



# Toll Plus system: A proposal from the iMONITRAF! regions

Strategic role of a Toll Plus system, proposal on design  
features and next steps in the political process

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## Summary for policy-makers – Recommendations on Toll Plus

### ***Agenda setting: A Toll Plus system in the frame of iMONITRAF!***

The common strategy of the Alpine regions of Lyon (May 2012) proposes – as a midterm instrument – the implementation of a Toll Plus system to support a common modal shift policy. A Toll Plus system can be characterised as additional and differentiated pricing-system for transalpine freight traffic. It can be designed to support the internalisation of (additional) external costs in the sensitive Alpine regions and/or the financing of a sustainable development of freight transport with a steering effect for modal shift. Its mechanism builds on existing toll and pricing systems in the Alpine regions as well as the European framework with the Eurovignette Directive.

As the implementation of a Toll Plus system is also discussed at national level in the frame of the Suivi de Zurich, there is an opportunity for the iMONITRAF! network to launch the debate on this issue in a pro-active way and to cover the topic from a regional viewpoint. Since the “Plus” is conceived as differentiated approach for the Alpine Space, the iMONITRAF! network has a strong legitimisation to present its own ideas on a Toll Plus system.

### ***Main elements for a Toll Plus system from a regional viewpoint***

Hence the iMONITRAF! network has developed a discussion paper on Toll Plus which derives recommendations on design elements and framework conditions for a Toll Plus system from a regional viewpoint:

#### **1) Consideration of environmental costs in sensitive areas**

Toll Plus should focus on a more effective external cost charging in mountain areas, based on the iMONITRAF! objective of reducing excessive environmental burdens of transalpine freight transport. This should be reached by lobbying towards:

- more appropriate mountain factors within the Eurovignette Directive for air quality and noise,
- inclusion of additional external cost elements in the Eurovignette Directive, especially elements with over-proportional impacts in the Alpine Space (nature & landscape, accidents),
- shorter exemption period for EURO VI HGV to ensure the polluter-pays-principle (Directive includes exemption until 2018, could be shortened to 2016),
- For the Swiss regions: Lobby for a spatial differentiation of the Swiss HGV fee to strengthen the polluter-pays principle in mountain areas.

*Explanation: A Toll Plus System can be designed as internalisation and/or financing instrument. As the steering effect of a Toll Plus system is less clear, this rationale should not become the basis for a Toll Plus system but should rather be considered with the help of a cap-and-trade approach. A detailed analysis of the EU Eurovignette Directive and the relevant national pricing systems show that the current framework does not appropriately consider the over-proportional costs in mountain areas and that a comprehensive review is necessary.*

#### **2) Charging higher infrastructure costs and external costs**

From a regional viewpoint, infrastructure and external cost charging should be designed as two individual elements. The current mark-up concept and the external cost charging concept of the Eurovignette Directive should be clearly separated. The mark-up should focus on over-

proportional infrastructure costs in Alpine regions. In Switzerland, the consideration of higher infrastructure costs in mountain areas could be considered via an Alpine transit levy.

*Explanation: Currently, there is a considerable overlap between the elements infrastructure and external cost charging as the Eurovignette Directive calls for a deduction of the mark-up from external cost charges for EURO classes III upwards (Article 7.f, para 5). Also in Switzerland, the role of a potential Alpine transit levy is not yet clearly defined.*

### **3) Distance-dependent approach and coverage**

From an iMONITRAF! viewpoint, tolls should be distance-dependent to support the polluter-pays-principle and to avoid over-proportional impacts on local and regional transport.

Tolls should be charged for HGV starting from 3.5 t.

*Explanation: The creation of over-proportional burdens for local and regional transport is often discussed for new steering instruments. With a distance-dependent approach, rather than a standardized/lump-sum levy, the regional impacts can be limited.*

*The minimum weight of 3.5 tons considers the general trend towards smaller shipments and higher flexibility which led to an increasing share of light duty vehicles.*

### **4) Corridor approach – but harmonisation as major objective**

Toll rates for a Toll Plus System should leave some flexibility per corridor to consider corridor specifications in environmental characteristics and finance needs, such as traffic exposure and infrastructure financing needs. As main objective, the implementation of Toll Plus should lead to a harmonisation of overall toll prices to avoid distributional effects between the corridors.

*Explanation: An exemplary calculation for two case studies shows the difficulties with calculating appropriate toll rates for a “plus”. When further specifying the Toll Plus proposal, the balancing act between harmonization and flexibility needs to be considered.*

### **5) Revenue management**

Revenues should be (at least) partly allocated to Alpine regions for financing of transport rail infrastructures and for turning economic burdens of a Toll Plus system into opportunities. This could also include a compensation of hardship cases. For instance, revenues should be used to finance rail base tunnels (A, F, I) and to further support combined transport. Financial support could be related to terminal planning and financing, to support pilot projects and specific supplies in addition to on-going EU and national programmes and efforts.

*Explanation: The case studies of this discussion paper illustrate that a Toll Plus system can generate considerable revenues. As Toll Plus is part of a common modal-shift policy, the revenue should be used for financing an improved rail infrastructure.*

### **Next steps: Consolidating the regional viewpoint**

The recommendations on Toll Plus and the discussion paper shall provide the basis for developing a regional position on a Toll Plus system and for launching the debate at regional and at national level. Toll Plus thus becomes the first element of the iMONITRAF! strategy of Lyon to be further developed.

The iMONITRAF! Transport Forum on 24<sup>th</sup> June 2014 in Innsbruck offers the possibility to discuss the recommendations and elements of the discussion paper in the political network and with interested stakeholders and experts. Based on these feedbacks, an official regional statement could be developed.

## Zusammenfassung für politische Entscheidungsträger – Empfehlungen zu Toll Plus

### **Agenda: Toll Plus System im Rahmen von iMONITRAF!**

Die gemeinsame Strategie der Alpenregionen von Lyon (Mai 2012) sieht, als mittelfristiges Instrument, die Umsetzung eines Toll Plus Systems zur Unterstützung der gemeinsamen Verlagerungspolitik vor. Toll Plus wird dabei als zusätzliches und differenziertes Pricing-System für den alpenquerenden Güterverkehr verstanden. Es kann als Internalisierungsinstrument zur Anlastung der (zusätzlichen) externen Kosten im sensitiven Alpenraum und/oder als Finanzierungsinstrument für nachhaltige Verkehrslösungen mit Verlagerungsbeitrag ausgestaltet werden. Der Pricing-Mechanismus baut auf den bestehenden Maut- und Pricing-Systemen im Alpenraum sowie dem europäischen Rahmen der Wegekosten-Richtlinie auf.

Das iMONITRAF! Netzwerk hat die Chance, das Thema Toll Plus pro-aktiv und aus regionaler Sicht zu besetzen. Insbesondere ergeben sich direkte Anknüpfungspunkte zur Diskussion auf nationaler Ebene, da die Umsetzung eines Toll Plus Systems auch im Rahmen des Suivi de Zurich Prozesses diskutiert wird. Da das „Plus“ als differenzierter Ansatz für den Alpenraum verstanden wird, fühlt sich das iMONITRAF! Netzwerk zur Präsentation seiner Ideen für ein Toll Plus System klar legitimiert.

### **Zentrale Elemente eines Toll Plus Systems aus regionaler Sicht**

Daher hat das iMONITRAF! Netzwerk ein Diskussionspapier zu Toll Plus erstellt, in dem Handlungsempfehlungen zu zentralen Elementen und Rahmenbedingungen für ein Toll Plus System aus regionaler Sicht vorgestellt werden:

#### **1) Berücksichtigung zusätzlicher externer Kosten im Alpenraum**

Toll Plus sollte auf eine effektivere Anlastung der externen Kosten im sensitiven Alpenraum ausgerichtet sein. Dies entspricht dem iMONITRAF! Ziel einer Reduktion der negativen Auswirkungen des Transitverkehrs. Folgende Elemente sollten über Lobbying auf nationaler und EU-Ebene durchgesetzt werden:

- Angemessenere Zuschläge für sensitive Bergregionen („mountain factor“) in der Wegekosten-Richtlinie für Luftschadstoffe und Lärm,
- Berücksichtigung weiterer externer Kosten in der Wegekosten-RL, insbesondere Elemente mit überdurchschnittlichen Wirkungen im Alpenraum (Natur & Landschaft, Unfälle),
- Kürzere Ausnahme-Zeiträume für EURO VI Fahrzeuge zur besseren Berücksichtigung des Verursacherprinzips (Wegekosten-RL sieht Ausnahme bis 2018 vor, könnte auf 2016 verkürzt werden),
- Für die Schweizer Regionen: Lobbying für eine räumlich differenzierte Ausgestaltung der LSVA zur Stärkung des Verursacherprinzips im Alpenraum.

*Erläuterung: Toll Plus kann als Internalisierungs- und/oder Finanzierungsinstrument ausgestaltet werden. Ein Steuerungseffekt kann durch Toll Plus nur indirekt erreicht werden, so dass diese Logik besser durch ein Cap-and-trade Instrument verfolgt werden sollte. Eine detaillierte Analyse der EU Wegekosten-Richtlinie sowie der nationalen Maut- und Pricing-Systeme zeigt, dass aktuell die überdurchschnittlichen externen Kosten im Alpenraum nicht angemessen berücksichtigt werden und somit eine umfassende Anpassung der Rahmenbedingungen notwendig ist.*



## **2) Klare Abgrenzung zwischen Infrastrukturkosten und externen Kosten**

Aus regionaler Sicht sollten die beiden Elemente Infrastruktur- und externe Kosten klar getrennt werden. Die bestehenden Elemente der Wegekosten-Richtlinie mit dem Mautaufschlag für Berggebiete („mark-up“) und der Möglichkeit zur Anlastung externer Kosten (Luft und Lärm) sollten klar getrennt werden. Der Mautaufschlag sollte dabei auf die überdurchschnittlichen Infrastrukturkosten in Berggebieten fokussieren. In der Schweiz könnten die höheren Infrastrukturkosten über eine Alpentransitabgabe abgedeckt werden.

*Erläuterung: Aktuell besteht in der Wegekosten-Richtlinie eine erhebliche Überschneidung zwischen den Elementen Infrastruktur- und externe Kosten, da der Aufschlag für Euroklassen III und höher von der Gebühr für externe Kosten abgezogen werden muss (Artikel 7f, Paragraph 5). Auch in der Schweiz ist die Rolle einer potentiellen Alpentransitabgabe nicht klar definiert.*

## **3) Fahrleistungsabhängiger Ansatz und Anwendungsbereich**

Aus Sicht von iMONITRAF! sollten die Mautsysteme im Alpenraum fahrleistungsabhängig ausgestaltet sein. Dadurch wird das Verursacherprinzip unterstützt und eine überproportionale Belastungen für den Kurzstrecken- und Regionalverkehr wird vermieden.

Zudem sollte die Maut auf Fahrzeuge mit einem Gewicht ab 3.5 t angewendet werden.

*Erläuterung: Die überproportionale Belastung des Kurzstrecken- und Regionalverkehrs wird im Zusammenhang mit Steuerungsinstrumente oft als Nachteil herangezogen. Mit einem fahrleistungsabhängigen Ansatz anstatt einer einheitlichen/pauschalen Abgabe würden diese regionalen Auswirkungen begrenzt.*

*Die Anwendung ab 3.5 Tonnen trägt der Entwicklung Rechnung, dass immer mehr Transporte mit Hilfe leichter Güterfahrzeuge abgewickelt werden (kleinere Transportmengen, höherer Anspruch an Flexibilität).*

## **4) Korridoransatz – aber Harmonisierung im Blick**

Die konkreten Mautsätze für ein Toll Plus System sollten per Korridor in gewissem Rahmen flexibilisierbar sein, um korridorspezifischen Umweltcharakteristika, Verkehrsbelastungen und Finanzierungsbedürfnissen Rechnung zu tragen. Als übergeordnete Stoßrichtung sollte jedoch die Harmonisierung der Mautgebühren angestrebt werden, um Verlagerungseffekte zu vermeiden.

