized in upcoming revision processes which are linked to implementing the EU Smart and Sustainable Mobility Strategy, the ‘Fit-for-55’ package as well as the corresponding Swiss strategies (such as the Transport Outlook 2050 and the 2050 climate targets). The following figure illustrates the policy pathway.



NEW iMONITRAF! POLICY PATHWAY

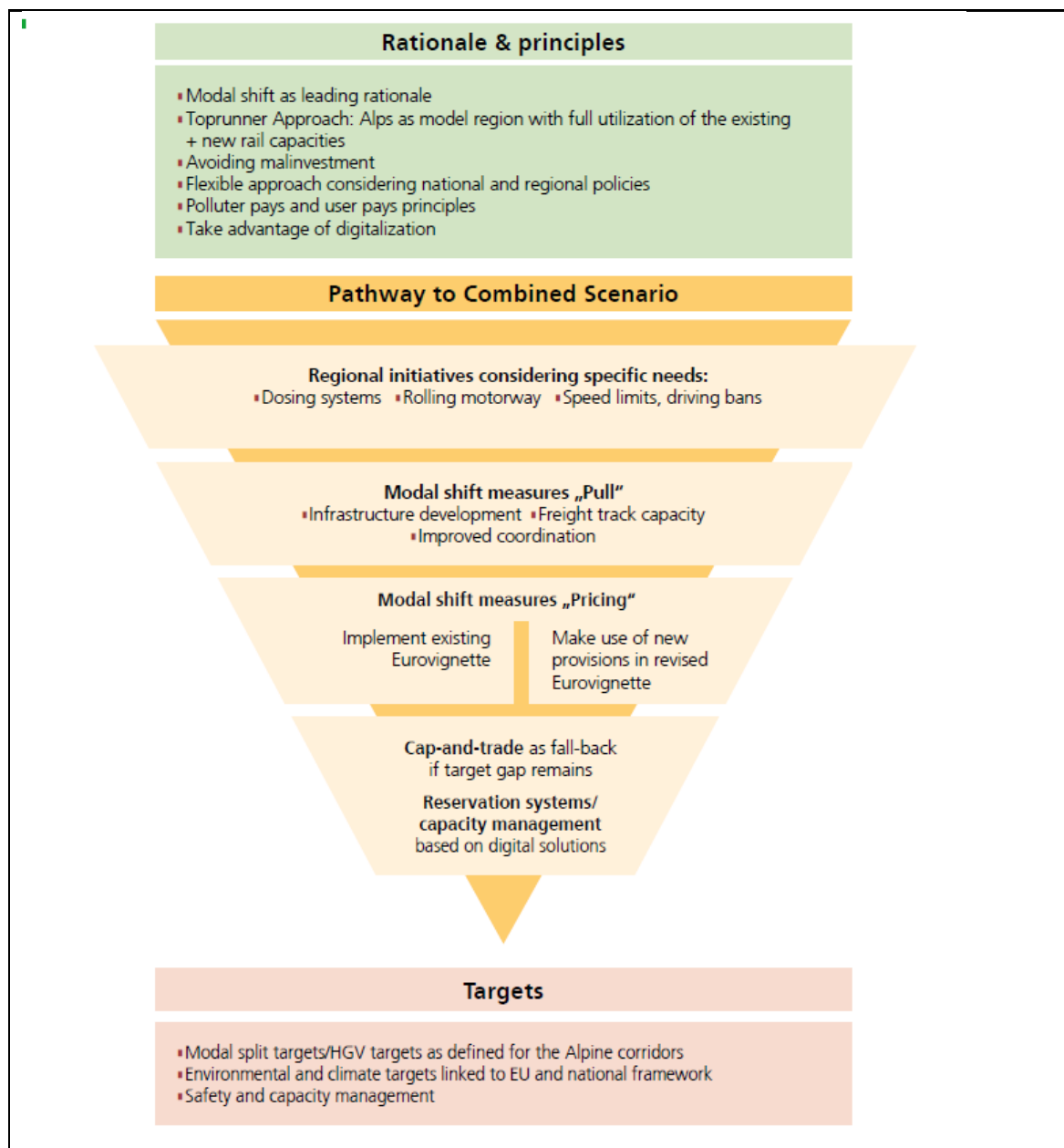


Figure 1: Illustration of the new iMONITRAF Policy pathway

Insights of the new policy pathway

The new policy pathway highlights the following needs:

- A set of common rationales confirms the objectives and principles of the common strategy of 2012 but puts a stronger focus on the **toprunner approach**. iMONITRAF! is dedicated to support the implementation of the toprunner approach, not only with respect to modal shift but also with an accelerated transformation of the HGV fleet across the alpine corridors and the use of digital solutions to support the combined approach. The rationales also highlight the need for flexibility: iMONITRAF! should not focus on developing “one solution that fits all” but rather a common toolbox which allows the regions to optimise and coordinate their measures. The exchange of good practices in this sense remains an important corner stone.

- The policy pathway thus starts from the recognition of regional measures which can be further optimised on the basis of continuous exchange. Pull measures for modal shift go beyond the provision of infrastructures, but also include measures for a smart capacity management that needs to be coordinated between the corridors in the long-run. Push measures, especially road pricing systems that are fully in line with the polluter-pays and user-pays principle remain a key element and iMONITRAF! partners will work jointly to assess the options of the revised Eurovignette Directive.
- For the target system, the pathway does not foresee the development of new targets but rather some supportive target indicators that allow a better comparison of the progress of performance between the corridors. These also need to be in-line with new EU and national targets to illustrate the toprunner function of the Alpine corridors.

2.2 Linking the policy pathway to EU activities: EU Year of Rail event

To implement the pathway towards the Combined scenario, iMONITRAF! requires a strong European framework – which considers the specific needs of the Alpine transit corridors. The discussion on the Eurovignette Directive has highlighted how a cooperation between iMONITRAF! as common voice for the Alpine regions and decision makers at EU level can result in optimized regulation. To discuss interfaces between European legislation and the new iMONITRAF! policy pathway, iMONITRAF! organised a lunch event in Brussels on 9th November 2021.



Figure 2: Discussion at lunch event

Flagged as an official event under the EU Year of Rail, this lunch event brought together Members of the European Parliament, representatives of NGOs and associations that are closely aligned to the iMONITRAF! objectives and regional politicians of the iMONITRAF! regions. As the event was organised in a hybrid format, it also offered partners of the broader iMONITRAF! community to listen in and to share their thoughts. The speakers called on iMONITRAF! to continue its efforts in finding common ground and joint solutions in reducing emissions caused by freight transport – prioritising modal shift as most effective decarbonisation measure. They agreed to continue their exchange and networking activities, with the exchange of political representatives of iMONITRAF! regions at the core.



3 Trends for transport and environmental policies at EU level

At EU level, the revision process of the Eurovignette Directive entered its final phase – with the objective to optimise the road pricing framework to contribute to the EU Green Deal. 2021 was a busy year at EU level in general, as a broad package of measures was put on the table to implement the ambitious Green Deal proposals. In June, the European Climate Law was agreed which writes into law the goals of the European Green Deal for Europe’s economy and society to become climate-neutral by 2050. The law also sets the intermediate target of reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels. Soon after, in July 2021, the European Commission adopted the ‘Fit-for-55’ package with proposals for 14 legislative pieces to make the EU’s climate, energy, land use, transport and taxation policies fit for reaching the 55% reduction target.

The ‘Fit-for-55’ package includes several legislations with high relevance for the transport sector, but in addition several additional dossiers were taken forward by the European Commission to start implementation of the EU Sustainable and Smart Mobility Strategy. On 14th December, the European Commission adopted four proposals that will modernise the EU’s transport system. This package has a high relevance for rail transport, including the new TEN-T regulation as well as an Action Plan on long-distance, cross-border rail transport.

3.1 Toll Plus: a compromise with mixed results

Supporting the revision process of the Eurovignette to achieve a strong European framework for ambitious road pricing system has been one major activity of iMONITRAF! in the last years. Starting point is the common resolution on Toll Plus (2016) where the Alpine regions call for a consideration of over-proportional external costs in sensitive mountain areas, more flexibility in using the mark-up factor as well as an extension of the cross-financing approach. Indeed, the revision process of the Eurovignette Directive touched upon all those issues. The discussion on the Eurovignette included many ups and downs and iMONITRAF! has been active throughout the process to make the Alpine voice heard.

Networking in 2021 to ensure that Alpine needs remain included

Under the Portuguese presidency in spring 2021, interinstitutional negotiations on the Eurovignette (“trilogue discussions”) reached a provisional agreement on 15th June 2021. The agreed text was approved by COREPER (Committee of Permanent Representatives) on 30th June.

Before the TRAN Committee was scheduled to confirm the agreement in July, iMONITRAF! was very active again in networking at European level, together with its partner organisation CIPRA International and other stakeholders from the Alpine community. Main critical points included:

- **Considering over-proportional external costs:** the compromise proposal as discussed in spring 2021 did not reflect the iMONITRAF! demands. In the compromise, mandatory external cost charging remains very limited (Art. 7c), the consideration of over-proportional costs in mountain areas is still only considered with factor 2 instead of the appropriate factor 4 (Annex IIIb) and an increase of the mark-up remains rather limited and its potential is linked to an agreement of neighbouring Member States which are part of the corridor (Art. 7f).
- **Limited effect on modal shift:** iMONITRAF! also considered that additional new provisions in the compromise are contrary to the modal shift objective. These include the provisions on

phasing out time-based charges (“vignettes”) which have been further extended with negative impacts on creating a level-playing field for rail freight transport as compared to road.

- **Exemptions for concession countries and vignette countries:** these are excluded from applying the CO₂ differentiation, environmental costs or earmarking, until the concession is renewed or substantially amended. This leaves essentially a handful of countries only, which need to apply all provisions of the Eurovignette. This will make road transport cheaper for long haul operations and leads to market distortions throughout Europe. Also, it contradicts the modal shift objective.
- **CO₂ differentiation:** The new provisions on CO₂-differentiation go into the right direction to set incentives for decarbonising the vehicle fleet but in their current design they contradict the user-pays principle. They should be linked to the external cost charging only and to a clear monitoring to avoid an over-proportional financial support for clean trucks that, again, would be contrary to our main objective of strengthening modal shift.
- Overall, iMONITRAF! recognized that the vast amount of loopholes, exemptions and derogations as integrated in the compromise will lead to a fragmentation of the transport market that does not create clear and transparent incentives for modal shift and does not strengthen the user pays nor the polluter pays principle. From the viewpoint of the Alpine regions of iMONITRAF!, it is a big step back as compared to the initial proposal of the European Parliament of October 2018.

Is a compromise better than a stand-still?

Many members of the EP TRAN Committee recognized the critical points that were included in the compromise proposal. But overall, the TRAN Committee confirmed the agreement on 12 July 2021, with 28 votes for and 21 against. The main achievements of the compromise include:

- While the current rules cover lorries over 3.5 tonnes, the agreement extends the scope to all heavy and light vehicles and foresees more proportionate road charges for cars, too.
- Strengthening the 'user/polluter pays' principle, future charges for lorries and buses will address CO₂, as well as pollutant emissions. The compromise includes a new rationale for differentiation of HGV charges. Instead of the current differentiation system on the basis of EURO classes, the differentiation shall be based on CO₂ standards from 2023 onwards to support the decarbonisation of the transport sector.
- A general phase-out of vignettes for trucks on the core TEN-T network over an eight-year period and a shift to distance-based charging is foreseen (in the EP version of 2018, the phase-out of vignettes was foreseen much earlier).
- Member States will now be able to set up a combined charging system incorporating distance, time, and CO₂ emission criteria.
- The mark-up can be extended to 50%, but only if all neighbouring countries agree to the higher mark-up.

The Council formally adopted the compromise proposal in its position on 9 November 2021 and transmitted it to the Parliament. Several amendments to improve the proposal were tabled by MEPs Barbara Thaler (EPP) and Anne-Deparnay Grunenberg (Greens), but were not supported by a vote in the TRAN Committee on 13th January 2022. The TRAN Committee thus passed the proposal on to the EP plenary for its final vote which is foreseen for February 2022.

From an iMONITRAF! perspective, this outcome of the Eurovignette revision is not fully satisfying. Some major demands of the Alpine regions have not been considered in the final document, yet

the revision offers some new potentials to further develop charging systems also in the Alpine countries.

Outlook on the further process – how iMONITRAF! can support the implementation of the new Directive

With the vote in TRAN in January 2022, the final agreement of the EP and with it the finalisation of the revision process are only a remaining formal act. After that, it lies in the hands of the Member States to implement the new provisions of the Directive. In this implementation process, iMONITRAF! will cooperate closely with the national level to ensure that charging systems are optimized and that also the streamlining of charging systems between the corridors is kept in mind. As the revision process of the Swiss HGV fee is closely linked to the new Eurovignette, iMONITRAF! will also put a focus on supporting the Swiss iMONITRAF! partners and observers in this revision process.

The Simplon meeting that brings together transport and environmental ministers from all Alpine countries on 14th January will be a first opportunity to start the implementation process of the Eurovignette.

3.2 Further developments at EU level: Fit-for-55 package and first packages to implement the SSMS

'Fit-for-55' package

To implement the increased ambition, on 14 July 2021 the Commission presented the first series of adopted files under the 'Fit-for-55' package. The package contains legislative proposals to revise the entire EU 2030 climate and energy framework, including the legislation on effort sharing, land use and forestry, renewable energy, energy efficiency, emission standards for new cars and vans, and the Energy Taxation Directive. The Commission proposes to strengthen the emissions trading system (ETS) and foresees a new emissions trading system for road transport and buildings that should start in 2025, complemented by a new social climate fund with a financial envelope of €72.2 billion to address its social impacts. New legislation is proposed on clean maritime and aviation fuels. To ensure fair pricing of GHG emissions associated with imported goods, the Commission proposes a new carbon border adjustment mechanism.

For iMONITRAF!, the new emissions trading system for the transport sector as well as the revision of the Energy Taxation Directive will become interesting dossiers as they both impact the level-playing field between road and rail and the streamlining of financial framework conditions in the iMONITRAF! regions.

Combined Transport Directive

Highly relevant for iMONITRAF! is also the Combined Transport Directive which sets framework provisions for CT services and the role of rail transport within it. An initial assessment report to kick-off the revision process has been published by the Commission in 2021, the full proposal for the revised Directive is foreseen for 2022 and iMONITRAF! will have the chance to take part in the consultation process linked to it.

TEN-T network: new guidelines for accelerating the development of TEN-T

The evaluation of the TEN-T regulation in 2020/2021, including ex-post evaluations, stakeholder consultations and impact assessment concluded that the TEN-T indeed provides an important policy framework to work towards the gradual completion of the common and consistent European transport infrastructure network. As such, it adds a European perspective to national infrastructure planning and addresses needs and benefits beyond single national approaches. However, the evaluation also concluded that efforts need to be stepped up in order to reach new political targets. The new TEN-T guidelines as proposed by the Commission on 14th Dec 2021 thus foresees the following new elements to make the network greener, more efficient, and more resilient.

- Set-up of nine “European Transport Corridors”, representing the main arteries of EU transport, integrating the former Core network Corridors with the Rail Freight Corridors.
- Stronger synergies between infrastructure planning and operation (incl. provisions to improve speed on rail lines and to reduce waiting times at borders).
- Requirements for the deployment, across the TEN-T network, of the charging and refuelling infrastructure needed for alternative transport fuels in line with the Alternative Fuels Infrastructure Regulation. This would mean sufficient charging capacity for cars, vans and trucks at 60 kilometres distance in each direction by 2025 on the core network and by 2030 for the extended core and comprehensive networks.
- Use of innovative technologies like 5G to further advance the digitalisation of transport infrastructure, further increasing efficiency, and improving the safety, security and resilience.
- Increased resilience of the TEN-T network to natural and human-made disasters via climate-proofing requirements and environmental impact assessments for new projects, and to the implications of an accident or breakdown.
- More transshipment hubs and multimodal passenger terminals in cities to facilitate multimodality, in particular for the last mile of a passenger or freight journey.
- Making it possible network-wide for lorries to be transported by trains.

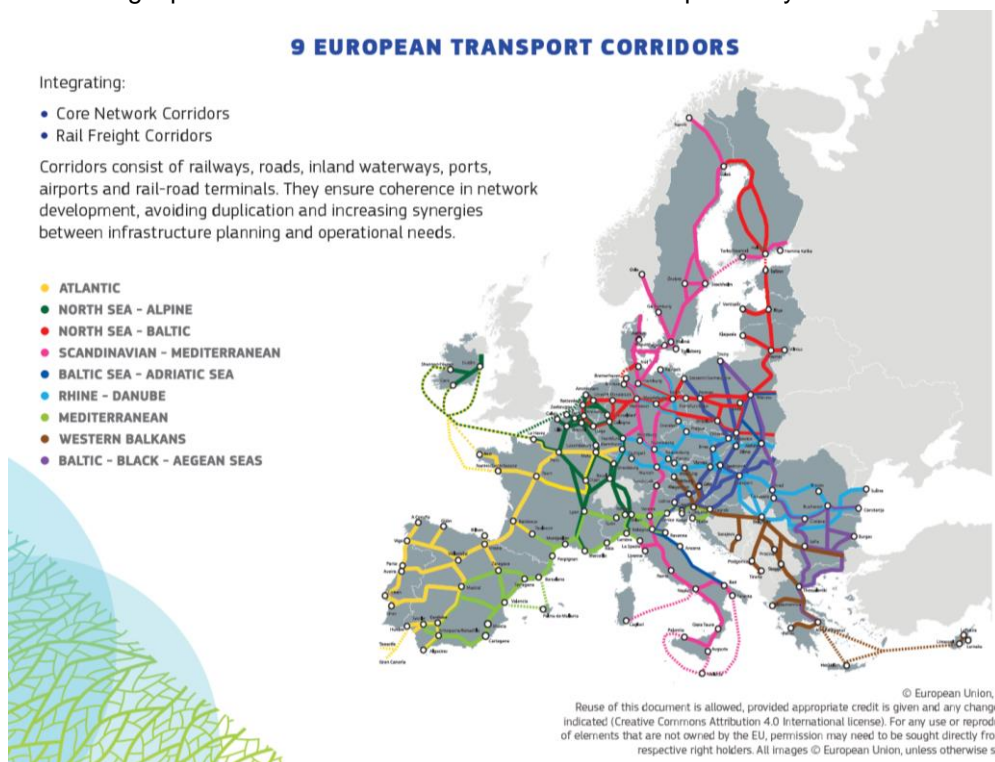


Figure 3: European transport corridors

December Package to implement SSMS: Action Plan on long-distance, cross-border rail transport

The new TEN-T proposal is accompanied by an Action Plan on long-distance and cross-border rail that lays out a roadmap with further actions to help the EU meet its target of doubling high-speed rail traffic by 2030, and tripling it by 2050.

Also part of the December package of proposals to support the Sustainable and Smart Mobility Strategy (SSMS), the Commission presented a proposal to update the Directive on Intelligent Transport Services to stimulate the faster deployment of new, intelligent services, by proposing that certain crucial road, travel and traffic data is made available in digital format, such as speed limits, traffic circulation plans or roadworks, along the TEN-T network and ultimately covering the entire road network. As last part of the package, a new Urban Mobility Framework sets out European guidance on how cities can cut emissions and improve mobility, including via Sustainable Urban Mobility Plans.

Review of Air Quality Directive

As part of the European Green Deal, the EU is revising its standards for air quality, to align them more closely with the recommendations of the World Health Organization (the latest Air Quality Guidelines of the WHO have been published on 22 September 2021). The EU also aims to improve overall EU legislation for clean air, building on the lessons learnt from the 2019 evaluation ('fitness check') of the Ambient Air Quality Directive. The Commission has published an Inception Impact Assessment, to guide the underpinning work to assess the impacts of a possible revision of the Ambient Air Quality Directives, planned for 2022. The revision of the Ambient Air Quality Directive is part of the Zero Pollution Action Plan which implements the zero pollution vision for 2050 for air, water and soil pollution.

New Alpine Space Programme

The INTERREG Alpine Space Programme (ASP) as an interesting financing programme for transnational cooperation in the Alps has finalised its Operational Programme for the period 2021-2027 and the Kick-off meeting took place in November 2021. A first call is already open. An interesting new element of the ASP is the option to set-up small-scale projects which are based on a one-step application process and allow smaller consortia to "set the scene" on new topics, to further roll-out existing knowledge from previous project to further target groups or to serve as laboratory for completely new ideas. Overall, the ASP has the objective to reach out to further target groups with this new strand of cooperation and to address innovative subjects.

Overall, the Programme puts a strong focus on "green" topics and digitalisation and climate neutrality is one key topic. If transport or mobility projects are developed in the frame of the ASP, they need to fit into this specific objective and thus need to have a decarbonisation focus.