*Erläuterung: Die beispielhafte Berechnung für zwei Fallbeispiele zeigt die Herausforderungen bei der Berechnung der „Plus“-Mautsätze auf. In der weiteren Konkretisierung des Vorschlags muss dem Spagat zwischen Harmonisierung und Flexibilität Rechnung getragen werden.*

## **5) Aufkommensverwendung**

Das Aufkommen sollte, zumindest teilweise, in die Regionen fließen, um dort Infrastrukturvorhaben zur Stärkung der Schiene umzusetzen und wirtschaftliche Belastungen in Chancen umzuwandeln. Dies könnte auch einen Ausgleich von Härtefällen umfassen. Das Aufkommen sollte insbesondere zur Finanzierung neuer Schienen-Basistunnel (A, F, I) und zur Stärkung des kombinierten Verkehrs verwendet werden. Finanzielle Unterstützung konnte sich dabei auf die Planung und Finanzierung von Terminal-Infrastrukturen und Pilotprojekte konzentrieren und somit nationale und europäische Programme und Anstrengungen ergänzen.

*Erläuterung: Die Fallbeispiele dieses Diskussionspapiers zeigen ein erhebliches Aufkommenspotential eines Toll Plus Systems. Da Toll Plus als Instrument der gemeinsamen Verlagerungspolitik verstanden wird, sollte das Aufkommen für die Stärkung der Schiene verwendet werden.*

### **Nächste Schritte: Konsolidierung der regionalen Sicht**

Die Handlungsempfehlungen zu Toll Plus und das vorliegende Diskussionspapier stellen die Grundlage für die Entwicklung einer regionalen Position und zur Lancierung der Diskussion auf regionaler und nationaler Ebene dar. Toll Plus ist damit das erste Element aus der iMONITRAF! Strategie von Lyon, dessen Umsetzung weiter konkretisiert wird.

Das iMONITRAF! Transport Forum am 24. Juni 2014 in Innsbruck ermöglicht die Diskussion der Handlungsempfehlungen und Elemente des Diskussionspapiers – sowohl auf politischer Ebene als auch mit Experten und Interessensvertretern. Basierend auf diesen Feedbacks kann dann eine offizielle Stellungnahme der Regionen zu Toll Plus entwickelt werden.

## **Riassunto per i decisori politici - Raccomandazioni su Toll Plus**

### **Agenda: Un sistema Toll Plus nell'ambito di iMonitraf!**

La strategia comune delle regioni alpine di Lione (Maggio 2012) prevede – come strumento da adottare a medio termine – l'implementazione di un sistema Toll Plus a supporto di una politica comune di trasferimento modale. Toll Plus può essere considerato un sistema tariffario addizionale e differenziato per il traffico merci transalpino. Può essere concepito in modo tale da sostenere l'internalizzazione, addebitando i costi esterni (addizionali) nelle sensibili regioni alpine e/o il finanziamento di uno sviluppo sostenibile del trasporto merci, indirizzandolo verso il trasferimento modale. Il suo meccanismo si basa sia sui sistemi di pedaggio e tariffe esistenti nelle regioni alpine che sul quadro normativo europeo della direttiva Eurovignette.

Dato che l'implementazione di un sistema Toll Plus è discussa a livello nazionale nell'ambito del Processo Suivi di Zurigo, per la rete iMonitraf! si presenta l'opportunità di intavolare un dibattito sulla questione Toll-Plus in modo proattivo, trattandolo dal punto di vista regionale. Essendo il "Plus" concepito come un approccio differenziato, pensato per lo Spazio Alpino, la rete iMonitraf! è fortemente legittimata a presentare le proprie idee sul sistema Toll Plus.

### **Principali elementi per un sistema Toll Plus dal punto di vista regionale**

Per questo motivo la rete iMonitraf! ha elaborato un documento di discussione sul sistema Toll Plus contenente una serie di raccomandazioni su elementi centrali e condizioni quadro dal punto di vista regionale:

#### **1) Valutazione dei costi ambientali in aree sensibili**

Toll Plus dovrebbe focalizzarsi sull'addebito più efficace dei costi esterni nelle aree montane, basato sull'obiettivo iMonitraf! di ridurre gli eccessivi impatti ambientali imputabili al trasporto merci transalpino. Questo dovrebbe essere raggiunto con l'attività di lobbying a livello nazionale e comunitario attraverso:

- oneri più congrui per l'ambiente montano (mountain factor) nella direttiva Eurovignette per la qualità dell'aria e il rumore,
- inclusione nella direttiva Eurovignette di ulteriori elementi relativi ai costi esterni, specialmente elementi che tengano conto di impatti sproporzionali nelle aree alpine (natura e paesaggio, incidenti),

- un periodo di esenzione più breve per gli autoveicoli pesanti euro VI per garantire il principio “chi inquina paga” (la direttiva prevede l'esenzione fino al 2018, scadenza che potrebbe essere anticipata al 2016),
- per le regioni svizzere: attività di lobbying per una differenziazione territoriale delle tasse svizzere per gli autoveicoli pesanti per rafforzare nelle aree alpine il principio “chi inquina paga”.

*Spiegazione: Toll Plus può essere progettato come strumento di internalizzazione e/o di finanziamento. Poiché con il sistema Toll Plus può essere raggiunto solo indirettamente un effetto di indirizzo, per quest'ultimo dovrebbe essere considerato piuttosto un approccio cap-and-trade. Un'analisi dettagliata della direttiva Eurovignette e dei sistemi tariffari nazionali mostra che attualmente i costi esterni sovrapporzionali nelle aree alpine non sono considerati adeguatamente e che quindi è necessaria una revisione globale.*

## **2) Netta distinzione tra costi dell'infrastruttura e costi esterni**

Dal punto di vista regionale i due elementi di costo rappresentati dai costi dell'infrastruttura e dai costi esterni dovrebbero essere distinti chiaramente. I concetti di mark up (maggiorazione) per le zone di montagna e di addebito del costo esterno indicati nella direttiva Eurovignette dovrebbero essere tenuti nettamente distinti. La maggiorazione dovrebbe focalizzarsi sui costi sovrapporzionali dell'infrastruttura nelle zone montane. In Svizzera i costi più alti dell'infrastruttura potrebbero essere coperti da una tassa di transito alpino.

*Spiegazione: Attualmente la direttiva Eurovignette presenta una considerevole sovrapposizione tra i costi dell'infrastruttura e la tariffazione dei costi esterni, in quanto la maggiorazione per le classi Euro III in su deve essere detratta dall'onere per i costi esterni (Art. 7.f, paragrafo 5). Anche in Svizzera non è ancora chiaramente definito il ruolo di un potenziale pedaggio per il transito alpino.*

## **3) Approccio dipendente dalla distanza e campo di applicazione**

Dal punto di vista di iMONITRAF!, i pedaggi dovrebbero dipendere dalla distanza per sostenere il principio “chi inquina paga”, in questo modo si eviterebbero impatti sovrapporzionali sul trasporto locale e regionale.

Inoltre i pedaggi dovrebbero essere previsti per i mezzi pesanti a partire da 3.5 t.

*Spiegazione: La creazione di oneri sovrapporzionali per il trasporto locale e regionale viene spesso discussa al fine di adottare nuovi strumenti di indirizzo. L'approccio legato alla distanza, piuttosto che un'imposizione standardizzata/a forfait, comporterebbe un impatto regionale limitato.*

*Il peso minimo di 3.5 t tiene conto del trend generale verso trasporti con autoveicoli merci con minore carico e una maggiore flessibilità, che determina un incremento rilevante di veicoli commerciali leggeri circolanti.*

## **4) Approccio per corridoio – senza perdere di vista l'armonizzazione**

Le tariffe del pedaggio in un sistema Toll Plus dovrebbero essere, entro certi limiti, rese potenzialmente flessibili, per tenere conto delle particolarità del corridoio in termini di caratteristiche ambientali e di esigenze di finanziamento. Come spinta di indirizzo di livello superiore dovrebbe essere però perseguita l'armonizzazione dei pedaggi per evitare l'effetto di deviazione del traffico.



*Spiegazione: L'esempio di calcolo per due studi dei casi mostra le sfide per calcolare il pedaggio "Plus". In fase di concretizzazione della proposta deve essere considerata la divaricazione tra armonizzazione e flessibilità.*

#### **5) Gestione delle entrate**

Le entrate dovrebbero essere, almeno in parte, assegnate alle regioni alpine per finanziare le infrastrutture ferroviarie e per trasformare gli oneri economici di un sistema Toll Plus in opportunità. Questo potrebbe anche comprendere una compensazione per casi di necessità. Per esempio, le entrate potrebbero essere usate per finanziare i tunnel di base (A, F, I) e inoltre per sostenere il trasporto combinato. Il sostegno finanziario potrebbe essere correlato alla pianificazione e al finanziamento di interporti, al supporto di progetti pilota e forniture specifiche in aggiunta agli attuali programmi e sforzi europei e nazionali.

*Spiegazione: I casi di studio di questo documento di discussione illustrano che il sistema Toll Plus può generare redditi considerevoli. Poiché il Toll Plus fa parte di una politica comune di trasferimento modale, gli introiti dovrebbero essere utilizzati per finanziare e migliorare le infrastrutture ferroviarie.*

#### **Prossime iniziative: consolidare il punto di vista regionale**

Le raccomandazioni sul Toll Plus e il documento di discussione forniscono le basi per lo sviluppo di una posizione regionale sul sistema Toll Plus e per avviare il dibattito a livello regionale e nazionale. Toll Plus diventa così il primo elemento della strategia iMONITRAF! di Lione da sviluppare ulteriormente.

Il Forum dei trasporti iMONITRAF! che si terrà il 24 giugno 2014 a Innsbruck offre la possibilità di discutere sulle raccomandazioni e sugli elementi del documento di discussione sia a livello politico che con i rappresentanti dei vari gruppi di interesse e con gli esperti. Sulla base di questi feedback potrà essere sviluppata una posizione ufficiale delle Regioni.

## At a glance: an analysis of Toll Plus from the regional viewpoint

### ***The role of a Toll Plus system for iMONITRAF!***

The Alpine regions have identified the need for a more appropriate internalisation of external costs, especially to charge over-proportional environmental impacts in the sensitive mountain areas. In their common strategy of Lyon (May 2012), they propose – as a mid-term instrument – the implementation of a Toll Plus system as additional and differentiated pricing instrument.

The implementation of a Toll Plus system is not only discussed on regional level. The Suivi de Zurich process has also proposed Toll Plus as short-term steering instrument. On EU level the Eurovignette Directive – as relevant legal framework – shall be revised in the coming years; a possible differentiation of HGV charging is on the agenda. Thus, Toll Plus offers an opportunity for iMONITRAF! to steer the discussion in a pro-active way and to strengthen its networking and lobbying activities on national and EU level. The network picks up the analysis of the Suivi de Zurich process and, with this discussion paper, aims at specifying the design of a Toll Plus system from the regional viewpoint.

### ***Toll Plus as further development of existing pricing approaches***

Toll Plus is not a completely new approach. Toll systems have been implemented in all iMONITRAF! regions to support financing of road infrastructures and, in some regions, to cover external costs. For the EU member states and regions, the Eurovignette Directive sets the boundaries for road infrastructure charging – it lays down rules for calculating infrastructure charges, for charging the mark-up in mountain areas and, since the revision in 2011, allows for a limited external cost charging (air quality and noise only). In Switzerland, the HGV fee (LSVA) already guarantees a comprehensive external cost charging, however without spatial differentiation.

### ***Defining the “Plus” from a regional viewpoint***

Three studies of the Suvi de Zurich process (ALBATRAS, Effinalp, LEGALP) have dealt with design elements, economic impacts and legal aspects of Toll Plus and have compared it with other steering instruments (Alpine Crossing Exchange and Alpine Emissions Trading System). Still, the “Plus” has not yet been clearly defined. Three different rationales are possible:

- Internalisation instrument: A Toll Plus system can be designed to improve the internalisation of external costs, considering over-proportional impacts in sensitive mountain areas. It thus leads to a spatial differentiation of existing pricing approaches.
- Financing instrument: A Toll Plus system can be designed as financing instrument to collect revenue for major modal shift projects and related infrastructures based on a cross-financing approach (most obvious: financing of new rail base tunnels).
- Steering instrument: Through the increase of transport prices and differentiation, a Toll Plus system also creates a financial incentive to support the shift from road to rail and to improve environmental performance of trucks. However, the steering effect of such an instrument should not be overestimated and is difficult to estimate ex-ante.

→ The regional statement on Toll Plus should focus on the rationales “internalisation” and “financing, following the approach of the common strategy. As the steering effect of a Toll Plus system is less clear, this rationale should not become the basis for a Toll Plus system. The steering effect is better addressed and considered with the help of a cap-and-trade approach. This is also in line with a further differentiation of the Swiss HGV fee (LSVA).

### ***Establishing the “Plus” in the current EU framework***

The current EU and national frameworks offer several opportunities to establish a “Plus” for pricing systems. On EU level, the Eurovignette Directive as crucial framework already includes two features which could be further developed:

1. The external cost charging element which allows a specific charging of different external cost components could be extended in the following way:
  - More appropriate factors for mountain areas: existing maximum cost factors for air and noise pollution could be differentiated with regard to different spatial characteristics more appropriately (flat areas vs. mountain areas).
  - Extension of external cost factors: also, additional external cost elements could be considered (nature and landscape, accidents, climate change, up-and downstream processes) with an appropriate mountain factor where necessary.
2. The mark-up factor as standardized approach to charge external costs in mountain areas.

→ The internalization of external costs is the most important feature for a Toll Plus system from the iMONITRAF! viewpoint. We thus focus on the further development of the external cost element which allows for a specific internalisation of external costs. The mark-up concept should much more focus on over-proportional infrastructure costs in Alpine regions and should be clearly separated from the external cost charging concept (avoiding the current overlap between those elements).

### ***Towards appropriate toll rates***

As crucial determinant, it is necessary to get a feeling on an appropriate toll rate for a Toll Plus system. Up to now, the analysis of the Suivi de Zurich process has used a pragmatic top-down approach to define exemplary toll rates. From the regional viewpoint, this needs to be narrowed down by a bottom-up analysis. With two case studies, the analysis derives exemplary toll rates for the following options: i) a restricted approach focusing on air quality and noise, however with appropriate mountain factors, ii) a comprehensive approach with all environmental cost elements and mountain factor, iii) an extension of the mark-up to 50% as comparison.

The following table presents the case study results for the Brenner and Gotthard corridors as well as an average. It shows existing rates per vehicle-km, as well as resulting “Plus” rates. The last column shows the top-down rate proposed by ALBATRAS. For the Brenner corridor, it can be seen that the “Plus” comes up to 16.6 €/vkm with the restricted mountain factor approach and to 37.1 €/vkm with the comprehensive approach. An extension of the current mark-up on the Unterinntal-Valley and Brenner motorway to 50% would however only lead to an average price increase of 6.8 €/vkm. For the Gotthard corridor, the scenarios focusing on environmental costs lead to higher price impacts as the starting level is about twice as high as on the Brenner. An implementation of an ATA as comparison would lead to a price increase of 22.7 €/vkm.

These values need to be seen as first estimates only as they are based on today’s different starting points. The average value can be compared to the ALBATRAS rate of 29 €/vkm which is also an average rate for all regions and vehicles. The comparison in the table below shows that the overall level proposed by ALBATRAS seems to be a lower boundary for an appropriate toll level.

The derived values furthermore expose the difficulty with calculating acceptable toll rates. If the calculation builds on the existing, unharmonised regime, Toll Plus would lead to a further divergence of toll prices. Thus, a more harmonized approach for calculating toll rates is necessary in

order to avoid unwanted distributional effects between corridors as stated in the iMONITRAF! strategy.

Overall, it can be seen that an extension of the specific environmental cost approach is more appropriate to develop an appropriate price signal than an extension of the standardized mark-up factor. We thus take this approach further in the following discussions.

#### COMPARISON OF CASE STUDY RESULTS WITH ALBATRAS (FOR EURO IV)

€/t/vkm	Brenner value	Gotthard value	Case study average value	ALBATRAS average value
<i>existing rate</i>	40,3	74,8		29
<i>rate with restricted mountain factor</i>	56,9	165,8		
<b>Δ rate with restricted mountain factor</b>	<b>16,6</b>	<b>91,1</b>	<b>53,9</b>	
<i>rate with comprehensive mountain factor</i>	77,4	186,9		
<b>Δ rate with compreh. mountain factor</b>	<b>37,1</b>	<b>112,2</b>	<b>74,6</b>	
<i>comparison: rate with extended (implemented) mark-up</i>	47,1	97,5		
<b>comparison: Δ rate with mark-up</b>	<b>6,8</b>	<b>22,7</b>	<b>14,8</b>	

Table S-1

A more detailed analysis would be necessary to derive a regional proposal on specific rates for Toll Plus. The case study estimates however serve to get a first feeling on an appropriate level.

#### A “Plus” also regarding the use of revenues

Revenues generated through Toll Plus could be earmarked to the Alpine regions to support projects with relevance for modal shift. Along the Brenner and Mont Cenis/Fréjus corridor, the financing of new base tunnels is the most obvious. To support modal shift, revenues could also be used for improving combined transport infrastructures, especially terminal capacities along the Alpine transit routes.

Beyond the financing of railway infrastructures, revenues could be used for limiting additional burdens which might come along with modal shift (especially noise protection) or for adapting transport infrastructures to climate change impacts. To avoid hardship cases and to strengthen regional development in most affected regions, it might also be possible to include additional financing needs that come along with modal shift from road to rail. For example, this could include the optimization also of passenger rail transport to ensure that new railway lines maintain or even extend accessibility of Alpine regions.

#### Limiting impacts on regional transport

Similar to the discussion on ACE and AETS, impacts of a Toll Plus system on local and regional transport in and between the Alpine regions need to be considered. For the cap-and-trade systems, several specific ideas to design rules for exemptions have been proposed. However, the problem is slightly less relevant under a Toll Plus system. If tolls are distance-dependent and are collected based on the effective driving distance, no over-proportional burdens will occur.

Still, hardship cases can emerge if transport prices increase considerably for transport-intensive sectors in the Alpine regions. Rules for exemptions could build on existing frameworks.

### ***Further steps towards establishing a Toll Plus System***

The analysis has identified some crucial design elements for Toll Plus from the regional viewpoint. To fit with the iMONITRAF! instrument mix, the system should be designed as internalization instrument which supports modal shift and which – even in the long-term – could supplement a common cap-and-trade approach. Specific proposals from the regional viewpoint are presented in the “Summary for policy makers”. They will be discussed during the iMONITRAF! Transport Forum in Innsbruck (June 2014), with the objective to develop an official regional statement on Toll Plus. This can then be used for further lobbying and networking activities.



# 1 Background and objectives of this discussion paper

## ***Starting point: Toll Plus system in the frame of iMONITRAF! and the Suivi de Zurich***

A Toll Plus system can be characterised as additional and differentiated pricing-system for transalpine freight traffic in the Alpine space. It can be designed to support the internalisation of external costs (consideration of excess burden) and/or the financing of a sustainable development of freight transport (consideration of excess financing needs) with a steering effect for modal shift. Its mechanism builds on existing toll and pricing systems in the Alpine regions (see iMONITRAF! Best Practice Guide for an overview). On EU level, a Toll Plus system is discussed as further development of the Eurovignette Directive.

The common strategy of the Alpine regions of Lyon (May 2012) proposes the implementation of a common modal shift policy as mid-term measure. Specifically, a Toll Plus system is proposed to improve the internalisation of external costs. Steering instruments based on a cap-and-trade approach like the Alpine Crossing Exchange (ACE) and the Alpine Emissions Trading System (AETS) are foreseen as long-term measures when additional railway capacities (e.g. base tunnels) are available.

Also at national level, the implementation of steering instruments is discussed. In the frame of the Suivi de Zurich process, the three instruments ACE, AETS and Toll Plus have been analysed in several studies. Based on their results, the transport ministers of the Alpine countries have agreed in their Conclusions of Leipzig (May 2012) to move forward with the implementation of a Toll Plus system in the short-term. Similar to the iMONITRAF! strategy, the Suivi de Zurich process sees an ACE or AETS as long-term measure.

## ***Agenda setting for Toll Plus: launching the debate through the iMONITRAF! network***

In the frame of the Suivi de Zurich process, the activities regarding a Toll Plus system have not moved forward since the resolution of Leipzig in 2012. Thus, there is an opportunity for the iMONITRAF! network to launch the debate on this issue in a pro-active way and to cover the topic from a regional viewpoint. It seems crucial to define the regional requirements and needs for a Toll Plus system to guarantee that a Toll Plus system will be designed in accordance with the iMONITRAF! strategy. As the Eurovignette Directive as crucial framework on EU level also foresees a review and revision starting in 2015, the definition and discussion of a regional viewpoint on Toll Plus in the next iMONITRAF! years seems sensible.

Until now, it is not clearly defined how a Toll Plus system differs from existing toll approaches, i.e. the “Plus” needs to be filled with content. Since the “Plus” is conceived as differentiated approach for the Alpine Space, the iMONITRAF! network clearly has the legitimization to present its ideas on a Toll Plus system.

Further, the current debate and background in Switzerland requires the specification of a Toll Plus system. The activities regarding an ACE are currently on hold as the discussion is fully focused on the upcoming construction work of the Gotthard road tunnel. The monitoring report on modal shift 2011 (“Verlagerungsbericht”, BAV 2011) already mentions that further optimization potential of the Swiss HGV fee (LSVA) should be used to strengthen modal shift. The recent monitoring report on modal shift published at the end of 2013 shows approaches for a further optimization of the pricing approach but relates to an upcoming transport cost calculation to gain a better knowledge on cost coverage through the current LSVA framework.

For the Canton of Uri (as well as the other Swiss regions participating in iMONITRAF!) the discussion of Toll Plus offers several opportunities: pushing forward the discussion on a differentiation of the Swiss HGV fee and – in the longer term - mobility pricing and securing additional rev-

enue for rail infrastructures (including noise protection) which are not yet financed under the existing (and planned) financial funds.

### ***Role of this discussion paper***

This discussion paper thus aims at further defining a Toll Plus system from the regional viewpoint. It provides a detailed overview on the current state of discussions on Toll Plus and the legal and political frameworks. On this basis, it is discussed how the “Plus” needs to be defined from a regional viewpoint and which core elements of a Toll Plus system are necessary. At the end of the paper, some recommendations for a regional statement are summarized.

The discussion paper and its recommendations should build the basis for launching the political debate on regional as well as national level. Results can be presented during the next iMONITRAF! Transport Forum and could be one subject of a political roundtable. Also, it should be fed into the Suivi de Zurich process to improve synergies and to ensure that further work under the Suivi de Zurich considers the regional viewpoint in an appropriate way.

## **2 Starting point: framework and existing analysis for Toll Plus**

The discussion paper starts with an overview on the need and existing analysis for a Toll Plus system. This overview is based on analysis of environmental and infrastructure costs as presented by the GRACE project (Lieb et al. 2006) and proposals for a Toll Plus system developed in the frame of iMONITRAF! and the Suivi de Zurich process. Also, the current framework on EU level and in Switzerland is considered.

### **2.1 Multiple burdens in Alpine regions – over-proportional costs and financing needs**

The analysis so far has shown clearly: Due to their specific characteristics, Alpine areas are especially sensitive to impacts of transalpine transport. Over-proportional effects can be identified on several steps along the impact pathway approach: either emissions themselves are higher in sensitive areas (e.g. higher emissions of air pollutants due to gradients) or emissions can lead to higher impacts (e.g. higher noise impacts due to the amphitheatre effect). Also, infrastructure costs in mountain areas lie above average due to higher investment costs (tunnels, bridges) and higher maintenance costs.

The difference in external environmental costs as well as infrastructure and accident costs between sensitive mountain areas and flat areas have been determined in the frame of the GRACE project (Lieb et al. 2006). The factors for the single cost factors are presented in the following information box. In its previous presentations and documents, the iMONITRAF! network has used a factor 3 (day-time) to factor 6 (night-time) to present the over-proportional impacts in mountain areas. In the frame of this discussion paper, the term “mountain factor” is used for representing over-proportional environmental costs.