4 Synergies with EUSALP and other networking activities

Synergies with EUSALP AG4

iMONITRAF! activities have a considerable overlap with EUSALP Action Group 4 Mobility and synergies between the two groups have been used throughout 2021. Especially, iMONITRAF! was able to present updates on the Eurovignette revision process during AG4 meetings. Also, insights from the Combined Scenario and the discussions on the policy pathway could be picked up by AG4 to further develop specific activities. Especially the following activities with strong synergies between the groups were relevant in 2021:

- Throughout 2021, AG4 has developed a “**Contribution of EUSALP states and regions to the European Year of Rail**” which highlights the needs to further improve the level-playing field for rail transport and to fully use the potentials of digitalisation and automation to improve efficiency in the rail transport sector. The contribution is expected to be supported by numerous EUSALP regions and states in early 2022 and will be disseminated widely to key actors in EU transport and regional policy.
- As part of the strategic sectoral implementation initiative “modal shift”, AG4 has conducted a **stakeholder analysis** with the aim to get a better understanding on stakeholders related to the different topics covered by AG4 and to more effectively identify implementation barriers and hurdles. The analysis provides stakeholder mappings that illustrate relations between different public and private stakeholders with respect to services, financing, approvals and operational information/data. This stakeholder analysis shall be the basis for stakeholder dialogues foreseen in the 2022 work programme of AG4.
- AG4 also continued its efforts of **project labelling** to identify projects with a large value added for the overall EUSALP perimeter. Especially the freight projects considered in this labelling are also interesting for iMONITRAF! to get a better understanding on ongoing freight infrastructures developments in the Alps. In 2021, six new projects were included in the labelling to add to the existing list of 14 labelled projects.

Alpine Climate Board, new Transport Community and further networking

iMONITRAF! has been closely involved with shaping the activities and priorities of the new Transport Community which has been set up as coordination group to support the implementation of the Climate Action Plan 2.0 of the Alpine Convention and its specific implementation pathways. This community offered opportunities to exchange information on the Eurovignette and other important EU and national developments. But also, it offered entry points into the upcoming discussions on the Simplon Alliance – which is an initiative under the Swiss Presidency of the Alpine Convention and the Follow-up Zurich process to give higher attention to modal shift policy and the needs to accelerate the mobility transition in the Alps.

iMONITRAF! closely cooperated with other institutions and stakeholders in the field of transalpine freight transport. The Lead Partner of iMONITRAF! also represents the network during the meetings of the Alpine Convention’s Working Group Transport which under its current mandate has the objective to develop political recommendations for sustainable mobility in the Alps, based on its previous work in promoting more sustainable transport means to support decarbonisation in transport. Furthermore, iMONITRAF! partners are in close contact with several specific projects and initiatives at Alpine-wide level, for example the LinkingAlps project which focuses on the development of an integrated, cross-border travel information.

5 Monitoring of iMONITRAF indicators

As monitoring data for a full calendar year is only published by the different sources throughout the following year, the monitoring data presented in the iMONITRAF! Annual Reports always focuses on the previous year. The Annual Report 2021 thus presents monitoring data for 2020 regarding indicators related to the road traffic volumes, the transported tons and modal split, the concentration of nitrogen dioxide and particulate matter and the exposure to noise.

To highlight the impacts of the COVID-19 pandemic, this year the monitoring chapter includes also monthly-level data (for the years 2019 and 2020), which allow a better understanding of the implications of the pandemic crisis. Monthly data regard (a) the road traffic volumes, (b) the trans-alpine freight transport (rail and road), and (c) the air pollution concentrations measured. Additionally, considerations about the impacts of the COVID-19 pandemic are included in the description of all the other indicators when relevant.

All data reported in this report are available also in the **iMONITRAF! WebGIS application**¹. It allows visualising and analysing the data contained in this report, as well as all data collected in the iMONITRAF! framework in the last 20 years.

This chapter provides the main findings from the data analysis of the iMONITRAF indicators, which include road traffic volumes, the transported tons and modal split, the concentration of nitrogen dioxide and particulate matter, the exposure to noise, toll prices, prices of fuel, recharging stations with alternative fuels, and national pricing components for road transport. To identify the eight transalpine corridors object of the analysis, a consistent colour scale is adopted: **yellow** = Ventimiglia, **orange** = Fréjus/Mont Cenis, **red** = Mont Blanc, **blue** = Gotthard, **light blue** = San Bernardino, **cyan** = Simplon, **green** = Brenner, **violet** = Tarvisio/Tauern.

Indicator “Road traffic volumes”

Road traffic volumes can be measured in different ways, according to the measuring stations and the counting systems considered. Regarding the **measuring stations**, for Fréjus, Mont Blanc, San Bernardino and Gotthard data is taken from the stations at the entrance of the tunnels. For Brenner and Tarvisio, the data series stem from the Austrian stations of Brennersee and Maglern, which are the closest toll stations to the Italian-Austrian border. Finally, for Ventimiglia, the Italian toll station of Ventimiglia (that is the closest to the FR-IT boundary) has been considered. Regarding the **counting systems**, Brenner and Tarvisio adopt the Austrian classification for road detection, as provided by ASFInAG: all vehicles below 3.5 t are counted as light vehicles, whereas those above 3.5 t are classified as heavy vehicles. For Swiss corridors, the official classification adopted by the Federal Office of Transport (FOT) has been considered: vehicles belonging to classes 1-3 (passenger cars, motorcycles and light commercial vehicles) are counted as light vehicles; those belonging to classes 4-7 (buses, coaches, HDV trucks, HDV truck trailers and HDV articulated trucks) as heavy vehicles. Finally, vehicles along Italian-French corridors are reckoned according to the system used by the Italian highways: the light vehicle category consists of vehicles belonging to class A (height below 1.3 m), while the heavy vehicle category includes

¹ Link to the iMONITRAF! WebGIS application: <http://sdi.eurac.edu/AlpinePoKforTransportandMobility/>

those means belonging to class B (height above 1.3 m) and classes 3, 4, 5 (according to the number of axles).

Figure 4 analyses the **overall annual average daily traffic for all vehicles** in the years 2005-2020. This indicator is the sum of total light and heavy vehicles circulating along the different corridors, divided by 365 (366 in leap years). In 2020, the number of vehicles crossing all iMONITRAF! corridors is about 71,910 per day (with a strong decrease of 31.9% compared to 2019, due to the influence of the COVID-19 pandemic).

With an average of 21,217 vehicles per day, the Brenner corridor presents the highest traffic flows, followed by Ventimiglia and Gotthard (16,785 and 13,345 vehicles). Tarvisio lies in the middle with 8,791 vehicles. Finally, San Bernardino, Mont Blanc and Fréjus present the lowest values, with 4,744, 3,552 and 3,476 vehicles per day.

The analysis since 2005 shows different trends. If we consider the absolute traffic volumes, Brenner presents the highest values and a generalised increase of flows up until 2019 (+25.0%) despite a significant reduction in years 2009-2011 due to the international economic crisis. In the long term (2005-2019), Ventimiglia and Gotthard also show an overall growth of vehicles (respectively +8.9% and +9.1%). In addition, Tarvisio reveals a generalised increase (+16.2%), but for this corridor, data is available only from 2012 onwards. Finally, from 2005 to 2019, Fréjus and Mont Blanc registered a generalised relative increase of more than 10% while absolute values are lower. These growing trends affecting the period until 2019 have to be significantly revised when considering also 2020. The restrictions caused by the COVID-19 pandemic have strongly reduced the flows along all corridors. Indeed, even compared to 2005, values are significantly lower for all corridors: -30.4% for Tarvisio, -27.0% for Ventimiglia, -25.7% for Mont Blanc, -22.8% for San Bernardino, -19.9% for Fréjus, -18.1% for Brenner and -17.0% for Gotthard.

In the short term (yearly variation between 2019 and 2020), this trend is even more evident. Tarvisio, Brenner, Mont Blanc, Ventimiglia and Fréjus register the highest decrease of vehicles (-40.1%, -34.5%, -34.0%, -33.0% and -29.9% respectively), whereas Gotthard and San Bernardino register lower decreases (-23.9% and -16.0%). Nevertheless, this remains the strongest decrease in volumes ever registered in the iMONITRAF! monitoring activity since 2005.



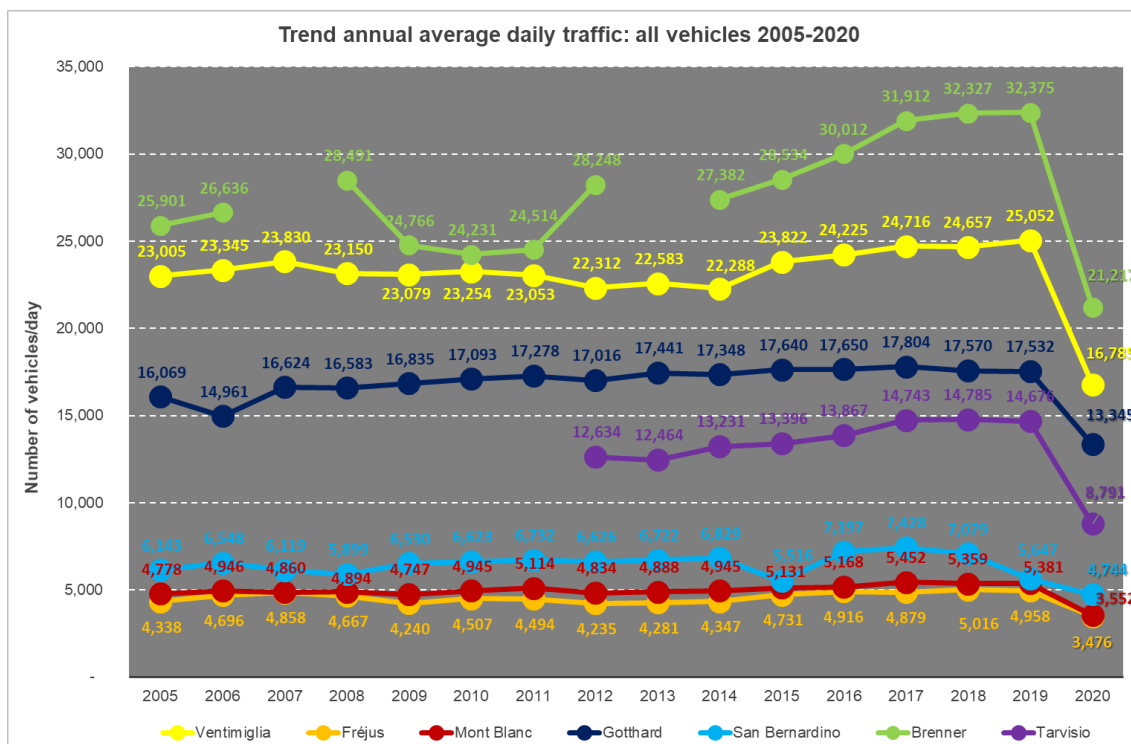


Figure 4: Annual average daily traffic: all vehicles per day

Considering the **annual average daily traffic of heavy vehicles** (Figure), the aggregated number of heavy vehicles crossing all iMONITRAF! corridors was at about 21,168 vehicles per day in 2020 (-11.1% compared to 2019). As a reference, the previous yearly variation (2018-2019) was +0.6%.

In 2020, the highest number of heavy vehicles was registered at Brenner, where an average of 6,612 vehicles per day was counted (-10.4% compared to 2019). Ventimiglia follows with 5,005 vehicles per day (-15.8% compared to 2019). Along these two corridors, a constant increase has been registered since 2012, but the trend has been inverted in 2020 due to the effects of the COVID-19 pandemic. A similar trend has affected also the other corridors with a lower amount of vehicles per day. Specifically, Tarvisio registered 3,690 vehicles per day (-2.0%), Fréjus 1,971 vehicles per day (-9.9%), Gotthard 1,938 vehicles per day (-16.2%), and Mont Blanc 1,563 vehicles per day (-16.2%). Finally, San Bernardino continued registering a decrease of flows (-21.3% between 2018 and 2019), with 388 vehicles per day (-13.3% between 2019 and 2020).

By analysing the period 2005-2020, several phases can be distinguished: between 2005 and 2007, the volume of heavy vehicles increased at all corridors. This development is followed by a decline until 2009, reflecting the impact of the economic crisis. The year 2010 showed some recovery (except for Brenner), followed by another generalised decrease in 2011-2013. In the period 2014-2019, a constant increase has been registered at Brenner and Ventimiglia. Tarvisio, Mont Blanc and Fréjus also showed an increase from 2014 to 2018 and a slight decrease in 2019. A stabilisation is visible along the Swiss corridor of Gotthard for the same period 2014-2019. Due to the COVID-19 pandemic, 2020 represents a decrease phase for all corridors. In particular, Brenner and Ventimiglia register the strongest variations, while Tarvisio and San Bernardino the lowest ones. However, a comparison between values registered in 2005 and in 2019 reveals that only two corridors present a decades-long negative trend: Fréjus (-8.9%) and Gotthard (-14.8%). Brenner and Ventimiglia recovered the effects of the economic crisis (respectively, +16.5% and

+18.4%). Mont Blanc also showed an increase (+7.9%). With a growth of +35.6%, Tarvisio registered the highest increase, but in this case comparison is made with 2012 due to a lack of previous data. Data about the recovery of the different corridors from the 2020 COVID-19 crisis will be available only in the next years and will allow understanding the reaction to the current crisis.

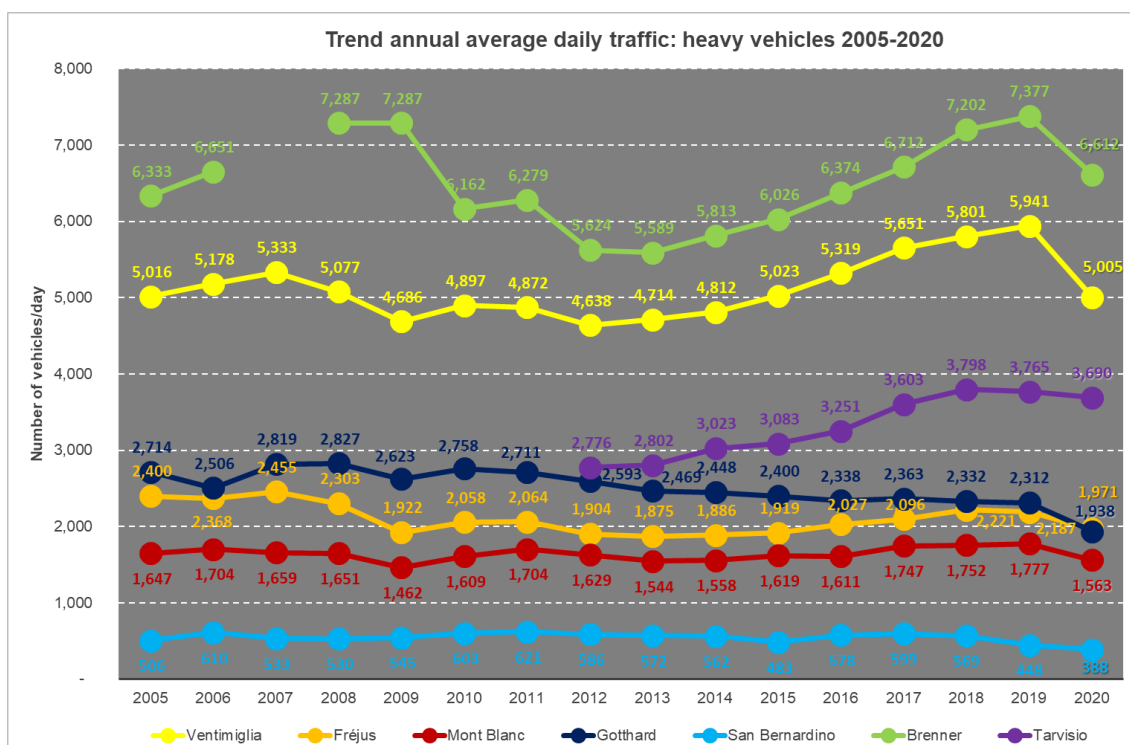


Figure 5: Annual average daily traffic: Heavy vehicles per day

Considering the **annual average daily traffic for light vehicles** (Figure 6), the aggregated number of light vehicles crossing all iMONITRAF! corridors was at about 50,700 per day in 2020 (-38% compared to 2019). Compared to heavy vehicles, the relative decrease registered for light vehicles is much higher. This is consistent with the mobility restrictions posed by the COVID-19 pandemic measures, especially to the movement of citizens rather than freights.

Considering these framework conditions, the highest values were recorded at Brenner, with 14,605 vehicles per day, followed by Ventimiglia (11,780), Gotthard (11,407), Tarvisio (5,101) and San Bernardino (4,356). The number of transits between France and Italy along Mont Blanc and Fréjus was the lowest (respectively 1,988 and 1,505 vehicles per day). Compared to 2019, a decrease of over 25% is visible at all corridors: Tarvisio (-53.2%), Fréjus (-45.7%), Mont Blanc (-44.8%), Brenner (-41.6%), Ventimiglia (-38.4%) and Gotthard (-25.1%). The only exception is San Bernardino (-16.2%).

The analysis of the development since 2005 depicts a moderate increase of light vehicles until 2009, followed by a general stabilisation for the years 2010-2013 (not valid for the Brenner corridor, which registered a significant reduction of flows in 2010 and 2011). After this phase, a general increase is recognised for all corridors in 2014, 2015 (except for San Bernardino, for a temporary closure of the road and for an incomplete dataset), 2016 and 2017. In 2018 and 2019 the trend was negative again (overall -1.2% in 2018 and -1.6% in 2019), followed by the strong decrease characterising 2020 due to the COVID-19 pandemic (-38% compared to 2019). Comprehensively, until 2019, a generalised increase of flows along all corridors was registered. In relative terms, the highest growth compared to 2005 is detected at Fréjus (+43.0%), followed by Brenner

(+27.7%), Mont Blanc (+15.1%), and Gotthard (+14.0%). Tarvisio, for which data for 2019 is compared with that of 2012, also reveals an increase (+10.7%). All these trends have been reversed by the exceptional events of 2020. It is therefore necessary to investigate in the next years how rapidly such values will return to a pre-COVID-19 condition across the different corridors.

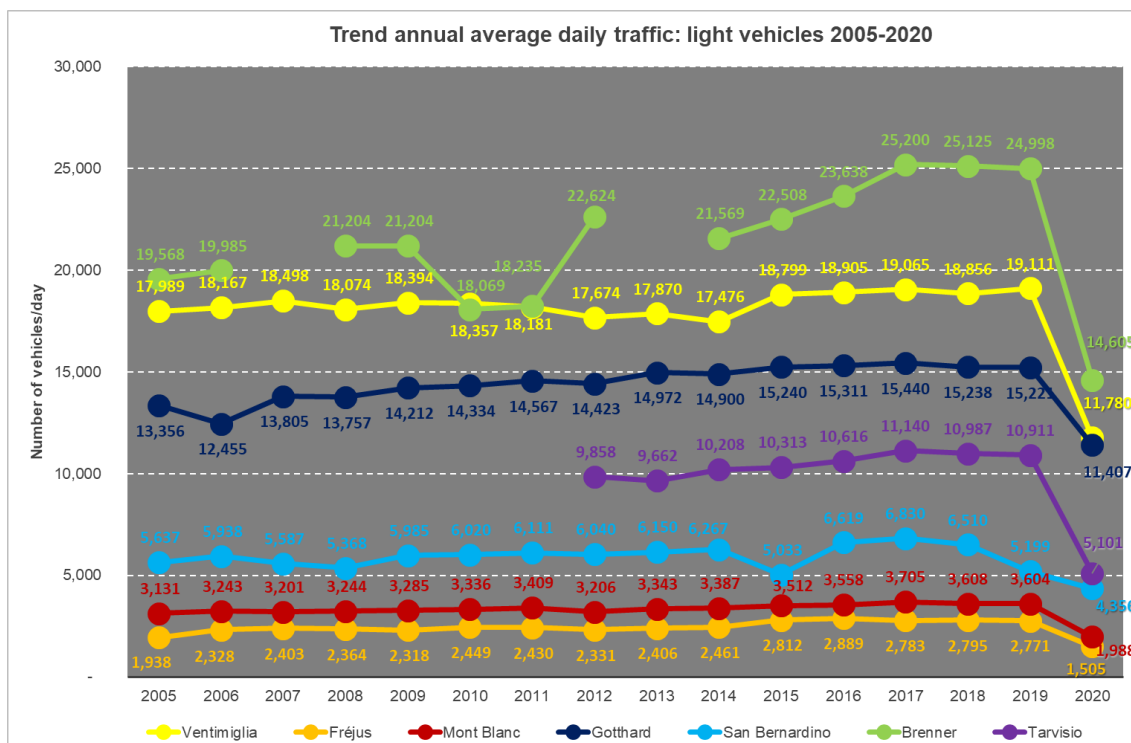


Figure 6: Annual average daily traffic: Light vehicles per day

Indicator "Road traffic volumes" – Monthly data 2019-2020

To investigate in more detail the impacts of the COVID-19 pandemic on the road traffic volumes along the iMONITRAF! corridors, monthly data have been collected from the same sources used to complete annual data. This ensures consistency between annual and monthly values and allows providing more details on the fluctuation of road traffic flows in the years 2019 (pre-COVID condition) and 2020 (first year of COVID-19 pandemic).