#### Information box: Factors for over-proportional costs in sensitive regions

- **Air pollution:** The cost-factor air-pollution is driven by pollutants that cause local damages, mainly PM10. Factors that are derived with regard to PM10 concentration in sensitive mountain areas apply to health costs and damages to buildings. Higher impacts are mainly due to the inversion effect (the same emissions lead to higher concentrations). This over-proportional impact is partly compensated by lower population densities.  
→ Factor for HGV: 5.2
- **Noise:** Noise impacts are estimated for road stretches outside tunnels. Due to better noise propagation conditions, noise can be heard farther away. Better noise propagation exists due to temperature inversions and the Amphitheatre effect of valleys and its reflections.  
→ Factor 5.1
- **Visual intrusion/nature & landscape:** Road infrastructures have greater visual impacts in Alpine areas as well as consequences on nature and landscape.  
→ Factor for HGV: 10.7
- **Recreational value of mountain areas/tourism:** Tourism in the Alpine region is determined by the possibilities of undisturbed outdoor activities which are strongly devaluated through transport infrastructures. Hence, traffic routes in the Alpine area can have great effects on the economy due to potential negative effects on tourism and a devaluation of hotel-values. In addition, a possible loss of unique natural resources which are situated close to the traffic routes might be possible. However, as these effects depend per se on the infrastructure that is installed and not on traffic volumes, a monetisation of this cost factor is not possible. Marginal costs are seen as virtually zero.
- **Accidents:** In mountain areas, accidents in tunnels and on bridges can have severe consequences. Descending slopes for example allow HGVs to drive too fast which increases their breaking distance. Braking problems might result and respective truck accidents can have heavy impacts. In an analysis of accidents numbers (Swiss data) a causality rate (causalities per vkm) on motorways can be derived:  
→ Factor for HGV: 1.22
- **Infrastructure costs:** Infrastructure costs are higher in sensitive mountain areas than in flat areas. This is due to more tunnels and bridges but also due to more curvy and hence longer transport infrastructures. Therefore, infrastructure investment costs in the sensitive Alpine region are higher. As these investment costs are very project specific, a focus on maintenance costs is more appropriate.  
→ Factor for HGV: 4.5 (three times lower traffic volumes, 1.5 times higher maintenance factor)

Source: Lieb et al. (2006)

## 2.2 State-of-the-art on Toll Plus: results of the Suivi de Zurich studies

Based on its meetings and conclusions of Lyon (2006) and Vienna (2009), the Suivi de Zurich has commissioned several studies to further analyse potential steering instruments and their impacts. All studies focus on the two cap-and-trade instruments Alpine Crossing Exchange (ACE) and Alpine Emissions Trading System (AETS) as well as the pricing instrument Toll Plus. The following chapter provides an overview on the three relevant studies and their main results.

### ***ALBATRAS – design features, thresholds and impacts on transport flows***

The ALBATRAS study sets the scene for further analysis. In much detail, this study proposes specific design features and operational aspects for the three steering instruments. This includes information on the instrument's rationale, its specific mechanisms and applications, the relevant trading mechanisms (for ACE and AETS), temporal and territorial validity, etc. For organisational aspects, it is shown how tolls/crossing rights can be charged via the European Electronic Toll Service and how the debiting can be organised with the help of on-board units.

Further, ALBATRAS defines thresholds which set the level of ambition of the instruments. For ACE and AETS, overall caps (crossing rights and CO<sub>2</sub>-emissions) are defined for each corridor for a restrictive and a tolerant scenario. For Toll Plus, ALBATRAS only considers a restrictive scenario which defines a toll level per km. Based on these rationales, impacts on transport flows are analysed with the help of a transport model.

For the restrictive Toll Plus system, ALBATRAS defines the following elements:

- Rationale: internalisation of external costs as well as optimisation of infrastructure use through tariff modulation.
- Main design features: Relevant rates need to be considered per corridor based on different spatial characteristics and traffic flows. It is proposed that toll rates are differentiated for vehicle types (weight, axles, emission standard) and for peak/off-peak periods.
- Need for exemptions: ALBATRAS does not analyse the need for exemptions within a Toll Plus system but mentions that this aspect needs to be further analysed.
- Operation: relevant technical installations are already available along crucial transit corridors. Debiting of the costs is done with an on-board unit and DSRC. As relevant infrastructures already exist, operational costs for a Toll Plus system are much lower than for a cap-and-trade instrument.
- Threshold: Regarding the relevant question of necessary toll levels, the report however uses a very pragmatic approach: the toll level is defined so that resulting costs lie between the ACE and AETS scenarios (for which thresholds are defined in much detail based on existing political objectives/strategies). For 2020, the scenario "Toll Plus restrictive" assumes a toll rate of 0.29 EUR/km. For 2030 there is a "high" scenario<sup>1</sup> with 0.80 EUR/km and a "low" scenario with 0.61 EUR/km. A comparison of these proposed toll rates with existing pricing systems and their potential further development is presented in chapter 4.2.
- Impacts on transport prices: For 2020, the toll rate of 0.29 EUR/km would lead to the following increase of transport costs on the main iMONITRAFI corridors: Mont Blanc: 73 EUR, Fréjus: 89 EUR, Gotthard: 78 EUR, Brenner: 125 EUR, Tarvisio: 87 EUR.
- Impacts on transport volumes: The introduction of TOLL+ leads to a decrease in total transalpine road freight transport volume of around 15% compared to BAU 2020. Due to different impacts on transport prices of a Toll Plus system, the reduction of road transport volume is varying per corridors: 13% on A – I/SLO, 23% on CH – I and 16% on F – I corridors (for more details see figure in the Annex).

### ***Effinalp – Economic effects of steering instruments***

Based on ALBATRAS results, the Effinalp study analyses the economic impacts of the three steering instruments. The study consists of different methodological steps. With the help of a

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<sup>1</sup> Considering two different levels of traffic forecasts.



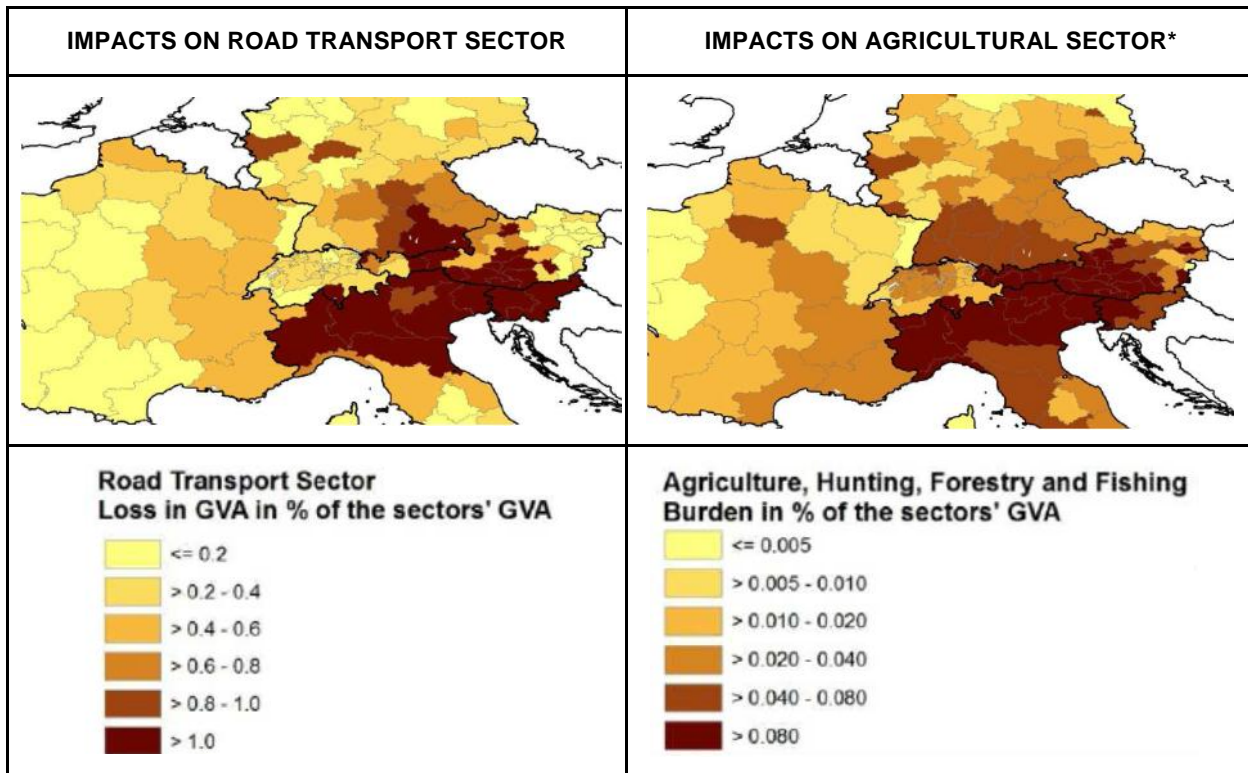
quantitative analysis, impacts on gross value added (GVA) and employment for the transport sector as well as transport-intensive sectors are calculated. The results are supplemented with a qualitative analysis which considers detailed reaction patterns of the relevant sectors. Results are validated with the help of a dynamic model analysis which also considers adaptation and compensation options as well as the use of revenues.

The economic analysis only considers two scenarios which are chosen to cover the full range of potential price impacts as shown by ALBATRAS. The scenario "Toll Plus" is one of those. For the Toll Plus scenario (called scenario "restrictive" in Effinalp), the following results are derived:

- **Effects on road freight transport:** As Effinalp assumes that additional costs from a steering instrument can be passed on from carriers to shippers, the burden for the transport sector (without adaptation and compensation measures) results only through the reduction of gross value added due to traffic decreases (lower demand). The highest burdens can be found in the south side regions of the Alps and in some Alpine regions itself. In Austria, the highest burden is calculated for Klagenfurt Villach (5.6% loss in GVA), in Switzerland for Ticino (2.6% loss), in France for Rhône-Alpes (0.5% loss) and in Italy for the Province of Bolzano (2% loss) (see overview below in figure 1).
- **Effects on rail freight transport:** Gains within the railway sector have in principal similar regional patterns. However, the regional allocation of rail transport is much more difficult since it depends on the logistics organisation of the national railways. It is obvious that smaller regions have less potential to acquire new railway value added than bigger logistic centres. Thus, the regional distribution depends very much on the location of new hubs/terminals for combined transport.
- **Effects on transport intensive industries:** Effinalp considers transport-intensive sectors for which transport costs amounts to 5-10% of their turnover (agricultural products, energy and manufacturing, construction). On the regional level, the economic burden per sector lies well below 1% of gross value added in most cases. The agricultural sector faces the highest burden with a maximum loss of 2.7% of GVA in the Austrian region Klagenfurt-Villach (see results for the agricultural sector in figure 1).

In Effinalp, costs are defined per passage (even though the instrument is a distance-dependent one). Thus, short distance transports have to carry a higher relative burden than long distance transport (in % of overall transport costs). If short distance transport would be given lower charges (e.g. km-dependent), the burden of alpine regions would decline by some 20% by average. This needs to be considered when interpreting Effinalp results as presented in the following figure.

## ECONOMIC IMPACTS OF A TOLL PLUS SYSTEM (ALPINE REGIONS)



**Figure 1** \* The figures shows effects (without adaptation and compensation measures) for the agricultural sector which faces the highest relative burden. Results for the other transport-intensive sectors can be found in the Effinalp study (chapter 3.4.3) Source: Effinalp

### LEGALP – Legal analysis

The legal framework for the three steering instruments discussed by the Suivi de Zurich is analysed in the LEGALP study (Waldeck Rechtsanwälte et al. 2012). It includes an analysis of European Union law, the bilateral transport agreement between the EU and Switzerland, international, multilateral and bilateral law (e.g. Alpine Convention, WTO law) as well as the national frameworks in the Alpine countries. Main results show:

- All three instruments raise concerns of conceptual inconsistency and possible user discrimination (violating the principle of non-discrimination). Especially, the missing integration of East-West transport routes along the Alpine Space needs to be better justified.
- Especially the cap-and-trade instruments which set an overall ceiling to transalpine transport are challenged from a legal viewpoint as they hamper the free movement of goods and distort competition between transport modes as major EU principles. LEGALP argues that proportionality for such an instrument is not given.
- A Toll Plus system is more in line with current frameworks on EU and national level and thus easier to implement. If the design of a Toll Plus system stays within the current boundaries of the Eurovignette Directive, legal adjustments only relate to the national framework. If a more ambitious approach is foreseen, the EU framework needs to be revised.
- An implementation of an ambitious Toll Plus system would further require a renegotiation of the upper price ceilings set for transit trips by the EU-Switzerland Transport Agreement

More information on the legal analysis of LEGALP as well as on the recent study of Prof. Epiney which challenges some of the LEGALP results, especially the concerns regarding the compatibility of an ACE with EU law, is summarized in chapter 5.

## 2.3 EU framework: relevant elements of the Eurovignette Directive

On EU level, the Eurovignette Directive sets the relevant framework for road infrastructure charging. Although the application of tolls and vignettes is not mandatory for Member States, the Directive lays down certain rules to be followed if Member States wish to levy those charges. The Directive provides some core principles on how to calculate investment and maintenance costs as well as operating, management and tolling costs. Maximum values for weighted average tolls are not provided but new tolls need to be agreed with the EU Commission.

First implemented in 1999, the Directive has been revised several times. Both the 2006 and 2011 revisions have incorporated important changes from the iMONITRAF! viewpoint. The **revision of 2006** introduced the possibility of a mark-up factor which can be charged in mountain areas for cross-financing of large rail infrastructure projects. Specifically, the following conditions must be fulfilled:

- It must be shown that the relevant road sections face either acute congestion affecting the free movement of vehicles or significant environmental impacts from road freight transport.
- Revenue generated from this mark-up must be invested in projects that lead to the alleviation of congestion or the environmental damage in question. Hence, it must be applied in the corridor of concern.
- The mark-up is not allowed to exceed 25% of a calculated weighted average toll (that must include all various costs of the respective infrastructure network) in sensitive mountain areas.
- Financial plans for the infrastructure on which the mark-up is applied and a cost-benefit analysis for the new infrastructure-project must be submitted to the European Commission in advance of the mark-up application.

Until the **latest revision in 2011**, the Eurovignette Directive allowed Member States to set tolls at levels required to maintain and replace infrastructure. Since 2011, the Directive is extended to further cost elements, especially external costs of transport. It allows an **internalisation of air quality and noise costs**, provides a framework for calculating external cost charges as well as maximum rates differentiated for different emission standards and road types. For mountain areas, the Directive allows the extension of environmental costs by a factor 2 to cover over-proportional impacts in sensitive Alpine areas.

It has to be noted, that the mark-up concept and the charging of external costs are not conceived by the Directive as two separate elements and are thus not fully complementary. In fact, the amount of the mark-up will be subtracted from the external cost charge. The subtraction will however not apply to the most polluting vehicles, that is EURO classes 0-II and from 2015 onwards also EURO class III. As the two elements follow different rationales, this offset approach seems highly questionable.

## 2.4 National frameworks

### *Swiss framework: the HGV fee (LSVA) and its role for modal shift*

In Switzerland, the HGV fee (LSVA) is the most important policy instrument of the modal shift policy. It has been implemented in 2001 together with an increase of HGV weight limits up to 40

t. The LSVA is based on the polluter-pays principle and can be seen as a “pure” internalisation instrument. Rates are calculated to fully cover external costs of road freight transport. The fee is applied to HGV above 3.5 tons and is charged on the overall Swiss road network. The fee depends on distance driven, maximum weight and EURO-standard of the vehicle.<sup>2</sup>

#### CURRENT RATES OF THE SWISS HGV FEE (LSVA)

Category	Eurostandard	Swiss Centimes per ton and kilometre	Rate for 40 t HGV on 300 km distance
<b>1</b>	0, I and II <i>Euro II with particle filtre</i>	3.10 <i>2.79</i>	372 CHF <i>334.8 CHF</i>
<b>2</b>	III <i>Euro III with particle filtre</i>	2.69 <i>2.42</i>	322.8 CHF <i>290.4 CHF</i>
<b>3</b>	IV and V <i>Euro VI</i>	2.28 <i>2.05</i>	273.6 CHF <i>246 CHF</i>

**Table 1** Rates as of 1<sup>st</sup> July 2012. In *Italics*: vehicle category with reduced rates. Source: Verlagerungsbericht 2013.

About 2/3 of the LSVA revenue is used for financing major rail infrastructure projects, including the new Gotthard base tunnel as well as noise protection infrastructure. In the new monitoring report on modal shift (Verlagerungsbericht), it is again stated that the LSVA has an important modal shift effect. However, it is not sufficient to reach the ambitious modal shift objective. In the long term, an Alpine Crossing Exchange is thus foreseen as additional steering instrument to reach the HGV reduction target (BAV 2013).

The further development of the LSVA is constrained by the bilateral transport agreement EU-CH which regulates overall costs that can be charged for crossing Switzerland. The current version of the agreement sets the following limit: weighted average costs for a 40 t HGV on a 300km distance cannot exceed 325 CHF. This implies a rate of 2.7 Swiss centimes per tkm. Due to the modernization of the vehicle fleet, the current weighted average rate lies below this limit. Thus, there is some room for increases of the pricing levels for transalpine HGV. Further, the bilateral agreement allows the introduction of a special Alpine crossing levy (Alpentransitabgabe) for specific alpine infrastructures (15% mark-up on weighted average, max. 48.75 CHF). This levy however needs to be included in the maximum chargeable costs of 325 CHF so that the levy is mostly an option for spatial differentiation of tolls. The current monitoring report on modal shift mentions these options but does not include specific recommendations as the underlying calculation on transport costs will be updated in 2014 (BAV 2013).

Depending on the further process of the Suivi de Zurich group, the iMONITRAF! activities, the activities on EU level to update the Eurovignette Directive, it might however be argued that it is time to renew the bilateral transport agreement CH-EU. Thus, the discussion should not only consider the current potential for optimization but should go beyond the legal restraints.

For the further process in iMONITRAF!, it also needs to be considered that there is a broad discussion in Switzerland on further financing modal shift, especially large infrastructure projects. In February 2014, there will be a public vote on the implementation of a new rail infrastructure fund which shall finance operation, maintenance and extension of rail infrastructures. This proposal will consolidate the cross-financing approach with the HGV fee for large rail infrastructure projects. A change in the pricing levels however is not foreseen yet.

<sup>2</sup> For more detailed information see fact sheet in iMONITRAF! Best Practice Guide (Lückge et al. 2010).

### ***Pricing systems and modal shift objectives on other iMONITRAF! corridors***

Also, road infrastructures on all other iMONITRAF! corridors are subject to motorway tolls. Based on the legal framework of the Eurovignette Directive, the following tolls have been implemented:

- On the Brenner corridor, motorway tolls are charged on the Austrian and Italian parts. The motorway section in the Unterinntal-Valley (German/Austrian border to Innsbruck) and the section between Innsbruck and Brennerpass are defined as “special toll sections” (Sondermautstrecken). These toll sections make use of the mark-up factor of the Eurovignette Directive (15% on Unterinntal motorway, 25% on Brenner motorway). Financing needs along the Brenner corridor mostly relate to the Brenner base tunnel. External environmental costs are not charged along the Brenner corridor as the mark-up factor covers the full potential of the Eurovignette Directive (due to deduction rule and parallel driving bans for high-emitting HGV on the Brenner corridor).
- On the Fréjus and Mont Blanc corridors, motorway tolls are charged on the French and Italian motorway network. The highest cost factor are tunnel charges for the Fréjus and Mont Blanc tunnels (298 EUR for a single passage with a EURO IV HGV in both tunnels). As these tunnel charges already consider the over-proportional infrastructure costs of the tunnel infrastructures, the mark-up concept is not applied. For the national and regional roads, the implementation of an “Ecotaxe poids lourds” has been foreseen for 2014. Due to lobbying activities, the implementation is however pending (see iMONITRAF! annual report for further details).

Current toll levels are presented in the iMONITRAF! annual report 2013.<sup>3</sup> The toll systems are presented in much detail in the iMONITRAF! Best Practice Guide (Lückge et al. 2010). Section 4.2 below focuses on the Brenner and Gotthard corridor and presents detailed information on existing toll regimes and options for establishing a “Plus”.

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<sup>3</sup> The iMONITRAF! Annual Report 2013 is available on the iMONITRAF! homepage:  
<http://imonitraf.org/DesktopModules/ViewDocument.aspx?DocumentID=GYxhbfuW/xU=>



### 3 Strategic role of a Toll Plus system

#### ***Strategic background – starting point of the iMONITRAF! strategy***

The common iMONITRAF! strategy of 2012 calls for the implementation of a Toll Plus system to strengthen the common modal shift approach in the medium-term: *“The further development [of existing pricing systems] towards a Toll+ system considering additional differentiated surcharges in sensitive Alpine region”*. Further details are not included in the strategy.

However, the principles, objectives and measures of the strategy provide further basic points for specifying a common Toll Plus approach:

- Polluter pays principle: The strategy is based on the polluter pays principle which calls for an internalisation of external costs.
- “Toprunner approach”: From the viewpoint of Swiss regions, the toprunner approach is important. The common design of a Toll Plus system should also create new opportunities for Swiss regions.
- Common targets: for the short-term, the common target system focuses on meeting environmental targets. The link to an internalisation instrument is thus obvious.
- Common measures: the strategy also calls for a common “pull” approach with an extension of rail infrastructures.

These elements build the baselines of the common strategy and should be considered when further defining a Toll Plus approach.

#### ***Defining the rationale for a Toll Plus system – how to define the “Plus”***

Latest discussions in the iMONITRAF! project team have shown that there is no general understanding of the role and design of a Toll Plus system. The “Plus” is not clearly defined in existing analysis so that many questions remain.

As a first step, it is thus crucial for further discussions to define the overall role of a Toll Plus system. As shown above, a Toll Plus system relates to several principles and objectives of the iMONITRAF! strategy. In general, it can follow three different rationales:

- **Internalisation instrument:** A Toll Plus system can be designed to improve the internalisation of external costs of road freight transport, considering over-proportional impacts in sensitive mountain areas. It thus leads to a spatial differentiation of existing pricing approaches. Differentiation features should also consider vehicle weight and emission standard to set incentives towards a more efficient use of HGV and a modernisation of vehicle fleet.
- **Financing instrument:** A Toll Plus system can be designed as financing instrument to collect revenue for major modal shift projects based on a cross-financing approach. Most obvious is the cross-financing of new rail infrastructures, especially new base tunnels (at the Brenner and Mont Cenis axis and access tracks for the Swiss base tunnels). However, the financing rationale could go beyond this focus and could include financing of environmental protection infrastructures (e.g. noise protection) as well an extension of combined transport infrastructures to reduce existing bottlenecks.
- **Steering instrument:** Through the increase of transport prices and differentiation, a Toll Plus system also leads to a financial incentive to switch from road to rail. However, the steering effect of such an instrument should not be overestimated and is difficult to estimate ex-ante as modal shift is also affected by other factors (availability and quality of rail services, infrastructures, overall economic situation, etc.).

→ The regional statement on Toll Plus should focus on the rationales “internalisation” and “financing, following the approach of the common strategy. As the steering effect of a Toll Plus system is less clear, this rationale should not become the basis for a Toll Plus system. The steering effect is better addressed and considered with the help of a cap-and-trade approach. This is also in line with a further differentiation of the Swiss HGV fee (LSVA).

→ A Toll Plus system should be designed as modern, differentiated and incentive-oriented pricing approach with a broad approach on cross-financing modal shift projects.

#### Strategic role of Toll Plus for the iMONITRAF! network

As the further development of existing pricing systems into a Toll Plus framework is part of the common strategy, a direct political mandate to specify this element exists. A common Toll Plus approach is foreseen as medium-term measure which should be supported by a cap-and-trade approach in the longer term. Considering this sequencing of measures, it seems appropriate to start the discussion process.

As the development of a Toll Plus system currently is also discussed in the Suivi de Zurich process, launching the debate has an additional strategic implication. In their Conclusions of Leipzig, the ministers *“confirm the interest of phasing in measures aiming at managing transalpine freight transport: in a short-term perspective, to consider the possibility of implementing the “TOLL+” concept in line with the modified Eurovignette directive which allows the internalisation of some external costs and therefore to deepen Eurovignette elements of the TOLL+ concept with particular reference to the socio-economic, legal and environmental aspects in each Member Country”* (Suivi de Zurich, 2012). With this formulation, the Conclusions of the Suivi de Zurich group contain several weaknesses (“interest” instead of “need”, reference to existing Eurovignette framework only).

Thus, it will be important to launch a debate that goes beyond this restricted formulation. In a regional statement on Toll Plus, it should become clear that a Toll Plus system is seen as short and medium-term instrument with internalisation and financing character. An additional steering instrument to meet the ambitious HGV targets as defined in the iMONITRAF! strategy remains necessary. A Toll Plus system can be seen as interim solution until new railway capacities are completed and the capacity-oriented approach of the common strategy takes effect.