By observing the **monthly average daily traffic for all vehicles in 2019 and 2020** (Figure 7), it is possible to recognise the impacts of the two pandemic waves occurred in Spring and Autumn 2020 respectively, due to the lockdowns in this period. At the same time, the partial recovery occurred in the summer months is visible. This trend is clearly visible when comparing monthly data between 2019 and 2020. In March, April and May 2020, values registered along all corridors are on average lower by 73.4%, 92.5% and 79.3% compared to the same months in 2019. The highest reductions are visible for Mont Blanc in March and April (-80.7% and -97.5%), and for Tarvisio in May (-91.0%). A similar condition is visible for October, November and December 2020, with an average decrease of 31.3%, 52.4% and 59.3% compared to the same months in 2019 (data of October 2019 not available for San Bernardino).

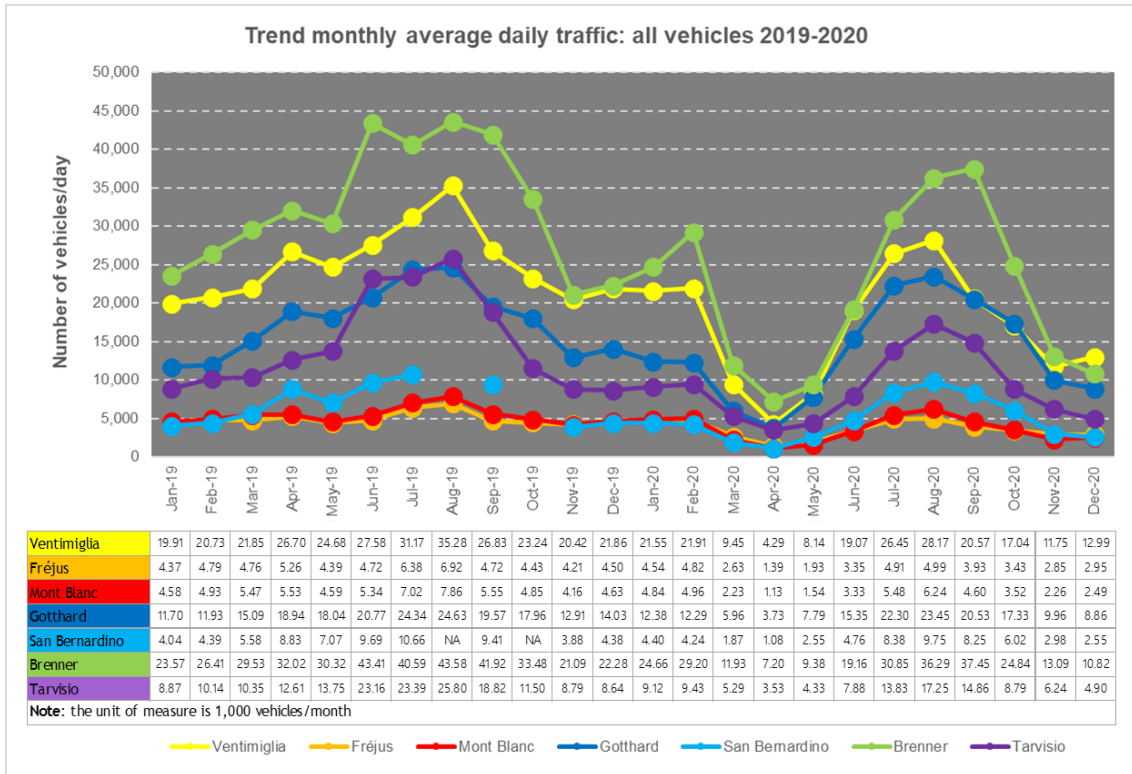


Figure 7 : Monthly average daily traffic: all vehicles per day 2019-2020

The general trend affecting all vehicles is consistent with that one regarding **monthly average daily traffic for heavy and light vehicles** respectively. However, some differences may be noticed (Figure 8 and Figure 9). In particular, the reduction of road traffic volumes experienced by heavy vehicles is less evident than that one affecting light vehicles (according to the different measures adopted for people and good mobility to address the pandemic crisis). For instance, in March 2020, the average daily number of heavy vehicles along the different corridors was on average 17.2% lower than in March 2019. Instead, the reduction in the same month for light vehicles was of 56.6%. Similar differences are visible also between April 2020 and 2019 (-42.3% for heavy vehicles and -79.3% for light ones), as well as between May 2020 and 2019 (-30.7% for heavy vehicles and -64.0% for light ones). Even during the second pandemic wave (Autumn 2020), a similar condition is visible, although the reductions are less evident. In October 2020, daily heavy vehicles flows were 6.4% lower than in October 2019; while the light vehicle ones were 21.6% lower. As for November 2020, the daily number of heavy vehicles along iMONITRAF! corridors decreased by 4.1% compared to the same month in 2019. For light vehicle such reduction was of 33.3%.

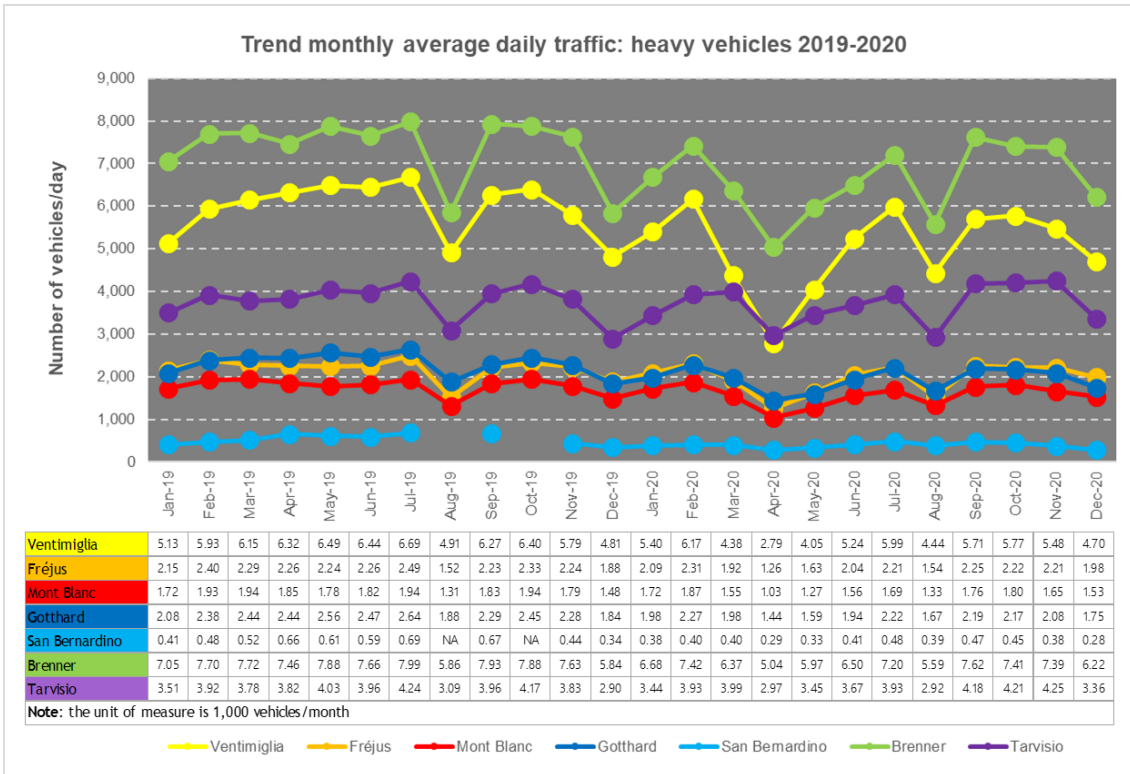


Figure 8: Monthly average daily traffic: Heavy vehicles per day 2019-2020

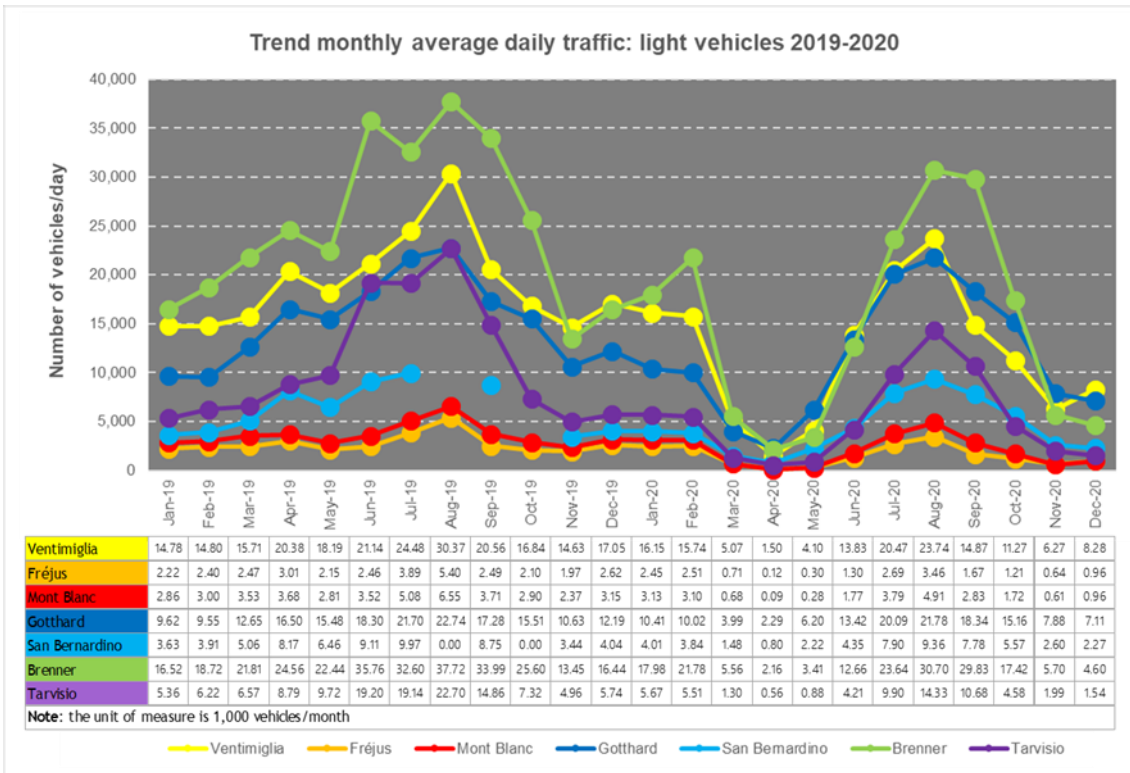


Figure 9: Monthly average daily traffic: Light vehicles per day 2019-2020

Indicator transalpine freight transport rail and road

The analysis of the **tons transported per year** is largely affected by the difficulties in finding reliable and consistent data. However, thanks to the information collected and provided by the Swiss Federal Office of Transport - Observatory for Road and Rail Freight Traffic in the Alpine Region (France, Switzerland, Austria; FOT 2021²), data for all corridors has been collected until 2020 (Figure 10).

From west to east, 6 corridors of the iMONITRAF! network allow a multimodal (rail/road) connection (Ventimiglia, Mont Cenis/Fréjus, Simplon, Gotthard, Brenner and Tauern), while 2 grant only a road connection (Mont Blanc and San Bernardino). In 2020, 148.6 Mt were carried across the above-mentioned corridors, 100.1 Mt by road (67%) and 48.5 Mt by rail (33%). The total amount registered in 2020 is by 7% lower than 2019, while the overall modal split road-rail has remained unchanged. However, the decrease of transported tons is less evident than that one of travelled heavy vehicles discussed before. This suggests that, due to the COVID-19 pandemic and the related restrictions, several road operators have tried to maximise the number of transported tons per vehicle. The decrease of transported tons between 2019 and 2020 affects both road and rail transport (-6% for road and -10% for rail on average across all corridors). As regards the single corridors, a decrease of the overall freight volumes is detected at Brenner (from 53.7 Mt to 51.0 Mt). This trend involves especially road transport (passing from 39.9 Mt to 37.4 Mt; i.e. -6%), while the rail mode decreased by 1% (from 13.8 Mt to 13.6 Mt). Along the Tauern, the other IT-AT corridor, the number of tons transported is less than half of the Brenner and it has decreased by 7% in the past year: 21.9 Mt in 2020 against 23.5 Mt in 2019. The decrease affects both road (passing from 15.4 Mt to 15.0 Mt; i.e. -2%) and rail (from 8.1 Mt to 6.9 Mt; -15%). Swiss corridors register a decrease in transported freight, apart from Gotthard where the amount is almost unchanged (+0.1% from 2019 to 2020; -2% road and +1% rail). At Simplon, the decrease of volumes (-14% from 2019 to 2020) was caused by rail (from 11.5 Mt to 9.7 Mt; i.e. -16%) whereas the road component has increased by 1% (from 1.03 Mt to 1.05 Mt). In 2020, at San Bernardino about 1.3 Mt were transported by road (-10% compared to 2019). Even along the French-Italian corridors, the total amount of transported tons has decreased, while the percentage of rail transport continued to remain low. In 2020 at Ventimiglia, the rail component counted for about 3% of overall freight transport (0.6 Mt out of 19.5 Mt) as it was in 2019. Along the Mont Blanc, where no rail connection is available, goods transported by road were decreased compared to the previous year (8.6 Mt; i.e. -10% compared to 2019). Finally, the incidence of rail transport at Fréjus/Mont Cenis was higher as compared to other French-Italian corridors: it counted for about 18% of the total (2.4 Mt out of 13.1 Mt), -2% compared to 2019.

² FOT 2021. *Observation and analysis of transalpine freight traffic flows, Key figures 2020*. The report will be available in the second half of 2022. It will be available online at: <https://www.bav.admin.ch/bav/de/home/verkehrsmittel/eisenbahn/gueterverkehr/verlagerung/berichte-und-zahlen.html> (German language version).

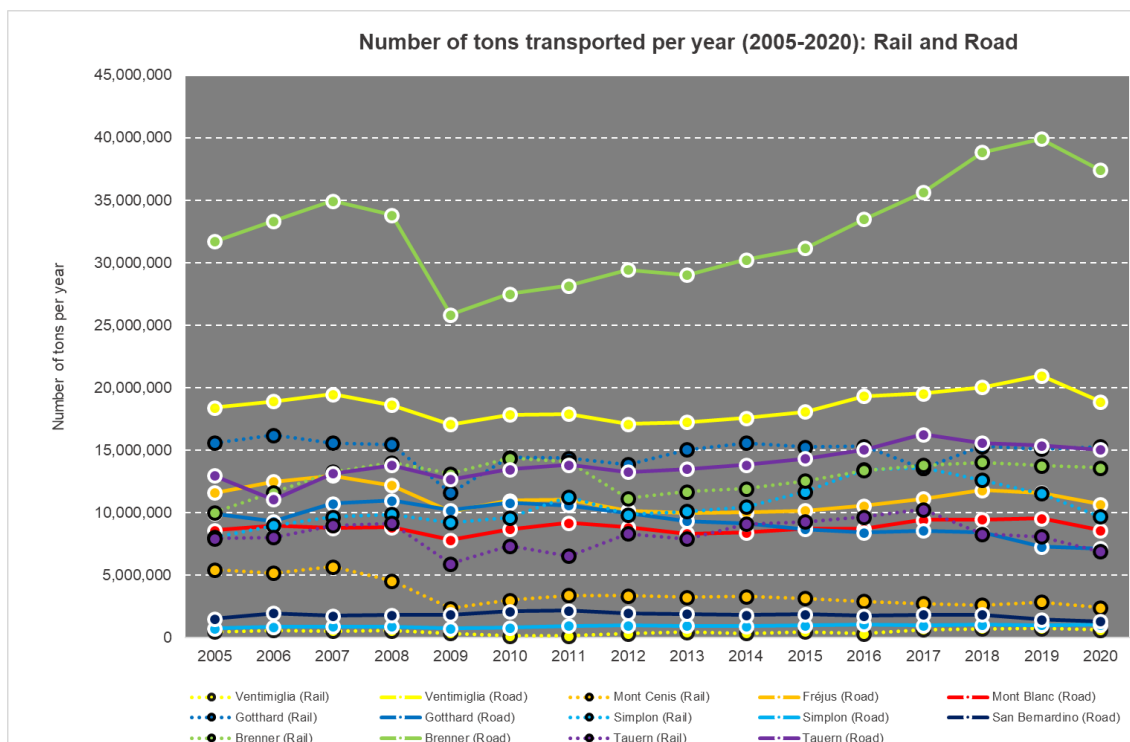


Figure 10: Transported tons per corridor

Considering **modal split** (Figure 11), the Swiss-Italian corridors of Simplon and Gotthard were the corridors with the highest share of rail and the only ones that exceeded the 50% of goods transported by train. Volumes at Gotthard increased in the period 2009-2014 and remained stable at 64% in the years 2015-2016, decreasing to 61% in 2017 (due to a construction accident of the Oberrheinstrecke in Rastatt) and again increasing in 2018, reaching 65%. During the period 2019-2020, the percentage further increased despite the COVID-19 pandemic (67% in 2019 and 68% in 2020). This last percentage is the highest value in the period 2005-2020. Simplon always presented values above 90%, and in 2020, the share was at 90%, which is 2% less than in the previous year. Along Brenner, rail transport had shown a decreasing trend since 2010, ending at 28% in 2014. In 2015 and 2016, a 1% increase was visible (from 28% to 29%), but in 2017, 2018 and 2019 the share decreased again by 1% per year, reaching the values of 2006 (26%). In 2020, a slight increase by 1% is visible, reaching the value of 2017 (27%). In 2020, the percentage at Tauern was 31% for rail (3% less than in 2019 and constantly decreasing since 2015) and 69% for road. Referring to French-Italian corridors, data referred to 2020 shows an decrease of the rail component for Fréjus/Mont Cenis, reaching the same share of 2018 (18% rail, 82% road). Ventimiglia remains instead stable in terms of modal split (3% rail, 97% road). Finally, Mont Blanc and San Bernardino do not have a transalpine rail connection, therefore 100% of freight is transported across their corridors on road.

When referring to the **railway component** (Figure 12), it is also possible to distinguish the type of service between conventional transport, unaccompanied combined transport (UCT) and accompanied combined transport (ACT). Along the two French-Italian corridors with rail connection (i.e. Ventimiglia and Mont Cenis), UCT and conventional rail transport play the major role. In 2020, along the Ventimiglia line, UCT constituted 47% of rail movements and the remaining 53% were conventional. Along Mont Cenis, UCT counted for about 49% and conventional transport for 51%, while ACT was 0%. The condition was similar along the two Swiss corridors, with UCT as the main component (70% at Gotthard and 78% at Simplon), followed by conventional transport (30%

at Gotthard and 12% at Simplon). At Gotthard, ACT service was suspended in December 2018, while it was still performed at Simplon (9.7%), mostly thanks to the connection between Freiburg and Novara. Along Brenner, UCT counted for 58% of total freight transport, followed by conventional transport and ACT (connection Wörgl-Brennersee-Trento), with, respectively, 22% and 20% of total volumes. Finally, at Tauern, most of the rail traffic (64%) is conventional, followed by UCT (36%).