#### **Positioning Toll Plus in the Swiss discussion, especially in the Canton of Uri**

For EU regions, launching a debate on Toll Plus seems obvious. The current framework of the Eurovignette Directive allows only a limited internalization of external costs and cross-financing is restricted. Thus, a Toll Plus system would provide new opportunities. In Switzerland however, the LSVA already fulfills these objectives to a large extent. Still there is some potential for optimization so that a Toll Plus system could also generate a value added for Swiss regions:

- A spatial differentiation of the LSVA for Alpine regions would strengthen the polluter-pays character of the LSVA and could be seen as signal that the needs and vulnerabilities of the Alpine regions are appropriately reflected in a modern pricing approach.
- A Toll Plus system could provide an intermediate solution with an indirect steering effect and the potential to generate additional revenue for modal shift projects until the implementation of an ACE.
- Although the financing approach is less obvious than in other regions, some financing needs remain, first of all the (foreseen) financing of the 4 meter corridor to facilitate combined transport along the Gotthard axis and the financing of additional access tracks (although outside of Switzerland). Especially in the Alpine regions, several accompanying

measures can be considered to cushion potential impacts of the new basetunnels. For example in the Canton of Uri, this could include an extension of the basetunnel ("Variante Berg lang"), additional noise protection infrastructures or improved railway passenger infrastructures (see box below for further details).

- A special strategic element might be linked to the upcoming construction work of the Gotthard road tunnel. It was often argued that closing the tunnel for construction work and providing rolling motorway services instead is too costly and complex. With the help of a Toll Plus system, additional revenues could be generated to finance replacement options during the maintenance period.

## 4 Design features of a Toll Plus system – “need-to-have” elements from the regional viewpoint

### 4.1 Options for establishing a „Plus“ in the existing framework for HGV tolls

The current EU and national frameworks offer several opportunities to establish a “Plus” for pricing systems. On EU level, the Eurovignette Directive as crucial framework already includes two features which could be further developed (see section 2.1):

3. the external cost charging of the 2011 revision which allows a specific charging of different external cost components based on a distance-dependent approach,
4. the 25% mark-up factor for mountain areas of the 2006 revision as standardized approach to cover external costs in mountain areas.

These two elements of the Eurovignette Directive thus have a considerable overlap which is considered in the current deduction rule. To develop a clear and transparent framework, it would be advisable to clearly separate the two elements: a mark-up for over-proportional infrastructure costs and environmental cost charging with appropriate mountain factors for internalization.

From the iMONITRAF! viewpoint, the internalization of external costs is the most important feature for a Toll Plus system. We thus focus on the further development of the external cost element. A system with a higher mark-up factor is considered for a comparison only.

#### *Approaches to strengthen external cost charging*

- **More appropriate mountain factors:** existing maximum cost factors for air and noise pollution could be differentiated with regard to different spatial characteristics more appropriately (flat areas vs. mountain areas). Currently, the Eurovignette Directive allows the application of a “mountain factor” of 2 for both air quality and noise costs. However, the appropriate mountain factor for those external cost elements lies much higher, as the factors in section 2.1 suggest.
- **Extension of external cost factors:** also, an extension of external cost factors might be possible. However, the inclusion of climate change costs should be integrated for all areas, since there is no specific argument to include climate change costs in mountain areas only. Further elements could rather be congestion cost and safety cost (with over-proportional impacts in the Alpine Space) as well as nature and landscape and specific Alpine risks.
- **No offset with mark-up factor:** Currently, the Eurovignette Directive calls for a deduction of the mark-up from external cost charges for EURO classes III upwards (Article 7.f, para 5). We argue that these two elements follow different approaches and should not compete against each other.
- **Reduction of exemptions:** exemption periods (especially for EURO V and VI) could be shortened for the Alpine Space area.

In general, lobbying activities regarding external cost charging should make clear that the current values of the Eurovignette Directive do not reflect external costs in an appropriate way. State-of-the-art analysis of external costs delivers much higher cost factors. The following table provides an overview. It can be seen that current analysis for air quality costs derive values for interurban areas which lie up to 100% above the maximum chargeable values of the Eu-

rovignette Directive (the lower the emission standard, the higher the difference). For noise costs, the maximum values of the Eurovignette Directive lie well below the current external cost estimates. Cost elements that are not yet covered by the Eurovignette Directive are also not negligible. The current legislation is not satisfying, especially from the viewpoint of the Alpine regions which face over-proportional impacts from emissions.

## VALUES OF EUROVIGNETTE AND COMPARISON TO LATEST ESTIMATES

	Eurovignette Directive (2011)		Handbook external costs (2008)		Latest UIC study* (2011)		EEA external air quality estimates (2013)	
	Suburban (incl. mw)	Interurban (incl. mw)	Suburban	Interurban	Suburban	Interurban	Suburban roads (incl. mw)	Interurban roads (incl. mw)
€ct/vkm (40 t HGV)								
<b>Air quality costs</b>								
<i>Euro IV</i>	4	3	7,4	5,1	n.a.	5,9	6,2	5,4
<i>EURO V</i>	3	2	5,2	3,1	n.a.	4,1	3,8	3,3
<i>EURO VI</i>	2	1	n.a.	n.a.	n.a.	2,0	2,5	1,6
<b>Noise costs</b>								
Day	1,1	0,2	7,01	1,1	83,0 - 201,4	4,6 - 13,0		
Night	2	0,3	12,78	2	151,4 - 367,0	2,37 - 8,5		
<b>Climate change</b>			2,5	2,2	1,77 - 10,3			
<b>Up and downstream processes</b>			3,1	2,7	1,79 - 3,18			
<b>Nature &amp; landscape</b>			n.a.***	1,15	n.a.			
<b>Accidents</b>			10,5	2,7	7,15	0,15 - 1,81**		
* UIV values are not differentiated for Euro classes. Average external costs provided by UIC have been transformed to EURO class values based on cost factors from the German "Methodenkonvention" (IER 2012 ).								
** range: motorways - outside urban								
*** Nature and landscape costs are not relevant in urban and suburban areas								

**Table 2** Sources: European Commission (2011), IMPACT (2008), INFRAS/UIC (2011), EEA (2013), not considering mountain factors for Alpine regions

### Comparison: approaches to strengthen the mark-up factor

Also, the existing mark-up factor of the Eurovignette Directive could be further developed. Two approaches seem possible:

- Mark-up as standardized approach to cover over-proportional costs: the current mark-up factor to cover both higher infrastructure costs, higher congestion and environmental damages in mountain areas could be further developed as standardized approach. Overlaps with the external cost charging would remain.
- Mark-up for higher infrastructure costs: alternatively, the mark-up could be defined more specifically to cover higher infrastructure costs in mountain areas. It would then be an autonomous element of the Eurovignette Directive and overlaps with specific external cost charging would be avoided. A deduction of both elements would no longer be necessary.

A detailed analysis on how to define an appropriate level for an infrastructure mark-up is not feasible in the frame of this study as this would require an analysis of infrastructure and maintenance costs of road infrastructures as well as the potential for cross-financing of rail projects.



Considering these approaches, there are three main options to establish a “Plus” for existing pricing regimes:

- 1) extension of external cost regulation,
- 2) further development of mark-up concept either as standardized approach to cover overall higher costs in mountain areas or as autonomous element for higher infrastructure costs.
- 3) combination of both if the mark-up concept focuses on infrastructure costs.

In Switzerland, the existing framework offers similar opportunities. As the LSVA is an instrument for internalization of external cost, this rationale could be further developed for mountain areas. Also, the idea of a mark-up factor is not new and has been considered under the term “Alpen-transitabgabe”. Thus, the three main options as shown above can also be applied within the Swiss framework.

## 4.2 Pricing level resulting from different options – case studies and comparison to ALBATRAS top-down proposal

### *Case study set-up – Defining the “Plus” for Brenner and Gotthard*

Please note: These case studies have the main objective to get a first feeling on appropriate toll rates of a Toll Plus system, they are not supposed to deliver specific recommendations. They serve the network to validate the top-down approach of the ALBATRAS study and to interpret the results of the Suivi de Zurich study. A specific proposal on appropriate toll rates that also meets the main objective of harmonization need to be defined in the next steps.

In this chapter, the potential impacts of the different “Plus” options on pricing levels are estimated with the help of two case studies.

As the iMONITRAF! network has the main objective to reduce environmental burdens in Alpine areas, we focus on the further development of the external cost charging. An increase of the standardized mark-up factor is only considered as comparative scenario. The following table gives an overview. Please note, that the design of the “Plus” elements is rather conservative and builds as far as possible on existing regulation and frameworks.

- A restricted scenario for environmental cost charging focuses on air quality and noise costs which make up the largest share of external costs and which are already covered by the Eurovignette Directive. However, we take the position that an appropriate “mountain factor” should be applied (according to calculations in GRACE concept instead of general factor 2 as proposed by Eurovignette).
- A comprehensive scenario for environmental cost charging includes all external cost elements (nature and landscape, accidents, climate change, up-and downstream processes) with an appropriate mountain factor where necessary.
- A comparative scenario with an increase of the current mark-up concept for the Brenner and an implementation of a corresponding concept for the Gotthard with the “Alpentran-sitabgabe” (Alpine crossing levy).

As the case studies mainly serve to get a first feeling on appropriate toll rates, they start from the existing frameworks which differ considerably at the Brenner and Gotthard corridors. In a more detailed analysis, the assumptions and frameworks would need to be better harmonized.

## CASE STUDY OVERVIEW – A “PLUS” FOR BRENNER AND GOTTHARD

	<b>Brenner (Kiefersfelden - Affi, 322 km)</b>	<b>Gotthard (Lucerne - Chiasso, 176 km)</b>
<b>Current pricing regime</b>	Kiefersfelden –Innsbruck: Unterinntal-Valley: motorway toll on A12 including 15% mark-up  Innsbruck – Brennerpass: Brenner motorway toll on A13 including 25% mark-up  Brennerpass – Affi: Italian motorway toll on A22	LSVA (Swiss HGV fee) on overall Swiss road network  LSVA is charged per km and tonne. For our calculation, we assume a 40 t semi-trailer (5 axles).
<b>Restricted scenario for environmental cost charging</b>	Currently, the options of the Eurovignette Directive to charge air and noise quality costs is not applied in Austria and Italy. In Austria this is due to the fact that the mark-up is applied and that external costs would be deducted.  Proposal: air quality and noise costs are applied on total relevant stretch (314 km) with appropriate “mountain factors” (5.2 for air quality and 5.1 for noise).	As the LSVA is calculated based on average external costs in Switzerland, the current rates already consider higher externalities in the Alpine Space. However, they are not explicitly shown in the cost rates.  Proposal: Assuming that the relevance of mountain and flat areas along the Gotthard corridor is about 1:1, we propose to use a “mountain factor” for air quality and noise that is half the factor proposed by GRACE <sup>4</sup>
<b>Comprehensive scenario for environmental cost charging</b>	Proposal: External cost charging is extended to cover all relevant external cost factors. Climate change and up- and downstream processes are included without specific mountain factors as there are no over-proportional impacts. Nature and landscape and accidents are included with mountain factors proposed by GRACE.	Proposal: All external cost elements are differentiated for mountain areas under consideration of relevant mountain factors.
<b>Comparative scenario: Extension/ application of mark-up concept</b>	It is argued that the standardized-mark-up factor of 25% is not appropriate, especially under consideration of financing needs for the Brenner base tunnel. GRACE results show an overall factor 2 (including higher infrastructure costs).  Proposal: mark-up factor of 50% on the Austrian sections (Unterinntal and Brenner motorways)	Currently, the mark-up concept is not used in the LSVA framework. The bilateral transport agreement CH-EU however includes the option of a mark-up (known as Alpentransitabgabe (ATA)). The maximum toll rate for this ATA amounts to 15% of the weighted average of the current regime. According to the report on modal shift, this amounts to 48.75 CHF or 40 € (with exchange rate 1 € = 1.22 CHF).  Proposal: introduction of this 15% ATA as new mark-up element

**Table 3** The relevant corridor segments are defined according to iMONITRAF!: motorway stretches of the relevant corridor within the perimeter of the Alpine Convention.

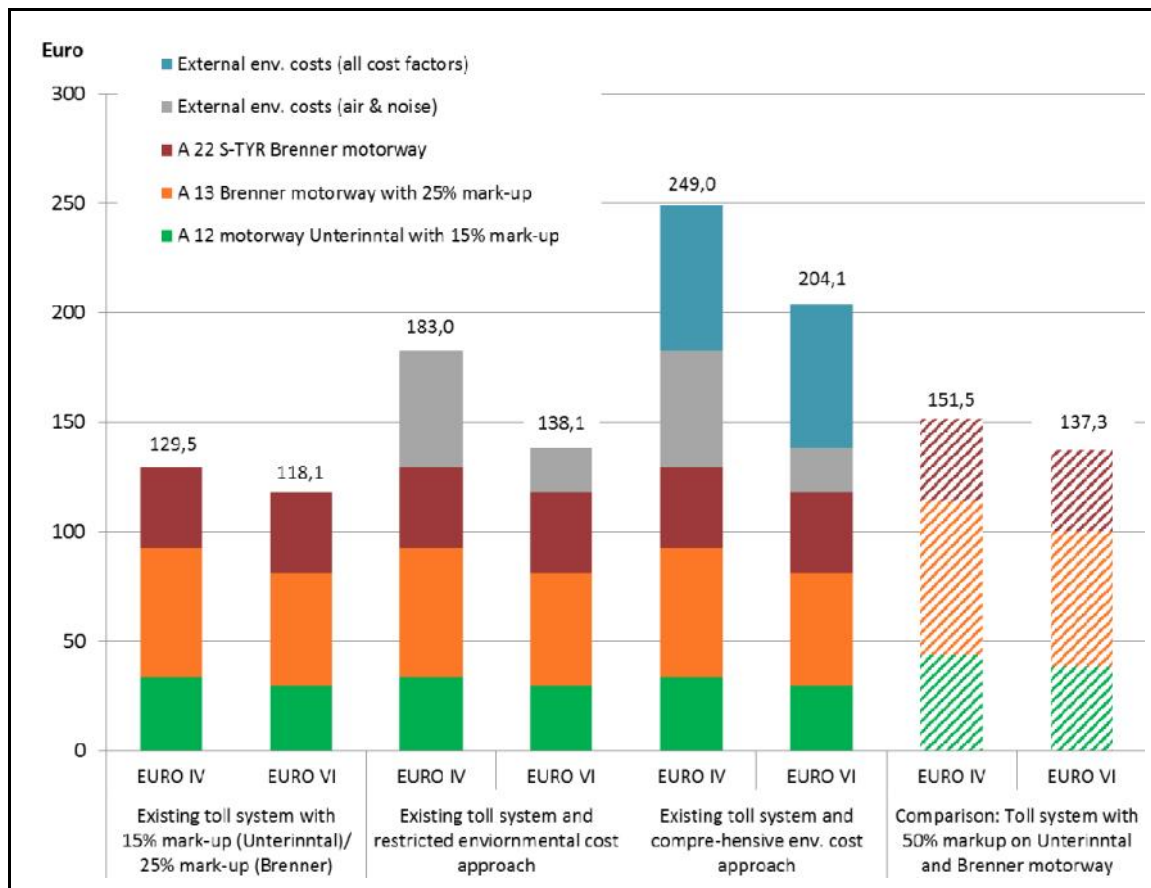
### Results for Brenner case study

Results for the Brenner corridor have been calculated for the corridor segment Kiefersfelden – Affi which represents the relevant segment in the Alpine Convention perimeter. This segment is also considered in the frame of iMONITRAF! monitoring activities. Total costs for this segment of 322 km are presented in the following figure for Euroclasses IV and VI. The costs for the existing pricing regime are presented by the left-hand columns, results for different “Plus” options

<sup>4</sup> As the factor is a multiplier, the mountain factor for Switzerland is calculated: mountain factor/2 + 0,5

with focus on external cost charging are displayed in the middle columns. The comparative scenario with an increase of the mark-up concept is illustrated on the right-hand side with shaded columns

## BRENNER: TOLL COSTS UNDER EXISTING REGIME AND DIFFERENT OPTIONS

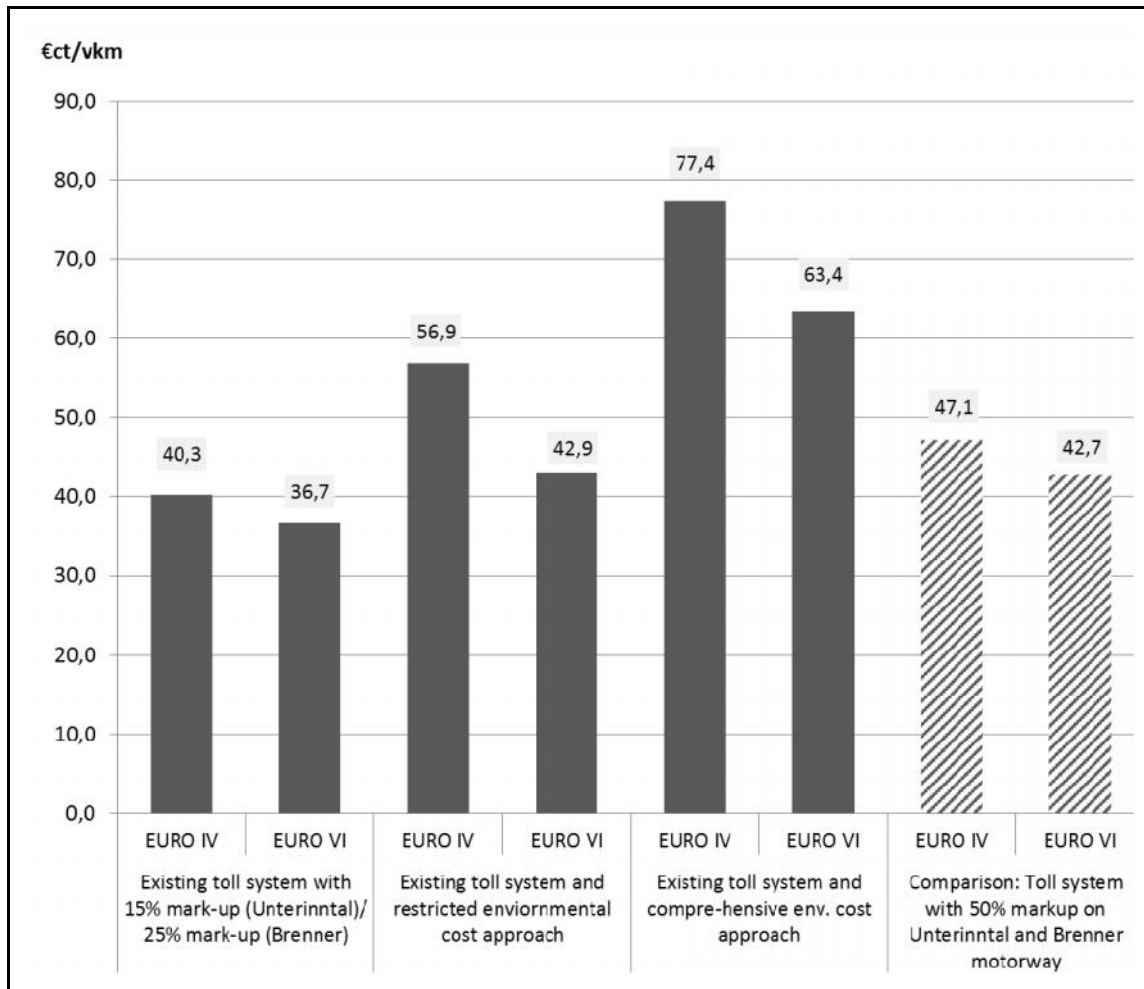


**Figure 2** Costs are presented as total costs for the corridor segment Kiefersfelden – Affi (322 km)

It can be seen that the “Plus” options focusing on environmental costs have considerable impacts on costs. For EURO IV, total toll costs would rise from 130 € under the existing regime to 183 € under the restricted environmental cost approach and to 249 € with the comprehensive approach. In comparison, an extension of the mark-up on the Brenner motorway to 50% would have lower impacts. To reach a similar price signal than in the comprehensive environmental cost approach, the mark-up would have to be set at a factor of about 3 (instead of 0.25).

Presenting these values in Eurocent per vehicle-km, the picture looks as follows:

## BRENNER: TOLL RATES PER VKM UNDER DIFFERENT OPTIONS



**Figure 3** Toll rates are presented as average rates per km for the relevant corridor stretch Kiefersfelden-Affi

### Results for Gotthard case study

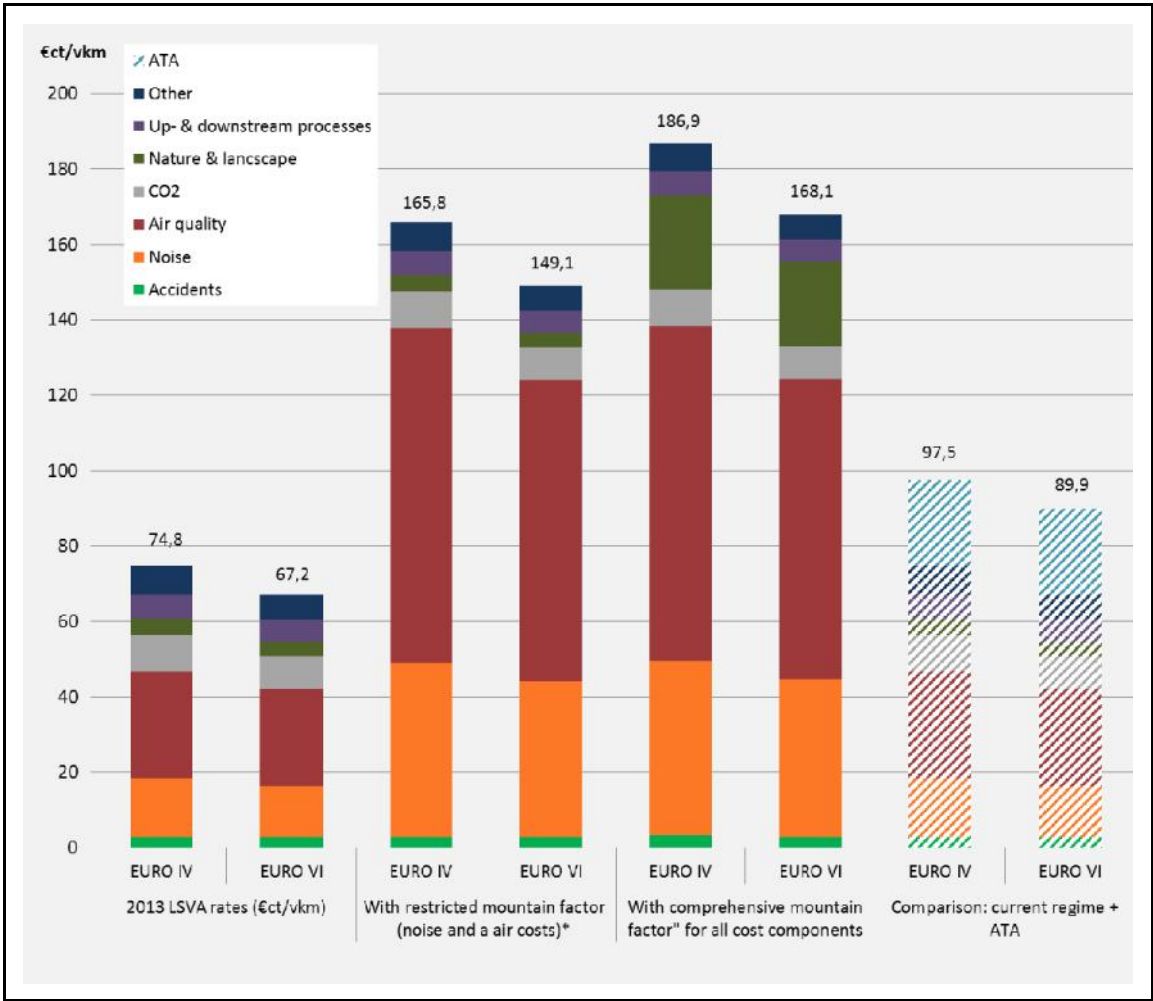
For the Gotthard, calculations consider the corridor stretch from Lucerne to Chiasso which fully covers Swiss territory. Thus, only the LSVA regime and potential “Plus” options need to be considered. The relevant stretch has a distance of 176 km.