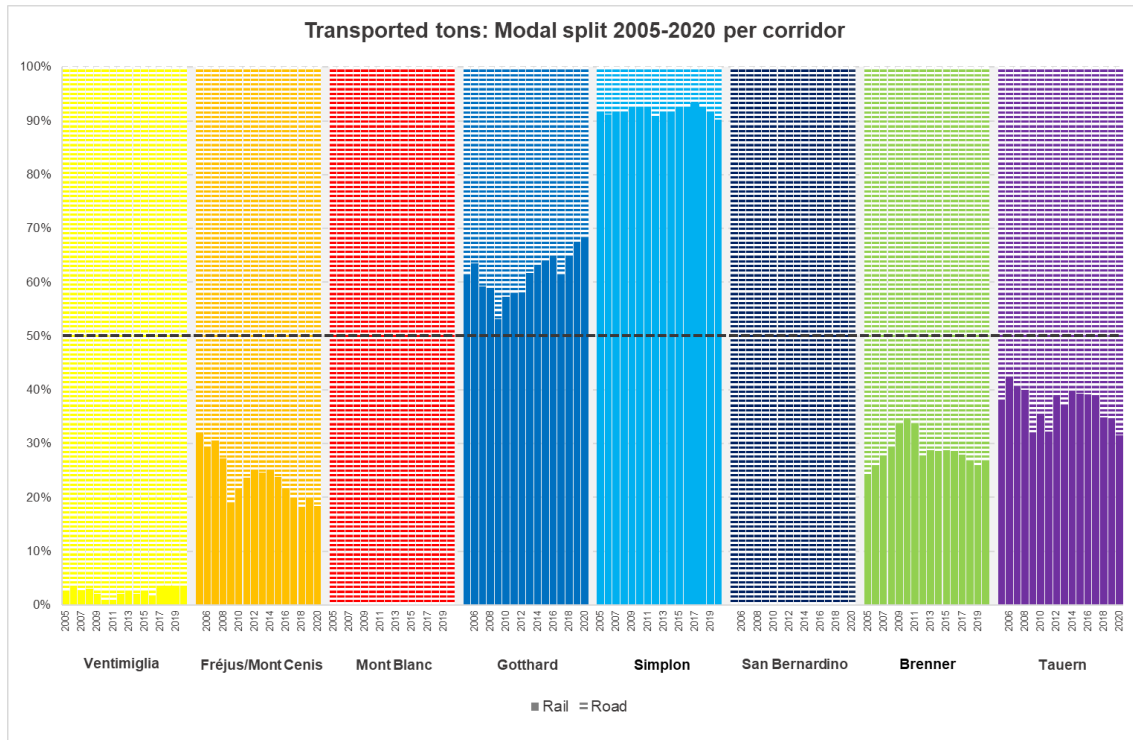


Figure 11: Transported tons, modal split per corridor

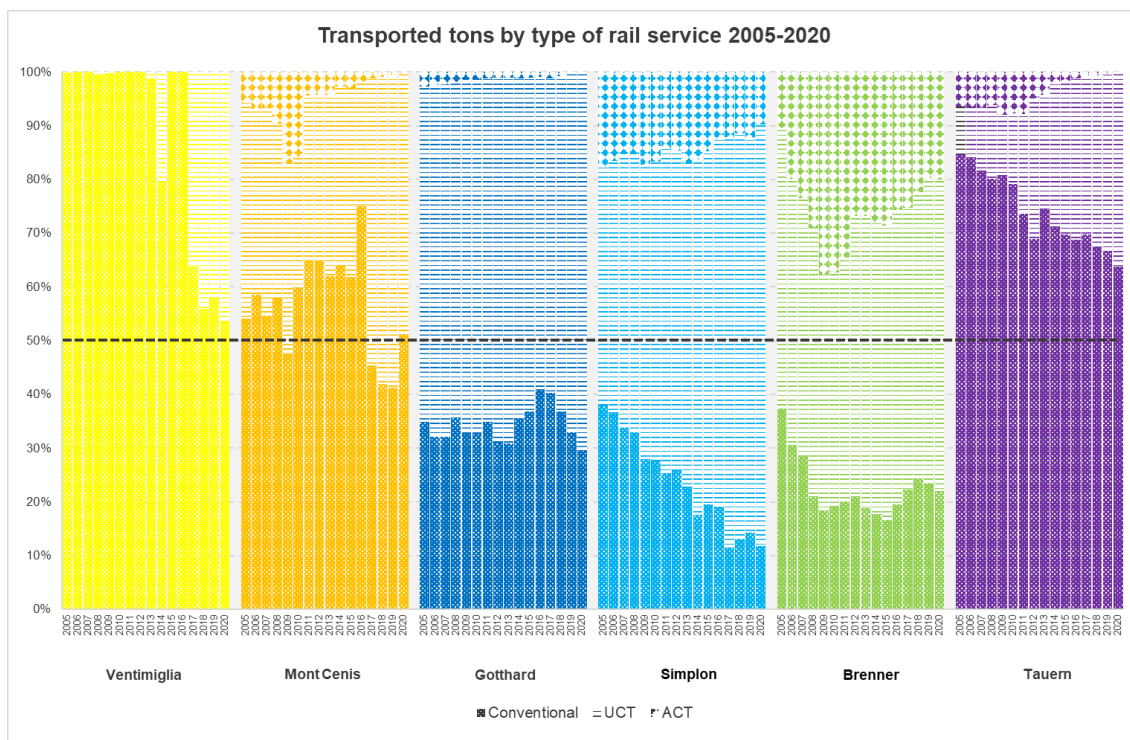


Figure 12: Transported tons by rail, type of services

Indicator transalpine freight transport rail and road – Monthly data 2019-2020

Also the analysis of the tons transported per month during the years 2019-2020 is largely affected by the difficulties in finding reliable and consistent data. Even in this case, the information collected by the Swiss Federal Office of Transport - Observatory for Road and Rail Freight Traffic in the Alpine Region (France, Switzerland, Austria), has allowed the collection and analysis of such data. Figure 13 shows the number of tons transported by road and rail per month during the years 2019 and 2020 along the eight transalpine corridors of Ventimiglia, Fréjus/Mont Cenis, Mont Blanc, Gotthard, Simplon, San Bernardino, Brenner and Tauern. The impact of the COVID-19 pandemic on the transported tons is particularly evident by comparing for each corridor and component (road and rail) the data registered in the same month in 2020 and 2019.

The highest difference is registered during the **first pandemic wave**, i.e. between March, April, May and June 2020 and 2019. The number of transported tones across all eight corridors was on average 11.8% lower in March 2020 compared to March 2019, 32.2% lower in April 2020 compared to April 2019, 24.5% lower in May 2020 compared to May 2019, and 8.5% lower in June 2020 compared to June 2019. Focusing on April 2020 (the month with the strongest decrease), different but consistent trends are visible across the corridors. As regards the road component, Ventimiglia registered the highest decrease (-46.0%), followed by Mont Blanc (-42.2%) and Fréjus (-41.9%). Smaller reductions were registered along the Swiss corridors: -32.1% for San Bernardino, -27.1% for Simplon and -20.6% for Gotthard. Finally, the Italian corridors of Brenner and Tauern experienced a reduction of transported tons of 26.6% and 28.8% respectively. Similar reductions affected also the rail component in April 2020 compared to April 2019. In particular, the highest decreases were registered for Mont Cenis (-51.8%), Simplon (-34.6%), Ventimiglia (-32.7%) and Brenner (-28.5%). Minor decreases affected Gotthard (-23.9%) and Tauern (-14.2%). The comparison between 2020 and 2019 shows an almost opposite trend during the **second pandemic wave** (from October to December 2020). In this period, the amount of tons transported

along the eight corridors were in most cases higher than in the same months of 2019. After a small reduction registered in October 2020 compared to October 2019 (-4.3% on average across all corridors), an average increase by 12.7% and 22.1% was registered between November and December 2020 and 2019 across all corridors. Focusing on December 2020 (the month with the strongest increase), some differences are visible across corridors. As regards the road component, the highest increases were registered for Tauern (+16.1%), Gotthard (15.2%), Brenner (+11.6%) and Fréjus (+9.2%). Minor positive variations affected Mont Blanc (+6.7%), Ventimiglia (+4.6%) and Simplon (+3.9%). Finally, an opposite trend was registered for San Bernardino, where the amount of tons transported by road in December 2020 was 13.1% lower than in December 2019. As regards the rail component, the most evident increase affected Mont Cenis (+273.5% compared to December 2019), although the absolute amount of tons transported by rails remains low compared to those transported by road along the Fréjus (0.22 Mt against 0.92 Mt in December 2020). Other increases regard Ventimiglia (+31.5%), Gotthard (+21.9%) and Simplon (+11.4%). Instead, Brenner and Tauern registered a decrease of tons transported by rail in December 2020 compared to December 2019 (-7.7% and -74.7% respectively).

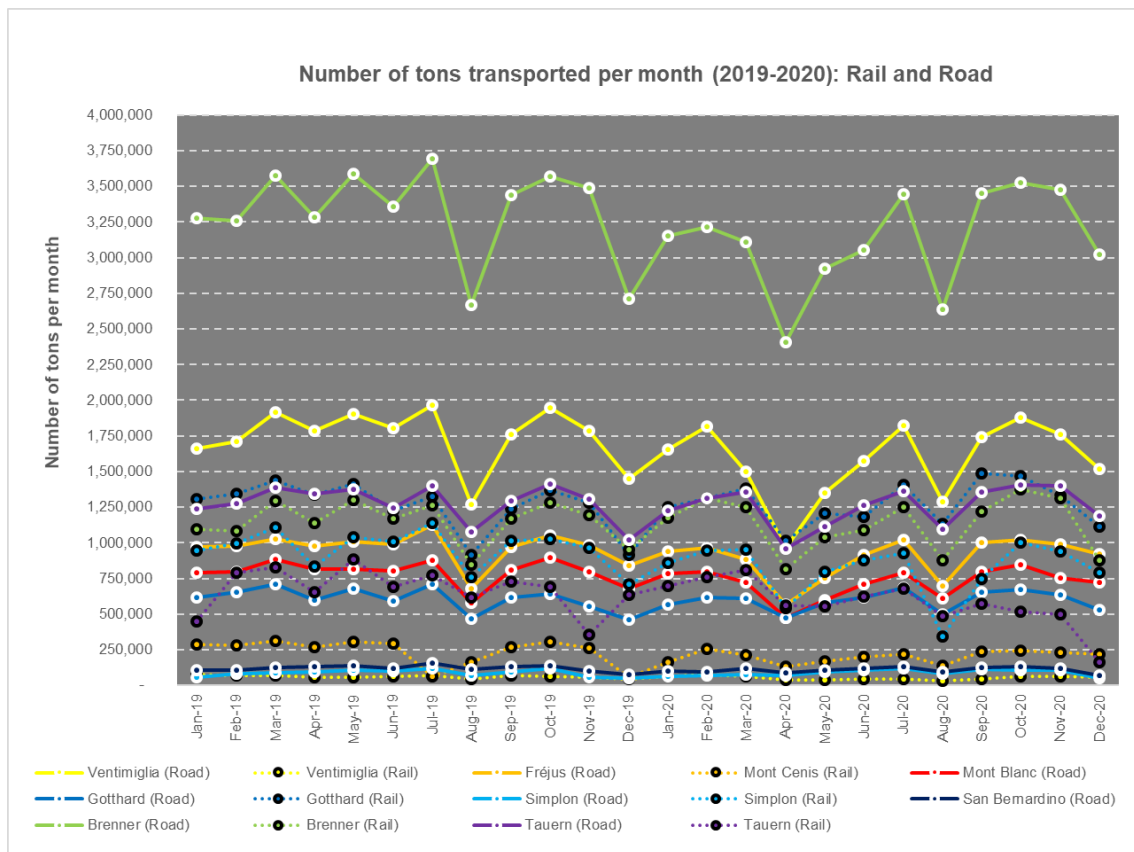


Figure 13: Transported tons per corridor per month (2019-2020)

As regards the modal split along the six corridors served by both road and rail (i.e. Ventimiglia, Fréjus/Mont Cenis, Gotthard, Simplon, Brenner and Tauern), less evident variations are registered between monthly data of 2020 and 2019. During the **first pandemic wave** (March-June 2020), the breakdown of tons between road and rail was very similar to that one registered in the same months of 2019. Only in three cases the share of tons transported by rail was higher in 2020 compared to 2019: along the Gotthard in March (+2% in March 2020 compared to March 2019), along the Brenner in March (+2% in March 2020 compared to March 2019), and along the Tauern in April (+4% in April 2020 compared to April 2019). Conversely, the strongest decreases

of the rail split were registered along the Mont Cenis from March to June 2020 (respectively -4%, -3%, -5% and -5% in each month compared to the same months of 2019); as well as along the Tauern in May 2020 (-6% compared to May 2019). For all the other corridors, variations were smaller than +/-2% in all the months of the first pandemic wave. During the **second pandemic wave** (October-December 2020), a similar trend was registered. However, two meaningful variations are visible by comparing data of the months of December 2020 and December 2019 for the corridors of Mont Cenis and Tauern. Mont Cenis registered an increase by 13% of its rail modal split (19% in December 2020 against 7% in December 2019). Conversely, Tauern experienced a decrease of the rail split (-26%; 12% in December 2020 against 38% in December 2019).

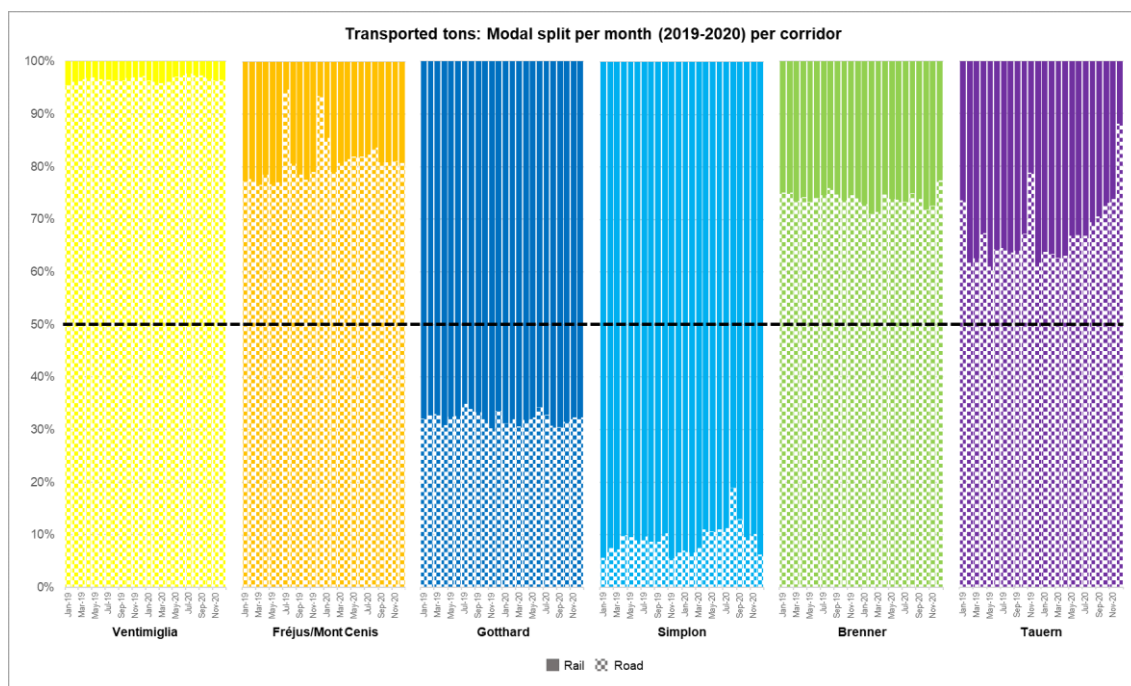


Figure 14: Transported tons, modal split per corridor per month (2019-2020)

Indicator air pollution concentrations measured

Figure illustrates the trend in annual average for **nitrogen dioxide (NO₂)** ambient concentrations between 2005 and 2020 near the highways, since NO₂ is mainly related to road transport (and particularly to diesel vehicles). Compared to the past years, two changes in the measurement stations have to be mentioned. First, the South Tyrolean station of Velturmo/Feldthurns was deactivated at the end of 2016 and the station of Bressanone sud/Brixen süd (located 1.5 km northward from Velturmo/Feldthurns, south of Bressanone/Brixen) has replaced it since 2018. Now that data from 3 years is available, this station has been introduced in the monitoring stations. South Tyrol is thus described by the stations of Velturmo/Feldthurns (years 2005-2016), Bressanone sud/Brixen süd (years 2018-2020) and Ora/Auer (years 2007-2020). Second, since NO₂ is not monitored at Tolmezzo since 2019, it is flanked with the station of Ugovizza-Tarvisio. This station was activated at the end of 2014 and data is available from 2015. Finally, data for the station of Vallée de la Maurienne is not available since 2019, while data of Chamonix Bossons is not available for 2020.

In general terms, in the same line of the previous year, the year 2020 registered a decrease in all available stations, including Quiliano and Erstfeld, which in 2019 registered either an increase or a constant score compared to 2018. This consistent trend across all corridors is strictly linked to

the COVID-19 pandemic, and the related mobility restriction measures applied in several EU countries. As in 2019, the highest concentrations in 2020 were measured along the Brenner (green colour scale), Mont Blanc (red) and Gotthard (blue) corridors, while lower values are visible along Fréjus, Ventimiglia, San Bernardino and Tarvisio (orange, yellow, light blue and violet colours). This result is related to the road traffic volumes presented in Figures 4-6, but it includes other effects, as well: composition of vehicle fleet (share of vehicle categories, share of EURO classes) and meteorology.

In 2020, the annual average values of NO₂ exceeded the EU annual limit value of 40 µg/m³ only for the Bressanone sud/Brixen süd station along the Brenner corridor (44 µg/m³), while the second highest registered value was 37 µg/m³ (Avio station along the Brenner). This is a meaningful difference compared to 2019, when five stations registered values above the EU annual limit. Compared to 2019, the highest decreases in NO₂ concentration have been registered in Oberaudorf (Brenner; -25%), Vomp (Brenner; -23%) and Avio (Brenner; -20%). On average, the decrease registered across the fifteen measuring stations was -17%.

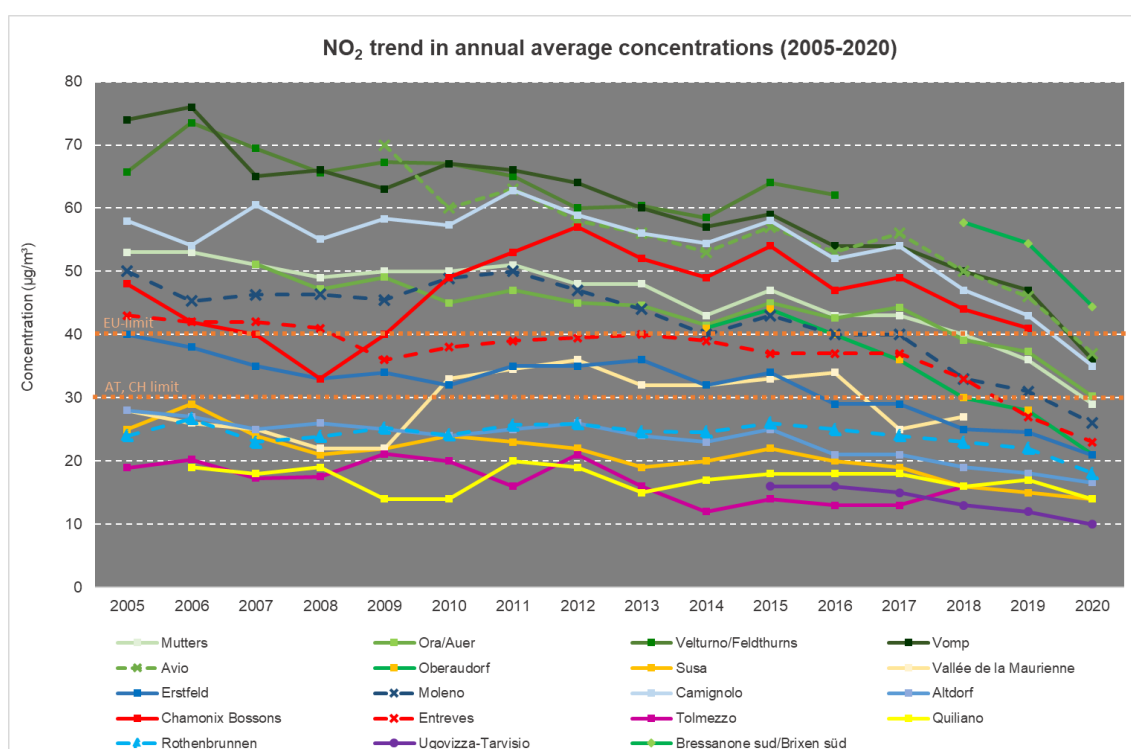


Figure 15: NO₂ trend in annual average concentrations³

Similar to the description of NO₂, the analysis of the **particulate matter (PM₁₀)** concentration is restricted at the roadside stations (Figure 16). For this indicator, the two stations of Bressanone sud/Brixen süd and Ugovizza-Travisio are considered, too. Furthermore, data for the stations of Vallée de la Maurienne (Fréjus) and Chamonix Bossons (Mont Blanc) is not available for 2020.

Compared to 2019, heterogeneous trends are visible. For six stations (Vomp, Avio, Oberaudorf for the Brenner; Entreves for Mont Blanc; Quiliano for Ventimiglia; Rothenbrunnen for San Bernardino), PM₁₀ concentrations have decreased by 9% to 13%. For three stations (Camignolo for Gotthard; Tolmezzo and Ugovizza-Travisio for Tarvisio), values are the same of 2019. Finally, for

³ The value for the station Vallée de la Maurienne in 2011 represents the average 2010-2012; the value for Entreves in 2011 and 2012 represents the average 2010-2013.

seven stations (Mutters, Ora/Auer and Bressanone sud/Brixen süd for Brenner; Susa for Fréjus; Altdorf, Erstfeld and Moleno for Gotthard), values have increased by 4% to 7%. The highest PM₁₀ concentration (19 µg/m³) has been registered at Quliano (Ventimiglia) and Bressanone sud/Brixen süd (Brenner). Conversely, the lowest value (10 µg/m³) regarded Rothenbrunnen (San Bernardino) and Ugovizza-Tarvisio (Tarvisio). The limit value for the annual average that has been fixed by the EU (40 µg/m³) was not exceeded at any station and the limit values of Austria and Switzerland (20 µg/m³) were not exceeded at any Austrian or Swiss station.

A time series analysis reveals a fluctuating trend of this indicator. After a general decrease between 2005 and 2014, concentrations started slightly increasing until 2018 and then decreased again in 2019, while remaining almost stable in 2020. Peaks in 2006, 2011, 2015, 2017 may have been caused by extremely hot weather periods in the Alps during summer months. A similar feature – but less significant – may also be recognised for NO₂ (see Figure 16). For PM₁₀, the value in 2017 in the Vallée de la Maurienne marks an exception, which has not been explained thus far.

A couple of caveats is necessary: PM₁₀ concentrations are (more strongly than NO₂) influenced by sources other than transport such as wood heating installations. This partially explains why the influence of the COVID-19 pandemic is less evident for the PM₁₀ than for the NO₂. Secondary PM₁₀, built from gaseous precursor concentrations (NO_x, SO₂, NH₃, VOC), can contribute to half of the PM₁₀ concentrations measured. The long-term trends can therefore not only be traced back to the development of PM₁₀ emissions of road vehicles.

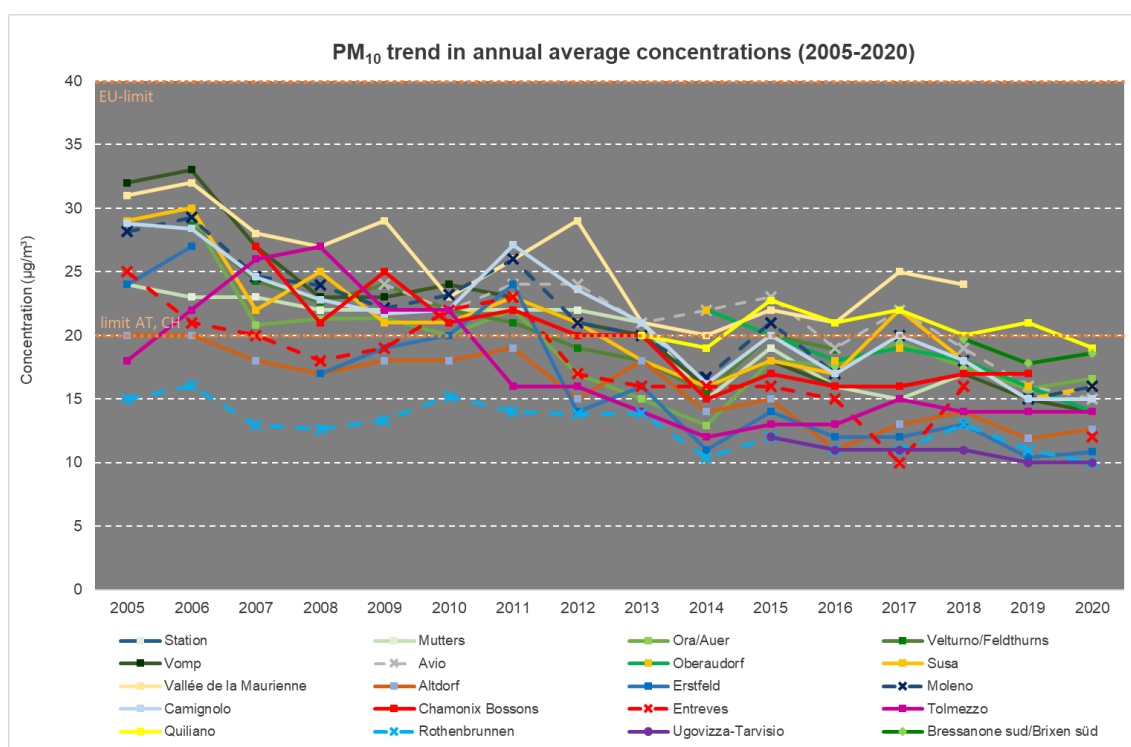


Figure 16: PM₁₀ trend in annual average concentrations⁴

Indicator air pollution concentrations measured – Monthly data 2019-2020

Figure 17 complements the previous data by focusing on the monthly trend for **nitrogen dioxide (NO₂)** ambient concentration during 2019 and 2020. This allows a more accurate observation of

⁴ The value for Vallée de la Maurienne in 2011 represents the average of the years 2010 and 2012.



how concentration values registered before the COVID-19 pandemic (2019) have changed during 2020. It has been possible to collect monthly data only for some of the measurement stations considered in the annual analysis. Specifically, monthly data are available for the stations of Quiliano (Ventimiglia), Susa (Fréjus), Rothenbrunnen (San Bernardino), Ugovizza-Tarivisio (Tarvisio), La Thuile and Entreves (Mont Blanc), Altdorf and Camignolo (Gotthard), and Ora/Auer and Bressanone Sud/Brixen Süd (Brenner).

Data about 2019 show a fluctuation of NO₂ ambient concentration that is mostly consistent across all corridors. The highest values are generally registered at the beginning and end of the year (February and December 2019), while the lowest one affect the summer months. Due to the impacts of the COVID-19 pandemic, the same fluctuation is not visible for 2020. Indeed, after a peak value reached in January 2020 for all corridors (apart from Entreves, Mont Blanc), a significant decrease of values is registered between February and May 2020. This is followed by a little increase in the period June-December 2020, which is however significantly less evident than that one shaping 2019. Such impacts of the COVID-19 are visible also by comparing values registered in the same month between 2020 and 2019 for all measurement stations. Between March 2020 and 2019, a decrease by 22.2% on average is visible across all measurement stations. This becomes -23.4% between May 2020 and 2019, and -28.9% between July 2020 and 2019.

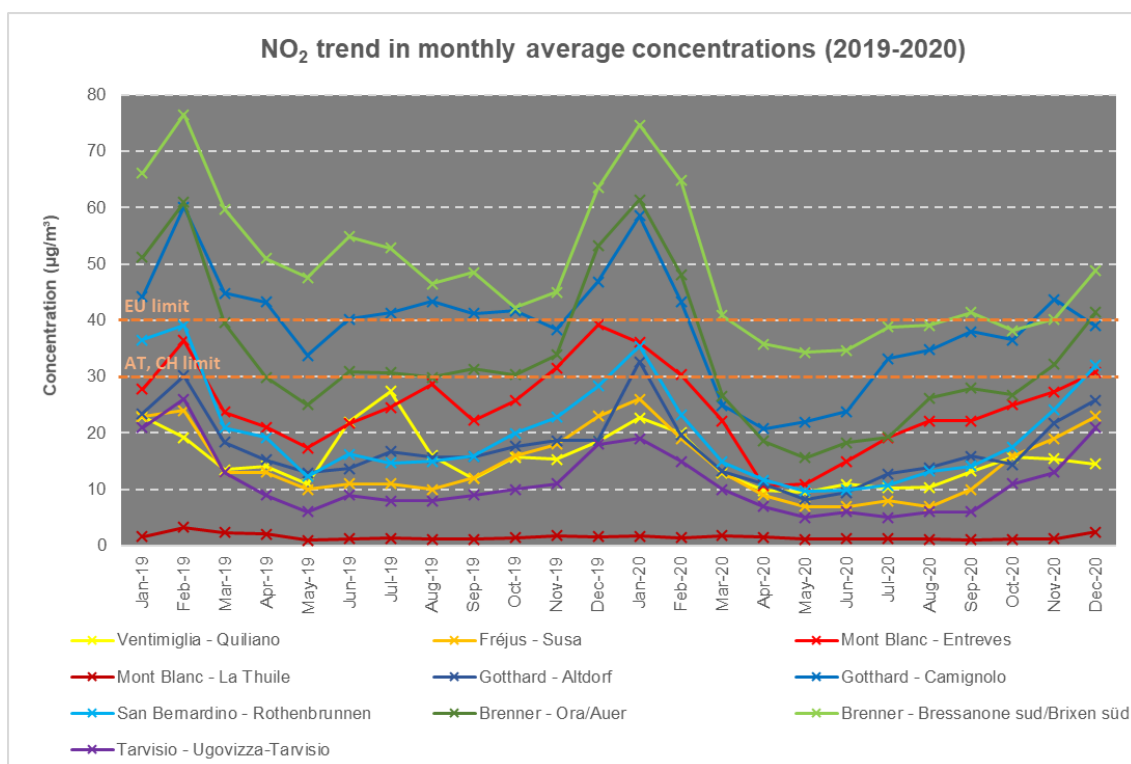


Figure 17: NO₂ trend in monthly average concentrations for 2019 and 2020

Figure 18 focuses on the monthly trend for **particulate matter (PM₁₀)** ambient concentration during 2019 and 2020. For sake of consistency, the same measurement stations considered above are taken into account, i.e. Quiliano (Ventimiglia), Susa (Fréjus), Rothenbrunnen (San Bernardino), Ugovizza-Tarivisio (Tarvisio), La Thuile and Entreves (Mont Blanc), Altdorf and Camignolo (Gotthard), and Ora/Auer and Bressanone Sud/Brixen Süd (Brenner). Data about 2019 show three main peaks for most corridors in February, June and December respectively. Conversely, values tend to decrease from March to May 2019, as well as from July to November 2019. As for

NO₂ concentration, even for PM₁₀ the same trend is not visible in 2020. After the peak registered in January 2020, values tend to steadily decrease until October 2020 (although there is a little recovery in July 2020 for all corridors). A second peak is then reached in November 2020, especially for the measurement stations along Ventimiglia, Fréjus, Brenner, Gotthard and San Bernardino. Such difference between 2019 and 2020 is visible especially when comparing values registered in June and August for the two years. On average, values for June 2020 are 44.1% lower than in June 2019, while they are 12.6% lower in August 2020 than August 2019.

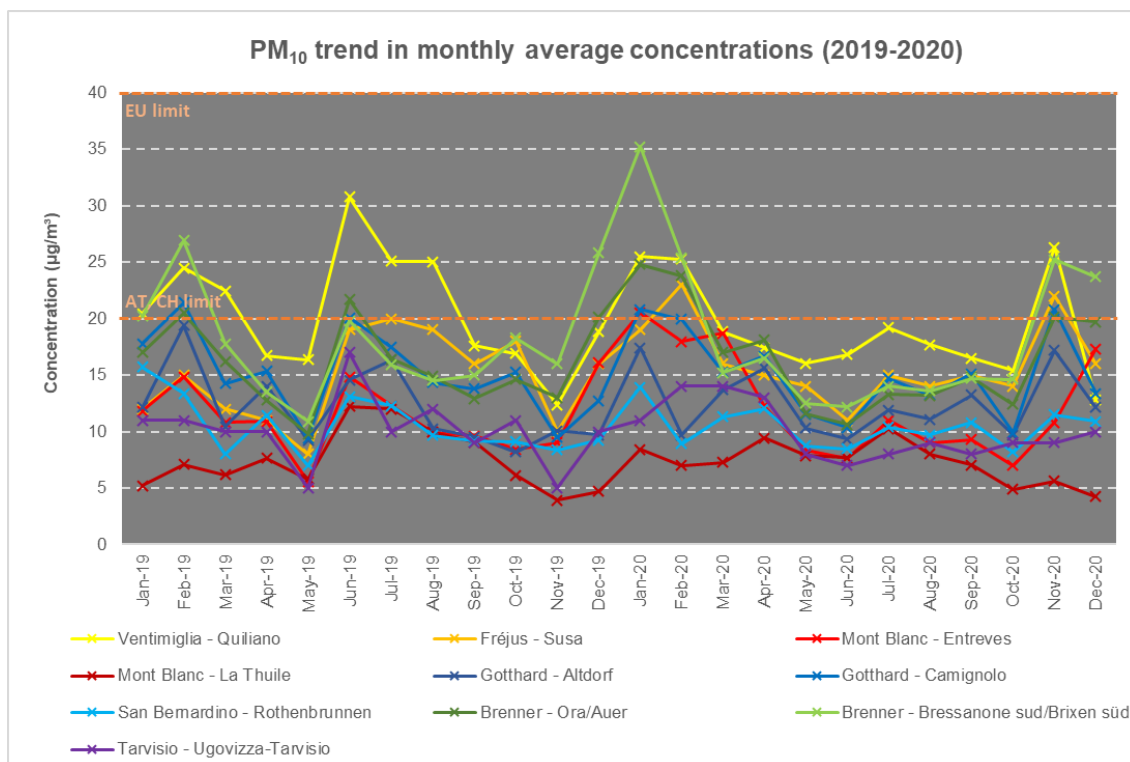


Figure 18: PM₁₀ trend in monthly average concentrations for 2019 and 2020

Indicator noise

Noise has been measured through the indicators **L_{den}** and **L_{night}**. The former defines the overall level registered during the day, evening and night and is used to describe the general annoyance caused by noise. The latter is the indicator for sound levels during the night and it is used to describe sleep disturbance. A comparison between the values registered in different corridors may be not appropriate due to different distances between the microphones and the streets. However, the variations along the individual corridors are consistent throughout the years. Gotthard and Mont Blanc are the only corridors with continuous data collection for the period 2005-2020 (measuring stations of Camignolo, Reiden and Courmayeur), whereas noise is not monitored along Brenner and Ventimiglia. Only partial data is available along San Bernardino (Rothenbrunnen), Tarvisio (Camporosso), Fréjus (Bardonecchia) and Mont Blanc (Châtillon). Regarding the first station, data collection started in 2012 and is currently ongoing; in Camporosso and Bardonecchia, updated values are not available: the monitoring period was limited to 2011-2017 in the former case and to 2010-2014 in the latter. In Châtillon, data collection is available for 2010-2020.

Figure 19 and Figure 20 show that in 2020, L_{den} lies in the range between the 79.7 dB(A) and 69.6 dB(A), while L_{night} lies between the 72.2 dB(A) and the 61.7 dB(A). As in previous years, the highest value for both cases was registered at Reiden and the lowest at Châtillon. According to the limits posed by the COVID-19 pandemic, all measurement stations register noise reductions, which range between -2.5% and -0.6% for L_{den} , and between -2.7% and -0.7% for L_{night} . Specifically, the highest reductions are registered in Courmayeur-La Palud (-2.0% for L_{den} and -2.7% for L_{night}) and Courmayeur-Villette (-2.5% for L_{den} and -2.7% for L_{night}). Intermediate values regard the measuring station of Camignolo since a reduction of 1.2% and 1.5% is registered for L_{den} and L_{night} . Finally, smallest reductions are visible in Rothenbrunnen (-0.7% for L_{den} and -0.9% for L_{night}) and Reiden (-0.6% for L_{den} and -0.7% for L_{night}).

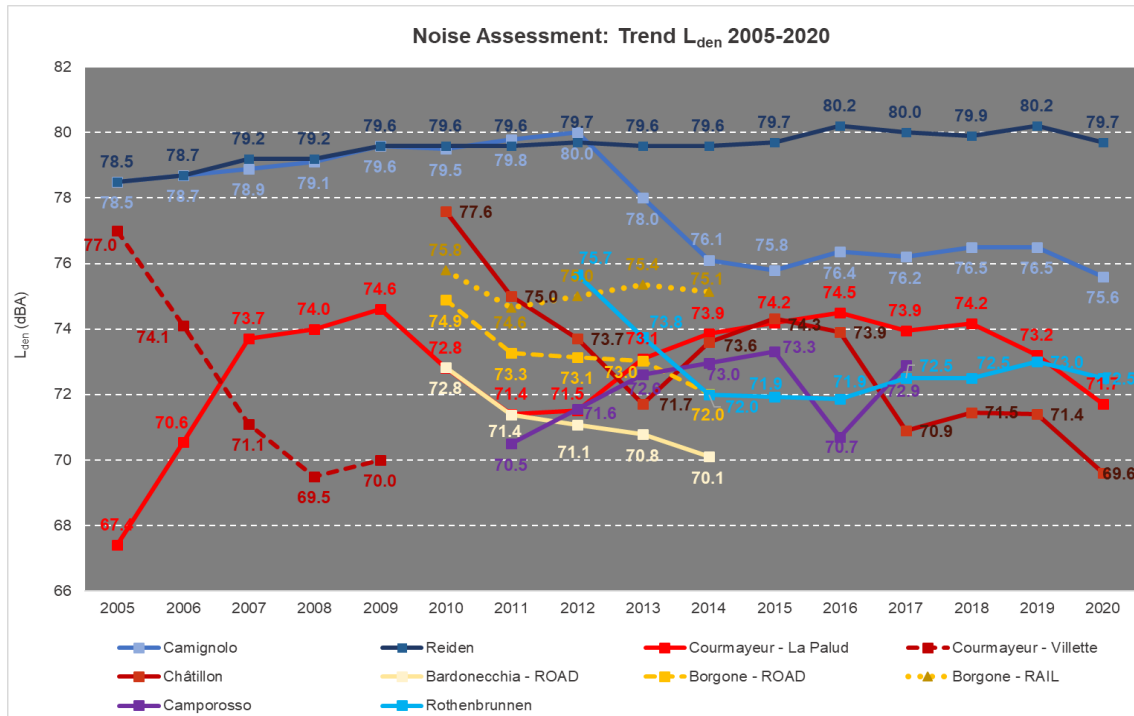


Figure 19: Daily average noise levels L_{den} trend⁵

⁵ Data for Courmayeur – La Palud (year 2006), Bardonecchia and Camporosso (year 2012) is not available. The average value between the previous and the following year has been considered.

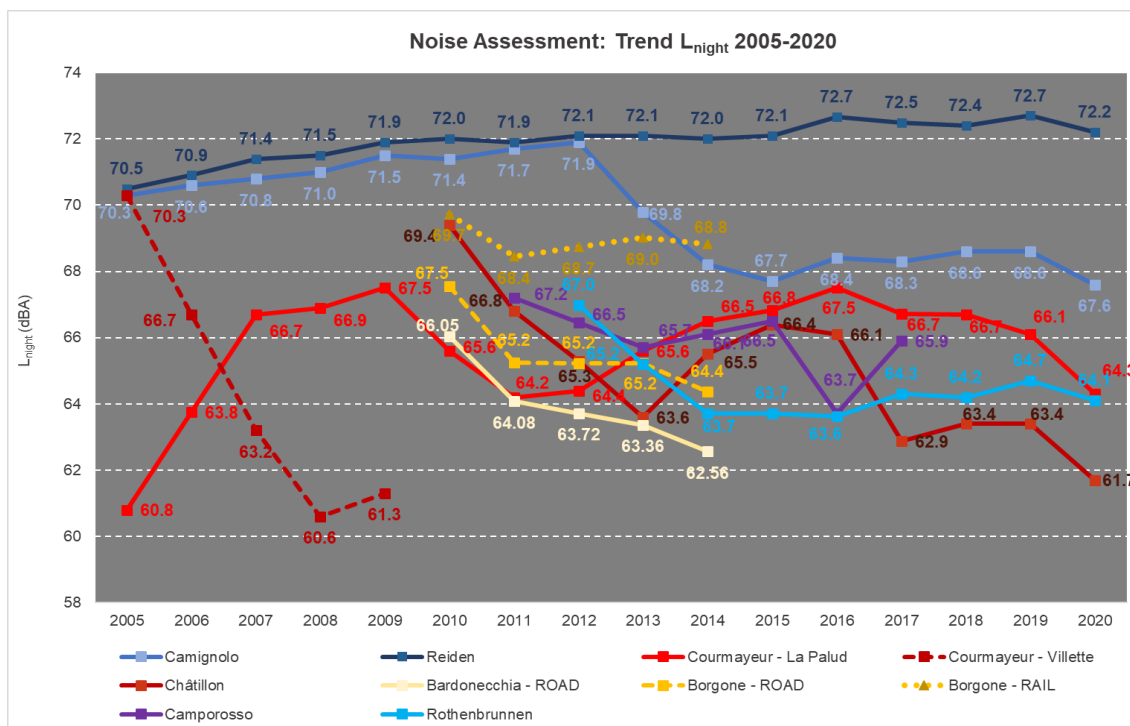


Figure 20: Average noise levels during night L_{night} trend⁶

Indicator Toll prices

Toll prices are calculated as the distance between the entering and exiting toll stations of localities that are situated along the transalpine axis under evaluation and that are relevant nodes of the infrastructural network. Origins and destinations have been defined as follows:

- Ventimiglia: from Marseille (FR) to Genova (IT) via Ventimiglia (381 km)
- Fréjus: from Lyon (FR) to Torino (IT) via Fréjus road tunnel (298 km)
- Mont Blanc: from Bellegarde-sur-Valserine (FR) to Ivrea (IT) via Mont Blanc road tunnel (228 km)
- Simplon: from Brig (CH) to Gravellona Toce (IT), via Simplon pass (99 km)
- Gotthard: from Basel (CH) to Chiasso (CH) via Gotthard road tunnel (288 km)
- San Bernardino: from Chur (CH) to Chiasso (CH) via San Bernardino road tunnel (169 km)
- Brenner: from Munich (DE) to Verona (IT) via Brenner pass (415 km)
- Tarvisio: from Salzburg (AT) to Udine Nord (IT) via Villach (313 km)

The assessment is performed for the passage of a standard passenger car and three standard heavy duty vehicles of 5 axles and 40 t, with a distinction between EURO-classes II, V and VI. The sums for the alpine passages for the year 2021 are visualised in Figure 21. The prices refer to the prices for a single passage (in direction north-south). This holds for the Fréjus and Mont Blanc tunnels, the Austrian highway vignette and the separate Brenner highway toll on the A13 in Austria as well as for the Swiss highway toll (passenger cars). For these corridors, return tickets and yearly subscriptions are also available, which would lower the cost for a single passage. For Switzerland, only a yearly ticket is available, meaning that only the first passage costs € 38.50, while all subsequent passages within the same year are free.

⁶ Data for Courmayeur – La Palud (year 2006), Bardonecchia and Camporosso (year 2012) is not available. The average value between the previous and the following year has been considered.

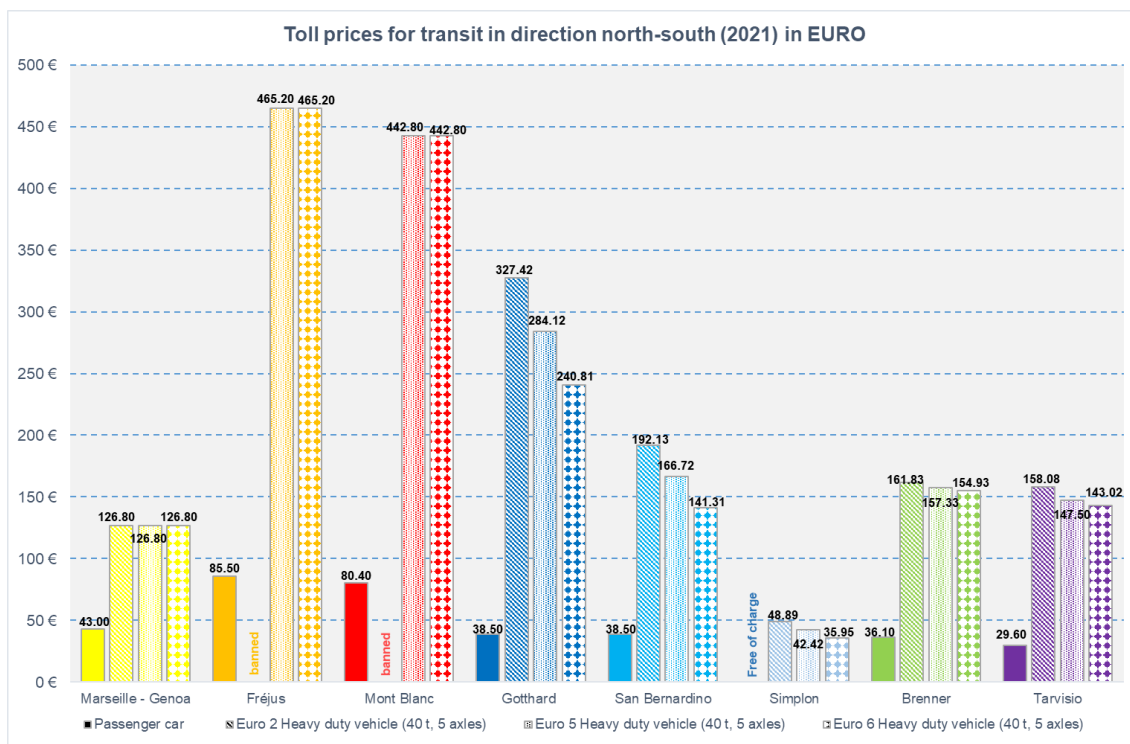


Figure 21: Toll Prices for a single transit on the iMONITRAF! corridors in direction North-South

For **passenger cars**, the highest charges are applied for the Fréjus and Mont Blanc corridors (€ 85.50 and € 80.40 respectively). Here, apart from the highway tolls, the additional tunnel tolls are responsible for the high overall sum compared to the other corridors. It is also important to point out that the tunnel tolls on the Fréjus and the Mont Blanc differ according to the direction of travel, due to the different VAT applied: they are higher when travelling from Italy to France (€ 47.40 and € 47.10 instead of € 46.60 and € 46.30 for Fréjus and Mont Blanc respectively). With € 43.00, € 38.50 and € 36.10, the charges for Ventimiglia, the Swiss highways and Brenner are in the mid-range of the corridors, while the costs for a passage on Tarvisio are the lowest (€ 29.60).

It is relevant to highlight that charges have increased for all corridors from 2020 to 2021. Mayor increases are registered for the Swiss corridors of Gotthard and San Bernardino (+3.05%), mid-range increases affect Fréjus (+0.53%), Ventimiglia (+0.47%), Tarvisio (+0.34%) and Brenner (+0.28%). Finally, minor variations are visible for Mont Blanc (+0.08%). This overall increase of charges relates to the conclusion of inspection and maintenance works along various highway network sections in Liguria as well as to an overall increase in prices affecting all involved countries. Finally, it is important to highlight that the Simplon corridor is free of charge for passenger cars: indeed, the highway A26 ends in Gravellona Toce, and to reach the national border, a state road (SS 33) is available, and for the Swiss part, the Vignette is not due. Data referred to this corridor has been fine-tuned and is not comparable with reports before 2020.

For **heavy duty vehicles**, road tolls follow the similar West-East-divide as for passenger cars. Fréjus and Mont Blanc charge the highest tolls, while Gotthard and San Bernardino charge medium-ranged sums. Leaving aside Simplon (of which the distance is considerably shorter than that of the other corridors), Ventimiglia, Tarvisio and Brenner charge the lowest tolls for a passage. Different than for light vehicles, German highways are not free of charge for heavy vehicles, so this component concurs in defining the tolls along the Brenner corridor. As opposed to Switzerland, Germany and Austria, the Italian and French toll systems have not yet applied a distinction of charges between single emission classes. For instance, at Ventimiglia, the toll for EURO

II and EURO VI is the same (€ 126.80). In 2021, a slight increase of prices has been registered as compared to 2020 for all corridors apart from the Swiss ones (where a decrease of 1.84% is visible for all EURO classes). Major differences are visible for Tarvisio and Brenner. For the former, tolls have increased by 1.64%, 1.42% and 1.47% for EURO II, V and VI heavy vehicles respectively (considering daytime for the Austrian section). For the latter, the increases are of 0.87%, 0.74% and 0.76% for the same three classes (always considering daytime for the Austrian section). Less relevant increases are registered along Ventimiglia and Fréjus. For Ventimiglia, tolls have increased by 0.32% for all categories of heavy vehicles. For Fréjus, they have increased by 0.61% (always for all categories). Finally, Mont Blanc registers the smallest variations: +0.06% for all EURO classes between 2020 and 2021.

The toll of the Italian part of the Brenner corridor (from Brenner to Verona) is € 40.20 for each EURO class. On the contrary, the German and Austrian systems (from Munich to Kufstein and from Kufstein to Brenner) introduce differences to the tolls according to the EURO classes. In Germany, tolls are € 20.41 for EURO II, € 15.91 for EURO V HDVs and € 15.01 for a EURO VI HDV; in Austria, € 101.22 for EURO II and V HDVs, € 99.72 for a EURO VI HDV. This explains the slight difference visible in Figure 21. The biggest difference among EURO classes is visible at Mont Blanc and Fréjus, where EURO II vehicles are not allowed to circulate. A further analogy with the situation of passenger cars is that the tunnel tolls on Fréjus and Mont Blanc differ according to the direction of travel for heavy duty vehicles: due to the different VAT, the charge is higher when travelling from Italy to France (€ 345.80 compared to € 340.10 for a EURO V or EURO VI truck at Fréjus; € 343.60 compared to € 338.00 for a EURO V or EURO VI truck at Mont Blanc). Finally, along the Gotthard corridor, a EURO V truck pays € 284.12, about 87% of the charge of a EURO II vehicle (€ 327.42). This percentage further lowers to 73% when EURO VI (€ 240.81) and EURO II trucks are compared.

This analysis shows the absolute costs of selected trips. For freight forwarders, the distance-specific costs – costs per vehicle kilometre – are another important criterion for choosing the most convenient corridor and transport mode. To this aim, Figure 22 shows the specific costs by dividing the absolute costs presented in Figure 21 by the number of kilometres for each corridor, as expressed at the beginning of this section. The order of corridors from highest to lowest costs remains similar to absolute costs: if we consider a heavy vehicle with EURO VI technology and 40 t, specific toll prices are the highest at Fréjus and at Mont Blanc (€ 1.94/veh-km and € 1.56/veh-km), they lie in the middle for Swiss corridors (€ 0.84/veh-km at Gotthard and San Bernardino) and are the lowest at Tarvisio (€ 0.46/veh-km), Brenner (€ 0.37/veh-km), Simplon (€ 0.36/veh-km), and Ventimiglia (€ 0.33/veh-km). Compared to the annual report 2020, these values are slightly higher (between 1 and 2 Eurocents per km) for Tarvisio and Fréjus, unchanged for Brenner, Mont Blanc and Ventimiglia, and slightly lower for the Swiss corridors. A general feature of absolute and specific costs is that high tolls correlate with low traffic volumes and vice versa: recalling Figure 5 and Figure 21, Fréjus and Mont Blanc have high tolls and low traffic volumes, while Brenner, Ventimiglia and Tarvisio have lower costs and higher traffic volumes.

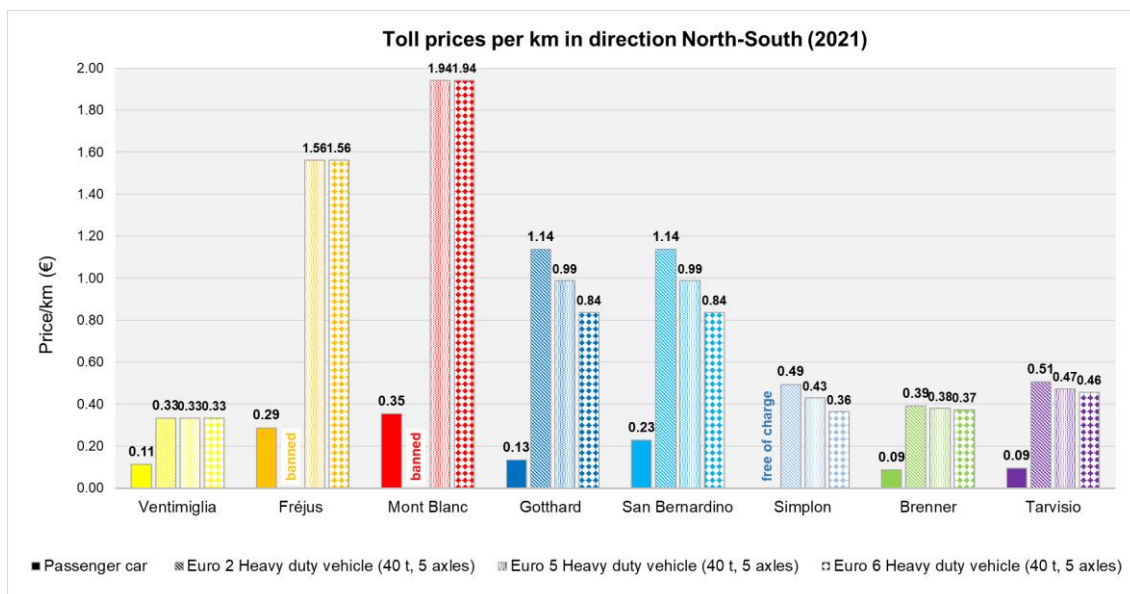


Figure 22: Distance-specific toll prices (€/km) for a transit on the iMONITRAF! corridors (direction North-South)

Indicator fuel price

This indicator monitors the average prices of diesel and petrol (normal petrol) at the national level in Austria, France, Italy, Switzerland and Germany. The values shown in Figure 23 are the annual averages of the values officially registered in every country on four days in all seasons (15th Jan, May, Jul, Oct). Data is provided by ÖAMTC for Austria, the Federal Statistical Office for Switzerland SFSO, ISTAT for Italy, INSEE for France and ADAC for Germany. Average prices in 2021 were € 1.42 for diesel and € 1.49 for petrol.

In comparison to 2005, an overall increase of prices happened in all countries, but with a significant fluctuation during the economic crisis of 2008 and 2009. From 2009 onwards, there has been a strong increasing trend until 2012, followed by a decrease in all countries for the years 2013-2016. The decrease is particularly relevant between 2014 and 2016 for Italy, France and Austria and can be explained by the drastic plunge in prices of crude oil. In Switzerland, the decrease seems less marked (diesel) or even in countertrends (petrol). However, this result must be interpreted by considering the unit of measure selected for our analysis (€) and the financial policies adopted by the Swiss National Bank, which in January 2015 decided to discontinue the minimum exchange rate of CHF 1.20 per Euro and to lower the interest rate. If the costs of petrol and diesel in Switzerland were expressed in CHF, the time series would show the same features as those in the other countries, the value for 2015 would be about 15% lower than in 2014. After four years of decreasing prices, 2017 and 2018 show a general increase, which has led to the levels of the year 2015. For 2019, a slight reduction of prices is recognised except for Switzerland. Again, if the variation of the exchange rate is accounted⁷, the trend is the same as in the other countries in this case, too. In 2020, a relevant decrease of prices is registered for all countries as compared to 2019 (about -9% for diesel and -10% for petrol, refer to footnote 5). This is linked to the crisis caused by the COVID-19 pandemic in spring 2020, which has led EU countries to introduce strong mobility restrictions. In turn, these restrictions have caused a fall in fuel prices. In 2021, a significant increase of fuel prices has been registered in all countries (ca +15% on average), in relation

⁷ Exchange rate EUR/CHF 2017: 1.111, 2018: 1.155, 2019: 1.112, 2020: 1.078 (<https://www.estv.admin.ch/estv/de/home/direkte-bundessteuer/wehrpflichtersatzabgabe/dienstleistungen/jahresmittelkurse.html>)

with the increase in prices of crude matters, which has involved the European energy sector as a whole. This increase has affected all observed countries to a similar extent. In Switzerland, diesel and petrol 95 values have increased by 11% and 14% respectively. In Austria, they have increased by 16% for both diesel and petrol 95. In Italy, +11% and +12% variations have been registered. In France, the increase has been of 12% for both diesel and petrol. Finally, in Germany the increase has been of 22% and 19%. In particular, it is worth mentioning that the values registered on 15th Oct 2021, have been the highest ever registered in iMONITRAF! in the last five years in Switzerland, Austria, Italy, France and Germany.

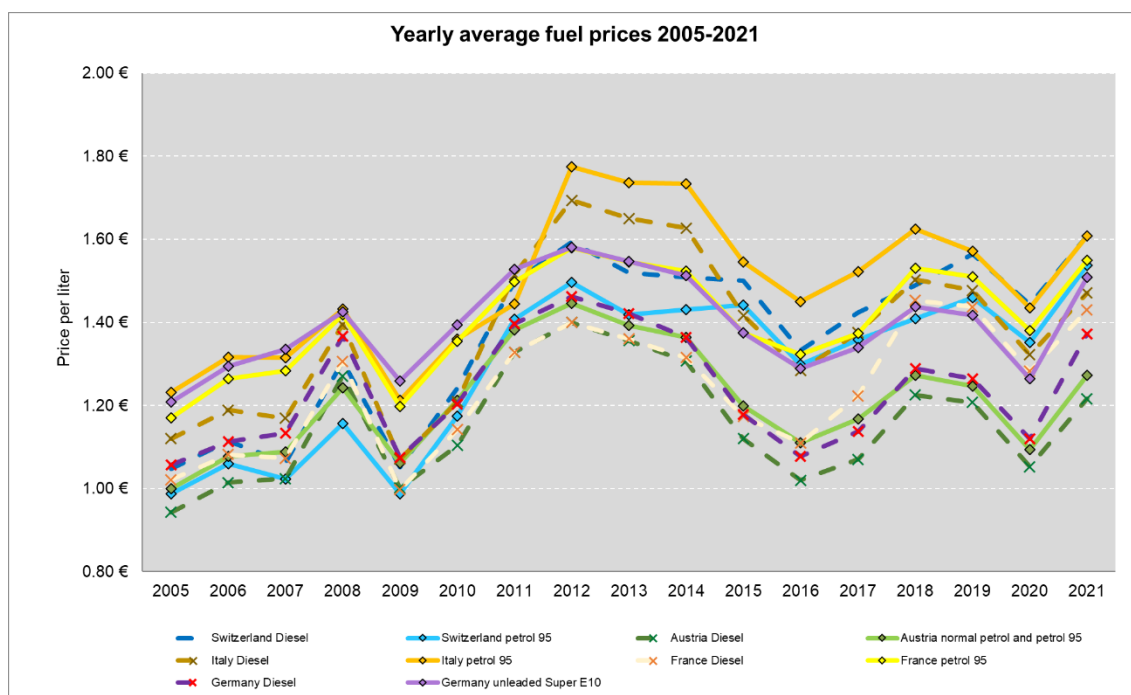


Figure 23: Annual average fuel prices in € per litre.

Indicator Alternative Fuels per corridor

The EU transport sector still heavily relies on fossil fuels. In particular, road transport accounts for the largest share of oil-derived fuels and was responsible for 71% of total EU energy consumption in 2017⁸. In this framework, the diffusion of sustainable fuels and renewable energy sources is highly encouraged by the EU⁹. **Alternative fuels (AFs)**, by alleviating the dependence on fossil fuels, have prominent advantages for reducing the emission of greenhouse gases (GHG) and air pollutants. However, their use requires the development of adequate AF charging infrastructures.

This indicator shows the **recharging stations for electric vehicles (EVs)** and the **service stations providing alternative fuels** (hydrogen, LNG, CNG, LPG¹⁰) along the iMONITRAF! corridors (using the same origins and destinations described in the indicator related to toll prices). For each corridor, the AFs stations located in the service areas and in the parking areas of the toll

⁸ European Environment Agency, 2020. Transport, increasing oil consumption and greenhouse gas emissions hamper EU progress towards environment and climate objectives. Online at: <https://op.europa.eu/it/publication-detail/-/publication/20388700-577f-11ea-8b81-01aa75ed71a1/language-en/format-PDF>

⁹ DIRECTIVE 2014/94/EU of the European parliament and of the council of 22 October 2014 on the deployment of alternative fuels infrastructure. Online at: <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32014L0094>

¹⁰ LNG: liquefied natural gas, CNG: compressed natural gas, LPG: liquefied petroleum gas

gates as well as those stations located in the autoports and at the entrance/exit of the road tunnels are identified. The only exception is made for hydrogen: due to its limited diffusion, the stations located close to the road corridors have also been included. The main source for data collection is the European alternative fuel station map¹¹, which has been integrated in other web-platforms at national and international level.

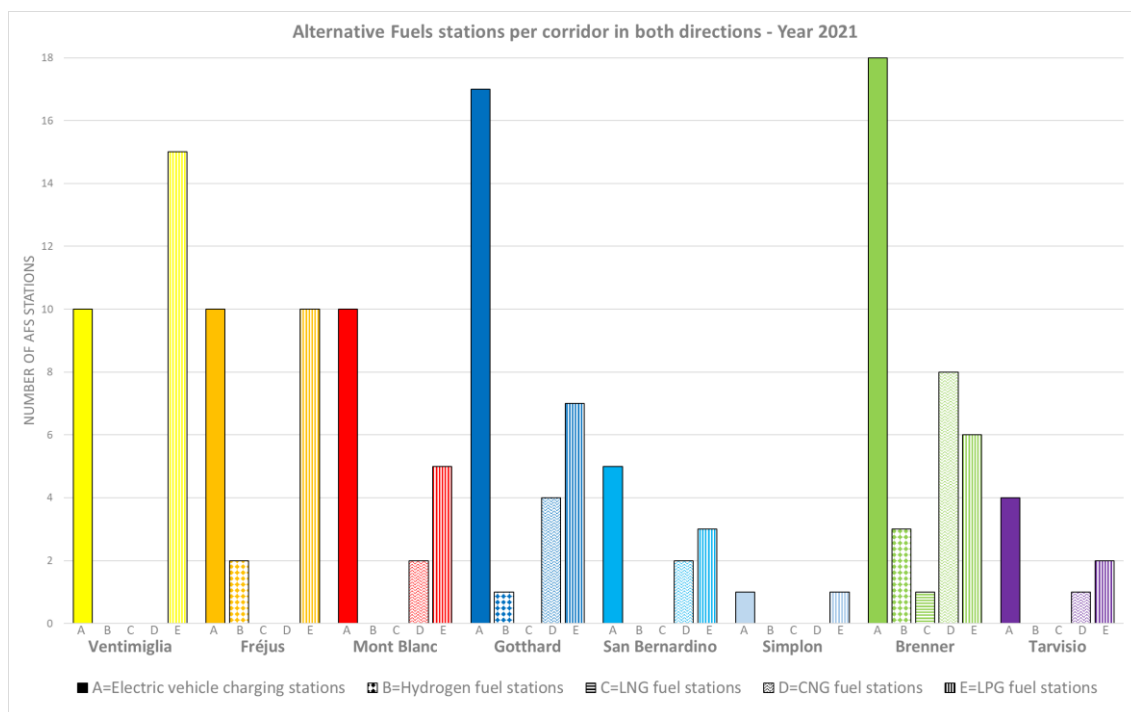


Figure 24: AFs stations per corridor in both directions (North-South and South-North) – year 2021

Figure 24 illustrates the AFs stations per corridor in both directions (North-South and South-North), available in 2021. EV charging stations include different types of charging points of which quantification is beyond the limit of this analysis. With 18 stations, the Brenner corridor reveals the highest number of EV charging stations, followed by Gotthard (17), Ventimiglia, Fréjus and Mont Blanc (all 10). Compared to 2020, the number of electric recharging stations have increased for Fréjus (+2), Mont Blanc (+1), Gotthard (+1) and Brenner (+1). The other corridors have maintained the same values of 2020. LPG also has filling stations at each corridor. The highest numbers were recorded along the FR-IT corridors of Ventimiglia (15 stations) and Fréjus (10 stations). Concerning the hydrogen fuel stations, only three out of eight corridors offer the possibility of recharging vehicles: Brenner, Fréjus and since 2021 also Gotthard. Regarding LNG fuel stations, only one station located at the autoport of Sadoebre (Italian side of the Brenner corridor) is available. Finally, existing stations for CNG are mainly located along the Brenner and Gotthard corridors (8 and 4 stations, respectively).

Indicator Unitary pricing components

This indicator includes taxes to be paid for the purchase and ownership of vehicles¹², which play an important role in influencing the modal and vehicle choices of users (e.g. in purchasing an

¹¹ <https://www.eafo.eu/fuel-map>

¹² The main sources used for data concerning the pricing components are the ACEA Tax Guide. See as example the 2021 report: https://www.acea.auto/files/ACEA_Tax_Guide_2021.pdf. Additional sources are used for each country.

electric rather than petrol car). Four components are observed for the years 2016-2021 for France¹³, Switzerland¹⁴, Italy, Austria and Germany¹⁵:

- 1) the *purchase tax*, expressed in % of the one-only purchase cost of vehicle;
- 2) the *registration tax*, expressed in Euros, to be paid one time only with the purchase of vehicle;
- 3) the *ownership tax*, expressed in Euros, to be paid yearly;
- 4) the *insurance tax*, expressed in % of the yearly insurance costs.

In France, Switzerland and Italy, the unitary pricing components vary from region to region. Therefore, sample regions are considered: the department of Oise for France, Ticino for Switzerland, Lombardy for Italy. Additionally, the unitary pricing components depend on the type of vehicle considered. Therefore, four types of vehicles are observed: petrol EURO VI car (1030 kg, 1000 ccm, 48 kW and 108g CO₂/km); electric car (1540 kg, 100 kW and 0 g CO₂/km); diesel EURO VI HGV (40 t, 5 axels and 235 kW); electric HGV (40 t, 5 axles and 235 kW).

In 2021, the **purchase tax** is applied to all vehicle types and amounts to 20% in France, 7.7% in Switzerland, 22% in Italy, 20% in Austria and 19% in Germany (2021). It is totally deductible for commercial vehicles for the transport of goods (except in Switzerland). In Austria, the same tax deduction is applicable for zero-emission passenger cars since 2016. From 2016 to 2021, the tax values have remained almost unchanged. Just one variation can be mentioned: the decrease from 8% to 7.7% in Switzerland between 2017 and 2018.

In 2021, the **registration tax** is calculated in different ways across countries. In Switzerland, Austria and Germany, a fixed amount is applied to all vehicles. It is equal to about € 120 in Switzerland, € 194 in Austria, and € 26 in Germany. In contrast, in France and Italy the tax changes depending on the type of vehicle. In France, a EURO VI petrol car has a registration tax of approx. € 146 (+0.05% compared to 2020). This depends on the "*puissance fiscale*" (fiscal power) of the vehicle, the regional tax, the CO₂ bonus/malus and the registration supplement. When considering an electric car, the tax drops to approx. € 14 since the only registration supplement is taken into account (increased by € 11 compared to 2020). As for the HGV, the registration tax amounts to approx. € 761 for a diesel EURO VI HGV and to € 299 for an electric HGV. In Italy, the registration tax differs between petrol and electric cars (€ 346 against € 607), while the amount is the same for diesel and electric HGV (€ 991). The tax is calculated on the basis of a fixed national registration fee (which has slightly increased in 2021 compared to 2020); an "*Imposta Provinciale di Trascrizione*" (provincial transcription fee) that varies depending on the type of vehicle and its engine power in kW; and a percentage increase applicable by each province. Over the last six years, the registration tax has slightly changed in France, Austria and Italy (Figure 25). In France, due to the increase in the regional component, the tax of a petrol car passed from approx. € 115 in 2018 to € 146 in 2021; for a diesel HGV it increased from approx. € 670 in 2018 to € 761 in 2021. In Austria, due to increases applied at national level, the registration tax applied to all vehicles passed from € 188 to € 191 between 2016 and 2017, and from € 191 to € 193 between 2018 and 2019. No further increase affects the period 2019-2021. Finally, in Italy the registration tax has increased by € 5 between 2020 and 2021 for all vehicle types, due to an increase in the fixed national registration fee.

¹³ Additional sources for France regard the online calculation of the registration tax. Available at: <https://www.service-public.fr/simulateur/calcul/cout-certificat-immatriculation>

¹⁴ Additional sources for Switzerland regard the online calculation of the registration tax. Available at: <https://www4.ti.ch/di/sc/veicoli-e-collaudi/immatricolazioni/immatricolazione-di-un-veicolo-nuovo/>

¹⁵ Additional sources for Germany regard the online calculation of the ownership tax. Available at: https://www.bundesfinanzministerium.de/Web/DE/Service/Apps_Rechner/KfzRechner/KfzRechner.html

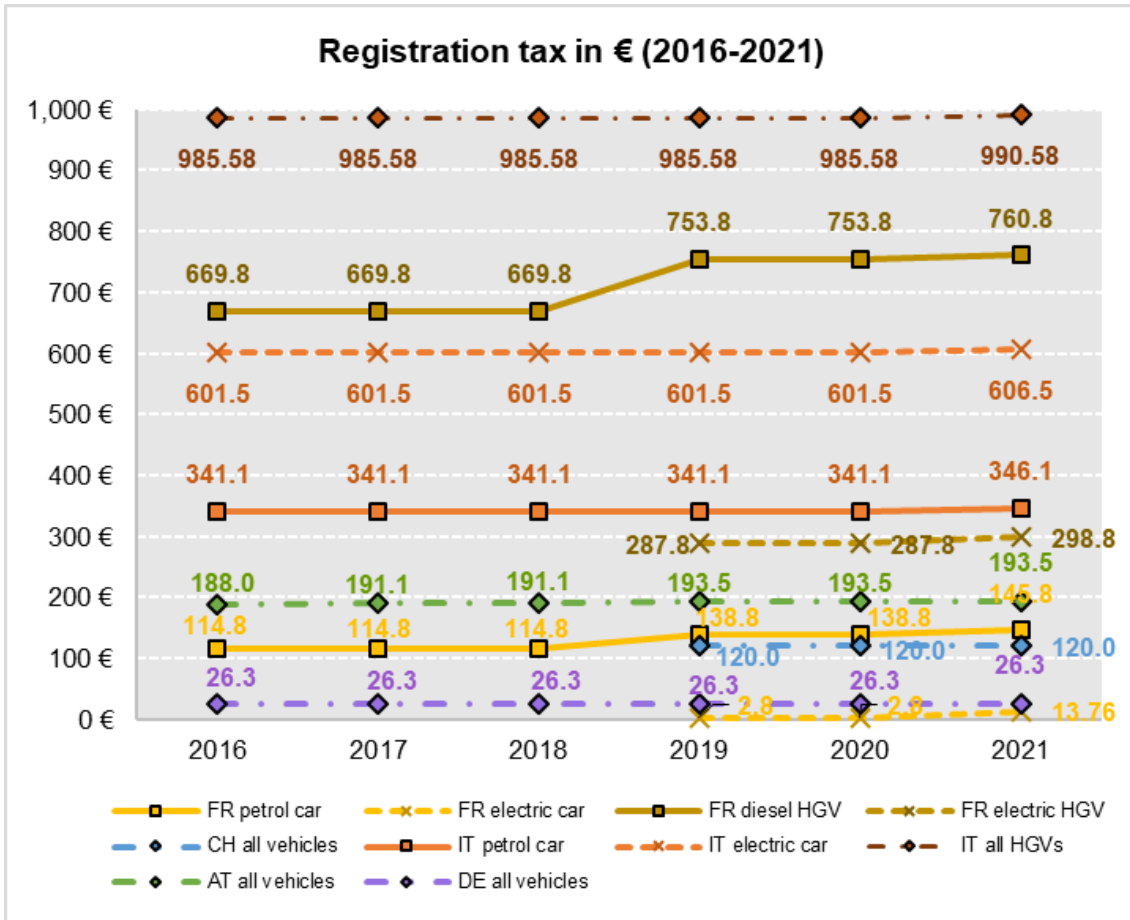


Figure 25: Registration tax to be paid *una tantum* with the purchase of a vehicle (2016-2020)

The **ownership tax** is calculated with similar approaches across countries. As visible in Figure 26, it significantly differs between passenger cars and HGVs. For a petrol EURO VI car, it is € 0 in France, € 140 in Switzerland, € 124 in Italy, € 179 in Austria and € 46 in Germany. For a diesel EURO VI HGV it is € 364 in France, € 2,455 in Switzerland, € 674 in Italy, € 912 in Austria and € 556 in Germany. Furthermore, except for France, there are relevant differences between vehicles using fossil and alternative fuels. As for passenger electric cars, the tax is not due in France, Italy, Austria and Germany. In Italy and Germany, this exemption applies respectively to the first five or ten years after vehicle registration. In Switzerland, the tax is lower for electric cars than for petrol ones (€ 103 against € 140). Also for electric HGVs, the ownership tax is not due in Switzerland, Italy and Austria, while amounting to € 278 in Germany (rather than € 556 paid for diesel EURO VI HGVs). Values in each country did not change between 2016 and 2021.

Similarly to the purchase tax, the **insurance tax** is also applied in each country in the same way to all types of vehicles. It is 33% of the insurance cost in France, 7.7% in Switzerland, 29% in Italy, 11% in Austria and 29% in Germany (2021). The only exception concerns France, where a share of 33% is applied to passenger cars while a reduced value of 15% is applied to commercial vehicles with a total permissible laden weight above 3.5t. These values have been unchanged from 2016 onwards.

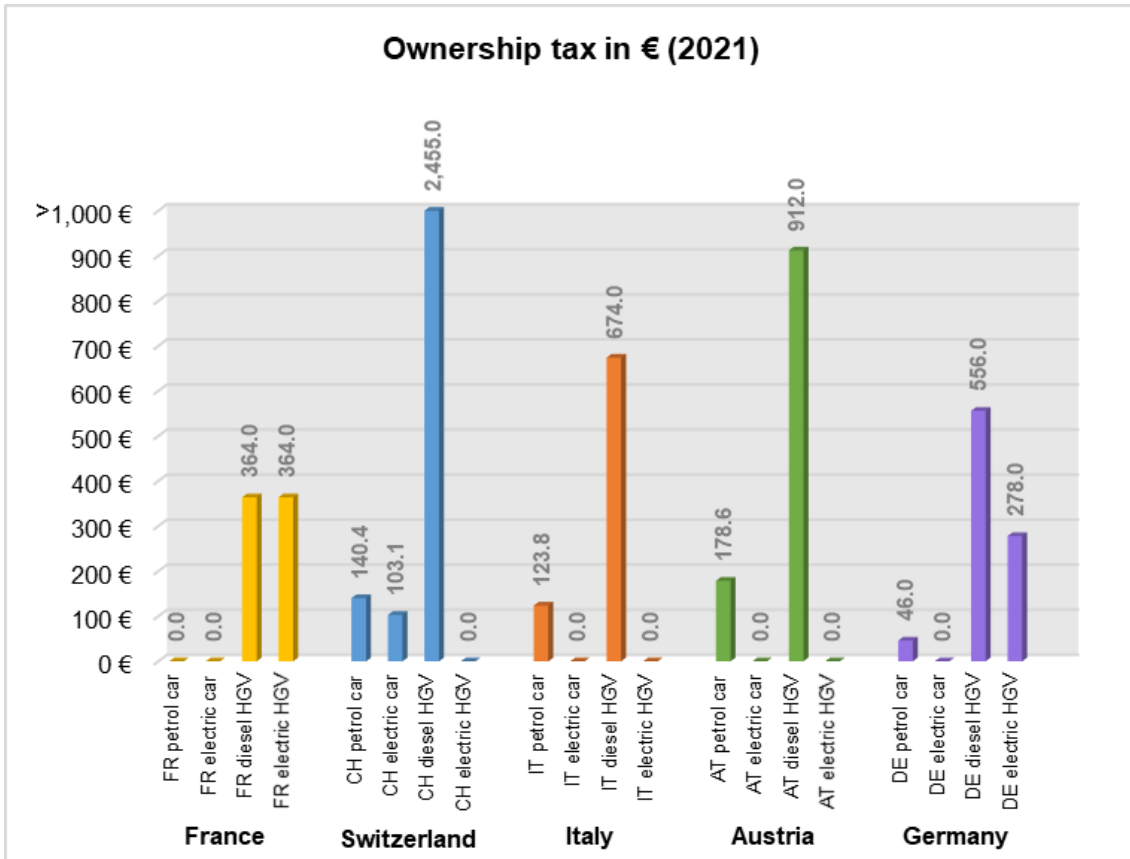


Figure 26: Annual registration tax to be paid for different types of cars and HGVs.

6 Moving ahead on regional and national level: Update on Best Practices

For the Annual Report 2021, iMONITRAF! partners and observers have provided information on Best Practices in their respective regions and countries. Several important developments can be summarized, relating to all five policy pillars (see table below). Regulatory and protection measures were further optimized in order to meet air quality targets in all iMONITRAF! regions. The set of modal shift measures with both push (charging systems) and pull (subsidies) measures was further developed, also taking into account coordination needs between the corridors. Rail infrastructures were further developed, not only on the major corridors but also to improve modal shift on smaller railway lines. Many activities were also reported in the field of passenger transport, including the extension of infrastructures and services but also new, integrated information and ticketing options that make public transport more attractive. Again, a strong focus was also put on alternative technologies, both for freight and passenger transport – including new corridor initiatives and cooperations.

OVERVIEW: BEST PRACTICE UPDATE 2021

Policy Pillar	Name of measure	Country/region
Pillar 1: Monitoring, Information & awareness raising	New traffic control system on the Simplon corridor	Switzerland
	Optimized mobility planning in the sensitive area of the Dolomites	Autonomous Province of Bolzano, Autonomous Province of Trento
Pillar 2: Limiting negative impacts of Alpine transport	Extension of night driving ban	Tyrol
	Extension of Euroclass driving ban	Tyrol
	Construction of additional noise barriers along the Brenner railway line and motorway A22	Autonomous Province of Bolzano, Autonomous Province of Trento
	Finalisation of Brenner LEC project (Brenner Low-emissions corridor)	Autonomous Province of Bolzano, Autonomous Province of Trento
Pillar 3: Modal Shift	Modal shift policy mix and CT	
	Support measures and subsidy system for CT (continuation of financing)	Autonomous Province of Bolzano, Autonomous Province of Trento
	Adjustment of charging categories HGV fee	Switzerland
	Continuation of CT subsidy system	Switzerland
	Infrastructure	
	Final construction works with Ceneri base tunnel to make full capacities available at the Gotthard axis	Switzerland
	Network usage concept for overall rail network	Switzerland
	Brenner Base Tunnel and southern access route: milestones	Tyrol, Autonomous Province of Bolzano, Autonomous Province of Trento

OVERVIEW: BEST PRACTICE UPDATE 2021

	Lyon-Turin Base Tunnel	France - Italy
	Zillertalbahnhof terminal	Tyrol
Pillar 4: Passenger transport	Improvements of the regional public transport system	Tyrol
	Development of missing railway link in the Rhaetian Triangle	Autonomous Province of Bolzano (Lead of working group)
	Electrification of Venosta railway line and Valsugana railway line	Autonomous Province of Bolzano, Autonomous Province of Trento
	Dolomiti Railway	Autonomous Province of Trento
	Conversion of non-electrified alpine rail lines	Région Sud Provence-Alpes-Côte d'Azur
	Intermodal centres for passenger transport	Autonomous Province of Bolzano
	New long distance railway lines in the summer time between South Tyrol and major Italian centres	Autonomous Province of Bolzano
	New Euregio ticket for students	European Region Tyrol-South Tyrol-Trentino
	Annual ticket for all public transport (KlimaTicket)	Austria
	New functions in mobility app, including ticketing	Autonomous Province of Bolzano
	Introduction of electric and hydrogen vehicles for public transport	Autonomous Province of Bolzano, Autonomous Province of Trento
	Support for the take-up of alternative technologies in the vehicle fleet for taxis and commercial vehicles	Région Sud Provence-Alpes-Côte d'Azur
Funding of hydrogen stations in the Port of Fos-sur-Mer and in the Port of Toulon	Région Sud Provence-Alpes-Côte d'Azur	
Pillar 5: Innovative approaches	Digital green corridor strategy	A22 motorway, Austrian and German motorway managers, chambers of commerce
	Pilot project Single European Railway Area - Prototype Corridor Munich-Verona	Italy, Austria, Germany
	Joint railway transport coordination along Brenner	Five regions along the Brenner corridor
	Automation in the railway sector: digital, automatic coupling	Switzerland and EU level

Table 1: Source: Compilation of the iMONITRAF! network

The Swiss best practice is collected from:

[BERICHT DES BUNDESRAATS: Bericht über die Verkehrsverlagerung vom November 2021 Verlagerungsbericht Juli 2019 – Juni 2021](#)

6.1 Overview on revised and new Best Practices

6.1.1 Pillar 1: Information, monitoring, awareness raising

Overall, monitoring campaigns are continued as in previous years and as summarised by the iMONITRAF! monitoring activities (see chapter 5).

In addition to the existing HGV control centres in Erstfeld, the new **control centre “Simplon”** has been put into operation already in 2020. This means that heavy traffic crossing the Alps between Lombardy and the industrial centers in Valais can be more comprehensively controlled thanks to the technical infrastructure available. The controls are particularly geared towards the possible transport of dangerous goods. Two more centers are planned or under construction and will be put into operation in the next few years.

Information and monitoring data is also used for optimising **mobility planning in highly frequented tourism areas**. The **Autonomous Provinces of Bolzano and Trento** are optimizing mobility planning in the sensitive area of the Dolomites thanks to the collected data on 12 counting points, which are also equipped with cameras. In a further step the project will also involve the main roads to get a precise picture of the traffic on South Tyrol's and Trento's provincial and national roads, to enable targeted traffic management measures to be implemented.

6.1.2 Pillar 2: Limiting impacts of Alpine transport

Pillar 2 deals with all regulatory measures that have the direct objective to limit negative impacts of transalpine freight transport, especially regarding air quality and noise. Especially along the Brenner corridor, pressures related to air pollution and congestion still remain high so that the existing set of regulatory measures was again optimized in 2021.

In **Tyrol**, the existing set of driving bans was further optimised and developed in a dynamic way in 2021 to finally meet all EU limit values for air quality. The regulation on Euroclass driving bans has been tightened again: the driving ban along the A12 motorway between Langkampfen and Zirl (both directions) was extended to EURO V for all vehicles over 7.5 tonnes (previously EURO IV). For regional transport, the driving ban was extended to EURO IV vehicles over 7.5 tonnes (previously EURO III). Also, the night driving ban was extended and now also covers EURO VI vehicles (vehicles over 7.5 tonnes). Only zero emission vehicles, the transport of perishable goods as well as EURO VI vehicles for regional transport are exempted. The sectoral driving ban remains unchanged, further adjustments are foreseen for 2023 (see overview table below).

OVERVIEW DRIVING BANS IN TYROL

		EURO 0-II		EURO III		EURO IV		EURO V (incl. EEV)		EURO VI (1st registr. before 31.8.18)		EURO VI (1st registr. after 31.8.18)		ZEV	
		Solo HGV	Semi- trailers	Solo HGV	Semi- trailers	Solo HGV	Semi- trailers	Solo HGV	Semi- trailers	Solo HGV	Semi- trailers	Solo HGV	Semi- trailers	Solo HGV	Semi- trailers
Driving bans for high-emitting vehicles "Euroclass driving bans" (Kufstein - Zirl)	Transit							As of 31.10.19	As of 01.01.21						
	Origin- and destination traffic			as of 01.01.20				As of 01.01.21	As of 01.01.23						
	Exemptions														
Sectoral Driving ban (Kufstein - Ampass)	All sectors included in sectoral driving ban									As of 01.01.2021					
	Origin- and destination traffic			As of 01.01.2020					As of 01.01.23						
	Remaining goods and exemptions														
Night driving ban (Kufstein - Zirl)	Transit									As of 01.01.2021					
	Origin- and destination traffic														
	Exemption for relation South-West (Westeast A12; Innsbruck-Zirl)														
	Exemptions														

■ ... no driving ban
■ ... existing driving bans
■ ... driving bans dynamically adjusted as of...

Figure 27: Driving bans in Tyrol

As illustrated in the Annual Report 2020, the **Autonomous Province of Bolzano** is currently developing its **noise protection infrastructures** along the Brenner motorway and railway line. On the Brenner motorway A22, the construction of six additional noise barriers in the municipality of Bressanone/Brixen has been going on and shall be completed in March 2022. Along the railway line, construction works for two additional noise barriers in a residential area in the municipality of Bolzano/Bozen have been started. The two barriers have a length of 105 m and 469 m and are 5 m high. Residents will benefit of a noise reduction of 5-15 decibels. Another noise barrier is currently built next to the railway station in the municipality of Bressanone/Brixen with a length of 300m and a height of 3,5 m. In the Autonomous Province of Trento, works for the construction of additional noise barriers along the Brenner railway line in a residential area in the municipality of Trento have been started.

Five years of intensive testing of variable speed limits (VSLs) applications on the A22 motorway in the frame of the **Brenner LEC project** (Brenner Low-emissions corridor) have provided solid empirical evidence on the benefits of this kind of measure, i.e. the reduction associated with environmental issues (in particular NO₂ and black carbon concentrations, CO₂ emissions), the increase of the levels of service of the motorway during heavy congestion situations, increased road safety and the reduction of travel times. The BrennerLEC results are the basis for the concretization of the low-emission Brenner Digital Corridor, which aims to extensively replicate these and other measures on the entire A22 motorway (see pillar 5 for more information).

6.1.3 Pillar 3: Modal shift

Pillar 3 focuses on modal shift measures, including both push and pull measures. It includes policy measures related to modal shift, with a special focus on developments related to the common measures of the iMONITRAF! strategy as well as infrastructure measures.

Policy measures

In **Switzerland**, the **HGV fee (LSVA)** was adjusted in July 2021. HGV belonging to EURO classes IV and V which up to now belong to the medium price category are downgraded to the most expensive LSVA category (affecting about 10-20% of the Swiss freight transport volume that is covered by the LSVA). Also, it was agreed to abolish the 10% discount for HGV of EURO classes II and III with an additional particle filter (about 2% of transport volume). This means that from July 2021 on, there are only two price categories for the LSVA, the reduced rate only applying to Euro VI HGV.

In the Italian regions **autonomous Province of Bolzano** and the **autonomous Province of Trento**, the motorway company A22 strengthens its role in the field of international railway freight transport by becoming an important player. In the view of a Green Brenner corridor the ambition is to manage mobility along the Brenner axis in a sustainable way and to shift freight traffic from road to rail.

After finalisation of the 4 m corridor through Switzerland, it was foreseen to reduce or even abolish the **subsidy system for combined transport**. However, it became clear that the cost reductions for operators on the overall long-distance trip were lower than estimated as construction works on the access tracks in other countries lack behind. To maintain incentives for rail transport, the Swiss Federal Council thus agreed, already in 2020, to continue the subsidies for combined transport in the period 2021-2024 with an overall amount of CHF 300 million. This includes:

- Loans for combined transport infrastructure, including investment contributions to intermodal transshipment facilities in Switzerland and abroad as well as their access tracks and port facilities for cargo handling in combined transport in Switzerland.
- Operating payments for unaccompanied combined transport (UCT): The operating payments in transalpine traffic serve to promote the shift from road to rail. The recipients of the operating compensation are the operators of combined transport. In 2021, the federal government ordered around 70 cross-Alpine routes from 15 operators. The compensation is differentiated according to trains and shipments and is based on the departure and destination terminal. The payment for a transalpine shipment is the same for all UCT shipments. A maximum of 32 consignments are paid for per train.
- Operating payments for rolling motorway: After initial goals for RoLa traffic volumes were clearly missed in 2019 (due infrastructure related train cancellations) and 2020 (COVID-crisis), the agreement between the operator RAlpine and the Swiss Federal Office of Transport was adapted in February 2021: it now envisages a modal shift of 80.000 to 90.000 shipments per year as a central target value. This goal is to be achieved with an offer of 4.600 trains on which about 100.000 parking spaces are available. The annual compensation amount was set at a maximum of CHF 23 million, although this amount can only be reached if at least 90,000 shipments are relocated to the Rola in the corresponding year. T.

In the other iMONITRAF! regions, subsidy systems for combined transport are continued. In the **Autonomous Province of Bolzano**, a financial support of € 3 mio. was available in 2021, focusing on the section Brenner-Salorno/Salorno-Brenner of the railway for Accompanied Combined Transport (ACT) or Unaccompanied Combined Transport (UCT). Also in the **Autonomous Province of Trento**, the subsidy measures for financial support to multimodal transport operators and railway undertakings located in the EU and offering rail freight services were continued in 2021, in particular for the following services: 1) for intermodal transport, aids were granted for the Trento-Borghetto section (having handled 171.000 tons of goods) and 2) for combined transport aids were granted for activities carried out along the Trento-Wörgl section. While the aid for intermodal transport on the Trento-Borghetto section shall be continued (formalization of the extension

is underway), the aid to combined transport on the Trento-Wörgl section will probably expire during the present year 2022.

Infrastructure measures and services

The Gotthard base tunnel has been in operation since December 2016 and the Ceneri base tunnel, the last sub-project of the NEAT, has been in operation since December 2020. As part of the final work, **further optimizations** are being carried out, particularly in the Gotthard base tunnel, in order to achieve full performance which foresees a capacity of six freight trains per hour and direction (during final works the capacity is limited to 4-5 freight trains per hour and direction). With the Ceneri base tunnel, the full 4 m corridor from Rotterdam to Genoa has been completed.

To ensure the availability of capacities for transalpine freight transport, the distribution of capacities is now regulated through a new **network usage concept** which has been adopted by the Federal Council in February 2021 and includes all railway infrastructures that are part of the expansion step 2035 of the Swiss railway network (see Annual Report 2018 for more information). The network usage concept secures routes and node occupancies for the major transalpine corridors and is binding for the infrastructure operators for developing the network use plans.

For the **Brenner Base Tunnel**, further milestones could be reached in 2021. For the main tunnel, the state border Italy-Austria was reached for the first time, with tunnel boring machine reaching its destination at the Brenner Pass after 14 km and 3.5 years of excavation works. In total, the BBT system comprises approx. 230 km of tunnels. Of these, 147 km are currently excavated: 52 km of railway tunnels, 54 km of exploratory tunnels and 41 km of other tunnel structures. Also, further steps regarding the southern access route were reached: after the assignment of the works for the construction of the southern access route Ponte Gardena-Fortezza/Waidbruck-Franzensfeste, the executive project is currently finalized. Also at the end of 2021, the approval process for the technical-economic feasibility project for the Trento railway bypass began. This is one of the lots of the southern access to the Brenner Base Tunnel.

2021 also saw some progress in the **construction of the Lyon-Turin railway link** as major cross-border railway connection between France and Italy. It is the main missing link along the TEN-T Mediterranean Corridor, which connects south-western Europe with central and eastern European countries. In July 2021, the major contracts to build the Lyon-Turin base tunnel in France were awarded. The tender procedure, divided into 3 lots for a total of €3 billion, represents one of the largest single tenders in Europe during the last two years. The works are supported by the Connecting Europe Facility (CEF) Programme (up to 40% of the total costs). The tunnel will be excavated from four construction sites in France (Saint Jean de Maurienne, Saint-Martin-La-Porte, La Praz and Villarodin-Bourget/Modane).

But the development of modal shift infrastructures did not only focus on the major corridors. In Tyrol, also regional railway lines were supported. To reduce HGV traffic in Zillertal and to improve local air quality, the narrow gauge railway operator **Zillertalbahn** started operation of a terminal in Jenbach to transport round timber directly to the Binderholz wood factory, located in Fügen, on rail. 20,000 HGV trips per year along busy Zillertal road will be saved. The project won the award "VCÖ Mobilitätspreis" (Mobility price of the Austrian non-profit organisation VCÖ specialising in mobility and transport) in 2021.

6.1.4 Pillar 4: Passenger transport

Public transport – Frameworks, infrastructures and services

After Tyrol has extended its financial support for public transport services in the previous year, additional train services were introduced in December 2021, coming into force with the new timetable. The extension of train services offers additional 780.000 train kilometres, including a new Cityjet Xpress between Innsbruck and Kufstein. Also new train stations were built or upgraded: The new train station Innsbruck-Messe improves accessibility to the urban area and alleviates Innsbruck main station. The upgraded station in Kirchberg will offer better accessibility and more comfort. In Jenbach, a new park and ride will offer 450 covered car parks and 226 covered bike parks. In Brixlegg, the park and ride was extended by 115 additional car parks.

Furthermore, several improvements of transport infrastructures and/or services have been agreed upon throughout 2021:

- **Closure of missing link in the railway network in the Rhaetian triangle:** under the lead of the Autonomous Province of Bolzano a cross-border technical working group with representatives of South Tyrol, Tyrol, Grisons and Lombardy in 2021 has deepened the possibilities to establish an attractive railway node in the so-called area of the “Rhaetian triangle” (currently not crossed by any railway) and to be connected with the international transport network. A technical report with recommendations is currently being finalized.
- **Electrification of Venosta valley and Valsugana railway line:** Works for the electrification of the Venosta valley railway line have intensively proceeded in 2021. The goal of doubling transport capacity and the more frequent connections thanks to longer electric trains (compared to the current diesel trains) requires also investments in more safety. The “Josefsberg tunnel” is currently adapted to the European technical standards and safety regulations. During 2021, some technical elements of the electrification project of the Valsugana railway line were studied in depth, assuming mixed use with battery trains.
- **Dolomiti Railway:** In relation to the 2026 Olympic event, studies have started to verify the feasibility of a railway project for the connection of Trentino, Alto Adige and Veneto.
- **Conversion of non-electrified alpine rail lines (effective in 2024):** Several railway links in Région Sud PACA which are currently working on diesel will be converted to alternative technologies: Marseille-Briançon (bio-diesel), Nice-Tende (bio-diesel) and Nice-Digne (GTL). A battery train will be experimented on the Marseille-Aix line from 2024. The Region Sud, which manages the local regional express train network, wants to integrate batteries on board its current hybrid-diesel and electric trains. The project consists of studying and building a first prototype, based on the Bombardier AGC trainsets put into service between 2007 and 2010. Today, these trains run on electricity and are powered either by catenaries or by two onboard diesel generators.
- **Intermodal centres for passenger transport:** Construction works for the intermodal centres in Brixen/Bressanone and Bruneck/Brunico are going on. The centres are built at the respective train stations and will allow and promote efficient intermodal exchange between railway, bus and bike mobility.
- During the summer 2021, new **long-distance connections** have been introduced to connect South Tyrol with other big hubs of norther Italy. In detail, two new high-speed connections have been introduced between Bolzano/Bozen and Milan; while two other high-speed connections were set between Bolzano/Bozen and Ancona. This initiative aims to promote a higher competitiveness of the train for visitors coming in South Tyrol for their vacancy, as well as for South Tyrolean residents visiting these hubs for business/leisure.

Information & Ticketing

The EGTC Euregio (Tyrol-South Tyrol-Trentino) has further extended its successful **Euregio ticket** which allows passengers to use public transport (buses and trains) in a seamless way in the whole EGTC area. A special ticket is now also available for students to further support an attractive cross-border public transport in the Euregio. The subscription-based ticket will allow university students flexible use of public transport in all of Tyrol, South Tyrol and Trentino at the price of EUR 430 per year. Students who already own the Südtirol Pass may purchase the Euregio Ticket Students with a supplement of 280 euro.

Affordable public transport is also incentivized at national level in Austria with the new **KlimaTicket**. With this ticket, a new federal public transport tariff has been launched in October 2021. With an annual subscription fee of 1.095 € (regular fee for adults in 2nd class), all public transport services across long and short distances can be used in a single ticket.

After the **Autonomous Province of Bolzano** launched its renewed **mobily app** and web portal in the previous year (see Annual Report 2020), new functions have been integrated in the “sued-tirol mobil app” in 2021. These include push messages for quick updates on timetables or selected train stations or bus stops. Also, a mobile ticketing function has been added, so that it is now also possible to validate train and bus tickets and subscriptions via app.

Transition towards alternative fuels

In the **Autonomous Province of Bolzano**, the subsidy system for the purchase of electric cars and charging systems was continued in 2021. In the frame of the extension of the public charging network for electric mobility, 11 new fast chargers were installed in 2021. 22 further hyperchargers will be delivered and installed in 2022. Also, alternative technologies have been promoted in public transport with three new hydrogen busses for urban public transport services in Bolzano. The fuel cell busses are 100% emission-free and the used hydrogen is “green”.

Furthermore, a pilot project with hydrogen trucks has taken place in 2021. At the hydrogen filling station in Bolzano an Italy-wide premiere took place in September 2021, when for the first time a truck was refuelled with hydrogen. Different partners are involved in this pilot project which foresees test drives of hydrogen HGV on the Brenner corridor.

In the **Autonomous Province of Trento**, procedures have begun to access funding from the Italian National Recovery and Resilience Plan for the introduction of hydrogen and electric vehicles in local public transport fleets.

In **Switzerland**, along the national motorway network, fast charging stations for electric vehicles (also trucks) are in place. Some cantons also support additional charging stations and hydropower stations.

In **Région Sud Provence-Alpes-Côte d'Azur**, support is provided for the conversion of taxis (grant between 2500 and 5000€) as part of the "Une COP d'avance" climate plan. Also, a support is granted for the acquisition of commercial vehicles that make use of alternative propulsion systems (grant between 500 and 15.000). Also, the set-up of new infrastructures for alternative fuels is supported in Région Sud PACA, one example being the new hydrogen stations (1,1 Mio. €) in the Port of Fos-sur-Mer (HV) and in the Port of Toulon (bus and shuttles) which are part of the HyAMMED (Hydrogen in Aix-Marseille for Ecological and Sustainable Mobility) project. The low-carbon hydrogen station will be located on the Air Liquide site in Fos-sur-Mer. HyAMMED is a first step in the deployment of hydrogen distribution by truck in France and even in Europe. Also,

the Ports “Rade de Toulon” are committed to a real port strategy in favor of innovation and applications related to hydrogen, symbolized by its ambition to become the first PortH2Ready in the Mediterranean.

6.1.5 Pillar 5: Innovative approaches

Removal of administrative barriers and automation in the railway sector

In 2021, Switzerland has been pushing technologies to promote the automation of rail freight transport. The central element for this is the digital, automatic coupling (DAC). Switzerland contributes in an initiative under the so-called “European DAC Delivery Program” (EDDP) which promotes a jointly agreed standard DAC technology and has started national-level activities for the introduction and migration to DAC in Switzerland. The Federal Council has the mandate to develop a concept for the financing and the coordinated implementation of technical innovations to simplify the management of the road-rail interface in multimodal logistics chains.

An important field of action to support modal shift, furthermore is the **removal of administrative barriers for rail transport** – especially resulting from different national regulations. Within the European pilot project “**Brenner without borders**” launched by Tyrolean MEP Barbara Thaler, the effects of removing administrative hurdles shall be demonstrated for the route between Munich and Verona. In January 2022 the European Commission opened a call to submit a proposal for a grant ‘Pilot project - Single European Railway Area - Prototype Corridor Munich-Verona’. The objective of this project is to assist regulatory bodies and rail stakeholders in finding solutions to the issues identified by the Commission as posing a risk to operations on the Brenner corridor and thus ensure seamless operations between Munich and Verona. The action should build on the results obtained so far by the Brenner Corridor Platform which identified five priorities for rail interoperability along the corridor. The aim of the pilot project should be to identify concrete solutions and disseminate and implement them with a view of seamless operation between Munich and Verona. The pilot projects can be launched in 2022.

Legal framework for new underground city logistic systems

Cargo sous terrain (CST) is a private sector initiative for an innovative city logistic system. It describes a complete logistics system for the flexible transport of small-component goods. Tunnels connect production and logistics sites with urban centres. Overground, CST distributes the transported goods in environmentally-friendly vehicles, contributing to the reduction of traffic and noise emissions. Cargo sous terrain follows a similar principle to that of an automatic conveyor system. Automated, driverless transport vehicles which are able to pick up and deposit loads automatically from the designated ramps and lifts travel around the clock in the tunnels. The vehicles, which travel on wheels and have an electric drive with induction rails, operate in three-track tunnels with a constant speed of around 30 kilometres per hour.

The Swiss Federal Council is currently preparing a framework legislation in order to define procedural aspects (spatial planning, non-discriminatory access, integration in existing transport systems). As part of the onward planning process, it is foreseen to precise locations and routings of the hubs and tunnels as part of a sectoral plan procedure in close consultation with the Swiss cantons and with the involvement of communities and local population. A financing plan for CST is however not yet available.

New alliances

The **motorway company A22** (Brenner motorway) is continuing its efforts together with the **Austrian and German motorway managers, the Provinces and the Chambers of Commerce along the Brenner corridor** to establish a **concept of green digital corridor**. The partners are sharing best practices and ideas on digitalisation, traffic data sharing, crisis situation management, environmental issues, digital solutions for traffic management, etc.

As a follow-up project from BRECO.QM, a **joint transport coordination of rail freight transport** on the Brenner corridor is currently underway under the leadership of DB Netz AG. It was launched during the Bavarian presidency within the framework of the Brenner Railway Action Group (AGB). In the project, a central control of the railway axis Munich - Verona should simplify the organisation, improve the performance and thus enable the politically demanded modal shift. To this end, numerous measures for the improvement of rail freight traffic from BRECO.QM are being processed by the participating network operators from Germany, Austria and Italy. The aim is that the infrastructure of the three countries is offered to the rail transport companies from a single source. For example, the poor flow of information between the terminals and the network as well as system discontinuities between the three railways, which lead to running times of freight trains on the Munich - Verona route of between seven and 17 hours, must be overcome. A follow-up project to digitalise the processes in a train board has now been successfully implemented. Here, figures, data and facts were recorded and structured in a database. Up to 400,000 data records of the network operators could be harmonised and a dashboard created. On this basis, the cause of problems on the Brenner axis can now be digitally recorded and improvements derived from it.

An interesting development also relates to the **new strategic orientation of the motorway company A22** which purchased 75% of the rail company InRail and thus becomes a key player to develop a sustainable and multimodal transport system on the Brenner corridor.



7 Outlook 2022 and beyond

The activities in 2021 provide many linkage points for further activities, especially the policy pathway will require some further in-depth work and analysis. iMONITRAF! partners already agreed to further discuss the role of a set of common target indicators and also the measures proposed in the policy pathway will require further consideration. The recently published traffic scenarios for the Brenner corridor (Brenner Corridor Platform)¹⁶ as well as the Policy Scenarios 2030 published by iMONITRAF! will serve as basis for the new activities.

With the Simplon Alliance that brings together the initiatives of the Swiss Presidency under the Alpine Convention and the Follow-up Zurich process, iMONITRAF! will have the possibility to exchange thoughts and ideas on the policy pathway and priority actions to implement it.

After two years of mostly virtual networking activities, iMONITRAF! aims at bringing together political representatives but also the technical level in person again in 2022. In May 2022, a mobility week will be organized in Innsbruck which shall offer a platform for both technical and political exchange and will give an opportunity for an iMONITRAF! Reunion while strengthening the cooperation with other relevant networks and actors such as EUSALP AG4 and the Brenner Corridor Platform.

Overall, 2022 will provide many windows-of-opportunity for iMONITRAF! to contribute its knowhow and experiences to important processes at national and European level:

- Crucial legislative frameworks at European level will be discussed in 2022, many of them with a high relevance for iMONITRAF!. This will be an opportunity for iMONITRAF! to make the Alpine needs and specificities heard at European level and to use its common voice to support policy making. The discussion of the Combined Transport Directive, the new ETS for transport but also the revision of the Air Quality Directive will be crucial elements.
- Also at national level, iMONITRAF! will have the opportunity to improve its networking efforts: with the finalization of the Eurovignette revision, it now lies in the hands of the Member States to implement the new provisions and iMONITRAF! will closely work with its national partners along the corridors to fully use the new potentials of the revised Directive. In Switzerland, the revision process of the HGV fee will continue in 2022 and iMONITRAF! can support the Swiss partners along the way.
- In the broader Alpine community, iMONITRAF! has already been recognized as important framework by the opening statement of the Swiss Federal Councillor during the first meeting of the Simplon Alliance on 14th January 2022. iMONITRAF! will pick on this “advance praise” and will offer its full support to design an ambitious action plan for the Simplon alliance.
- Strengthening networking and coordination efforts has shown to be a key success element for iMONITRAF!. The lunch event in Brussels in November 2021 has again highlighted that iMONITRAF! requires good partners at European and national level to move ahead with its common initiatives. In 2022, these networking efforts will be further continued – also considering political alliances that can be shaped between the different policy levels.

As the ongoing partnership agreement is limited to the period 2021-2022, iMONITRAF! will also have to work towards the continuation of the partnership agreement. This will include the development of new strategic priorities for the time beyond 2022 and the positioning of iMONITRAF! within the sphere of Alpine transport networks and initiatives.

¹⁶ The traffic scenarios of the Brenner Corridor Platform are available online: <https://www.bcplatform.eu/korridorstudien/>