As the LSVA is charged according to ton-km, the presentation for the Gotthard corridor starts with the presentation of toll rates per km (assuming a 40 t semi-trailer as representative vehicle). The following figure presents the rates under the existing regime with the shares of different environmental cost categories.<sup>5</sup> To implement the restricted “Plus” scenario focusing on environmental costs, a mountain factor is applied to air quality and noise costs. It can be seen that this mountain factor for air quality and noise costs would nearly lead to double rates. In the comprehensive scenario, the mountain factor is applied to all relevant cost factors. As a comparison, an “Alpentransitabgabe” (ATA) of 40 € for the mountain stretch of the Gotthard corridor

<sup>5</sup> The shares are based on Infrast and Ecoplan (2008): Externe Kosten des Verkehrs in der Schweiz. The shares are applied to current LSVA rates.

is applied (BAV 2013, Verlagerungsbericht). It can be seen, that the cost increase of such an ATA is much lower.

### GOTTHARD: TOLL RATES PER VKM – CURRENT REGIME AND SCENARIOS



**Figure 4** Toll rates are presented as average rates per km for a representative vehicle (semi-trailer 40 t)

Total costs for the different options are presented in the following figure:

## GOTTHARD: TOLL COSTS UNDER EXISTING LSVA REGIME AND SCENARIOS

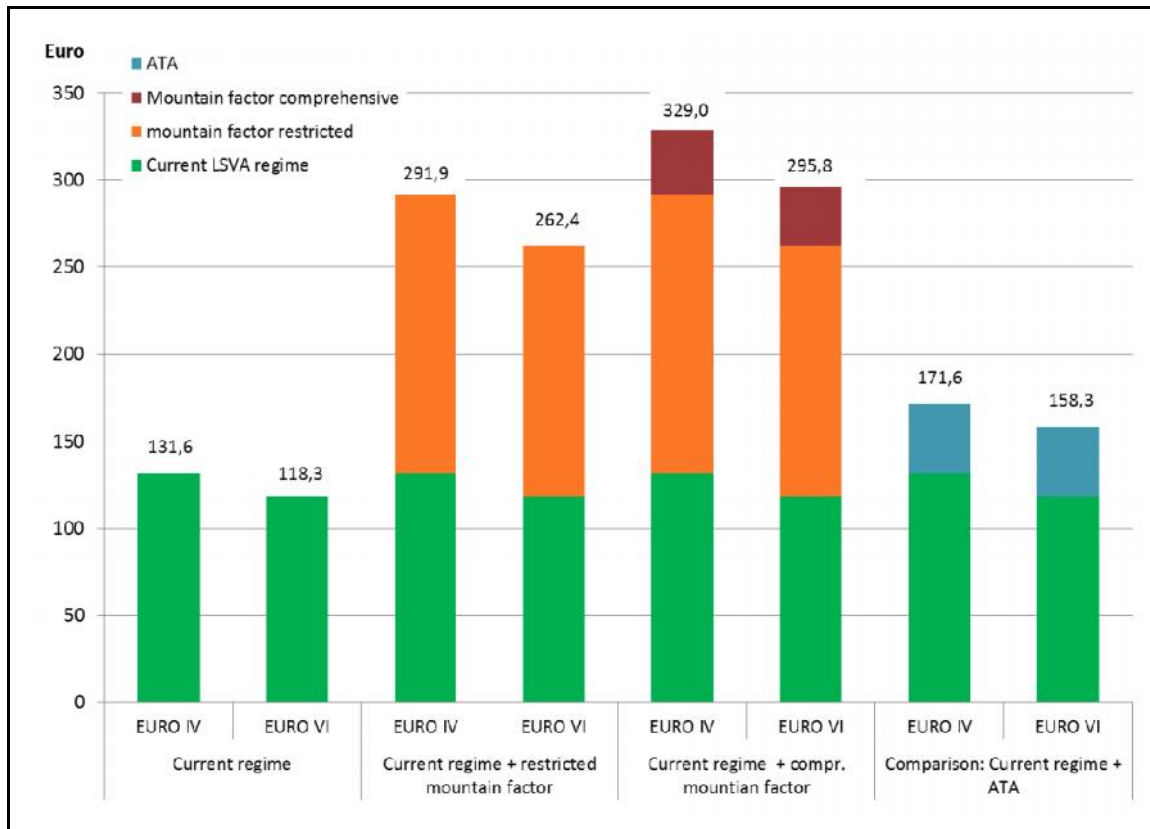


Figure 5 Toll rates are presented for the overall motorway stretch Lucerne – Chiasso (176 km)

### Comparison with price levels proposed by ALBATRAS

The ALBATRAS study does not calculate the level of tolls (“thresholds”) in a bottom-up approach. Rather, the proposed toll levels are derived in a very pragmatic way: the Toll Plus scenario is defined so that Toll Plus charges lie in between the prices that are resulting for the restrictive ACE and AETS-scenarios as calculated by ALBATRAS. This leads to the following Toll Plus rates in Albatras:

- “Toll Plus restrictive 2020”: 0.29 EUR/km
- “Toll Plus restrictive 2030 high” 0.80 EUR/km
- “Toll Plus restrictive 2030 low”: 0.61 EUR/km

For our analysis, especially the ALBATRAS proposal for 2020 with 0.29 EUR/km is relevant as this can be compared with figures derived in the case studies. ALBATRAS does not explicitly make clear if the rate of 0.29 EUR/km includes existing rates or if it has to be seen as addition to existing rates. As current rates on the Brenner and Gotthard corridor already today lie above this value we assume that the 0.29 EUR/km of ALBATRAS relates to the “Plus” only. This value thus needs to be compared to the differences between existing rates and the options calculated in the case studies. The following table presents the comparison for EURO IV HGV.

For the Brenner corridor, the exemplary calculation based on the existing framework shows that the “Plus” comes up to 16,6 €/t/vkm when the restricted mountain factor approach is considered. Applying a comprehensive approach to external cost charging would lead to an increase of toll prices of 37.1 €/t/vkm. An extension of the current mark-up on the Unterinntal-Valley and



Brenner motorway to 50% would however only lead to an average price increase of 6.8 €/vkm on the overall stretch Kiefersfelden-Affi. For the Gotthard corridor, the scenarios focusing on environmental costs lead to higher price impacts as the starting level is about twice as high as on the Brenner. An implementation of an ATA as alternative scenario would lead to a price increase of 22.7 €/vkm.

These values need to be seen as first estimates only as they are based on today's different starting points. We thus also build an average to get a feeling for a more harmonized toll rate. This average can also be better compared to the ALBATRAS rate of 29 €/vkm which is also an average rate for all regions and vehicles. The comparison in the table below shows that the overall level proposed by ALBATRAS seems to be a lower boundary for an appropriate toll level only.

Overall, it can be seen that an extension of the specific environmental cost approach is more appropriate to develop an appropriate price signal than an extension of the standardized mark-up factor. We thus take this approach further in the following discussions.

#### COMPARISON OF CASE STUDY RESULTS WITH ALBATRAS (FOR EURO IV)

€/vkm	Brenner value	Gotthard value	Case study average value	ALBATRAS average value
<i>existing rate</i>	40,3	74,8		29
<i>rate with restricted mountain factor</i>	56,9	165,8		
<b>Δ rate with restricted mountain factor</b>	<b>16,6</b>	<b>91,1</b>	<b>53,9</b>	
<i>rate with comprehensive mountain factor</i>	77,4	186,9		
<b>Δ rate with compreh. mountain factor</b>	<b>37,1</b>	<b>112,2</b>	<b>74,6</b>	
<i>comparison: rate with extended (implemented) mark-up</i>	47,1	97,5		
<b>comparison: Δ rate with mark-up</b>	<b>6,8</b>	<b>22,7</b>	<b>14,8</b>	

Table 4

As mentioned above, a more detailed analysis would be necessary to derive a regional proposal on specific rates for Toll Plus. The case study estimates however serve to get a first feeling on an appropriate level. Also, they show the difficulty with calculating acceptable toll rates. If the calculation builds on the existing, unharmonised regime, Toll Plus would lead to a further divergence of toll prices (as seen by the difference between the case study results for Brenner and Gotthard). Thus, a more harmonized approach for calculating toll rates would be necessary. Also, a follow-up analysis would need to further define the relevant stretch of the corridors on which Toll Plus should be applied.

### 4.3 A „Plus“ also regarding the use of revenues

#### Approaches to using additional revenues

As discussed above, a Toll Plus system should not only be seen as internalization but also as financing instrument. Revenues generated through Toll Plus could be earmarked to the Alpine regions to support projects with relevance for modal shift.

- Up to now, the cross-financing rationale in Switzerland has mostly focused on large rail infrastructures. An extension of this idea would be most obvious. Especially, along the

Brenner and Mont Cenis/Fréjus corridor, additional revenues could be used for financing new railway base tunnels.

- To support modal shift, revenues could also be used for improving combined transport infrastructures, especially terminal capacities along the Alpine transit routes.
- Beyond the financing of railway infrastructures, revenues could be used for limiting additional burdens which might come along with modal shift. Noise protection infrastructures could be an important element. Also, it might be possible to optimize routes of new railway infrastructures regarding noise impacts.
- Revenues could further be used for adapting existing and new transport infrastructures to climate change impacts (especially impacts through natural hazards).
- To avoid hardship cases and to strengthen regional development in most affected regions, it might also be possible to include additional financing needs that come along with modal shift from road to rail. For example, this could include the optimization also of passenger rail transport to ensure that new railway lines maintain or even extend accessibility of Alpine regions.

### **Revenue management**

A Toll Plus system as described above will generate considerable revenues. Using the additional toll rates resulting from the case studies and HGV volumes of 2012 (Alpinfo data), additional revenues would lie between 46 and 103 Mio. €/a for the Brenner corridor and between 315 and 388 €/a for the Gotthard corridor. The comparative scenario with an extension of the mark-up concept leads to lower revenues.

### **ANNUAL REVENUE GENERATED IN THE CASE STUDIES**

	<b>Brenner corridor</b>	<b>Gotthard corridor</b>
HGV volume 2012	886.000	1.966.000
Corridor length (km)	314	176
<b>Annual revenue (Mio. €)</b>		
<b>with restricted mountain factor</b>	<b>46</b>	<b>315</b>
<b>with comprehensive mountain factor</b>	<b>103</b>	<b>388</b>
<b>comparison: with mark-up</b>	<b>19</b>	<b>79</b>

**Table 5**

The following priorities for revenue use might be possible:

- If large rail infrastructure projects are foreseen on the relevant corridor, the additional revenue is used for cross-financing these infrastructures.
- If no major projects are foreseen or if they are already financed (i.e. Switzerland), the additional revenue could be used for regional projects. It could be discussed if the revenues goes to the regions for financing relevant modal-shift projects and accompanying measures, including climate change adaptation measures.

#### **4.4 Recognising the impacts on local and regional transport**

Similar to the discussion on ACE and AETS, impacts of a Toll Plus system on local and regional transport in and between the Alpine regions need to be considered. For the cap-and-trade systems, several specific ideas to design rules for exemptions have been developed in the frame of ALBATRAS and relevant studies for the Swiss framework (e.g. INFRAS/Metron 2011). The iMONITRAF! report on innovative approaches (Lückge et al. 2011) provides an overview and derives recommendations.

However, the problem is slightly less relevant under a Toll Plus system if tolls are distance-dependent. If the collection of tolls on the basis of effective driving distance is technically feasible, there are no over-proportional burdens.

Still, hardship cases can emerge if transport prices increase considerably for transport-intensive sectors in the Alpine regions. As this mechanism is similar to impacts of existing pricing systems, rules for exemptions could build on existing frameworks.

## 5 Legal aspects: which adjustments are necessary?

The previous analysis has already shown the relevant legal and political framework for a Toll Plus system with the Eurovignette Directive and the national frameworks (see chapter 2). A detailed legal analysis has also been provided in the LEGALP project for the Suivi de Zurich. This analysis has considered the legal consistency of an ACE, AETS and Toll Plus with European Union Law, the Agreement between the EC and Switzerland on goods and passenger transport, other EU agreements, international, multilateral and bilateral treaties and agreements on transport and trade as well as the national law of the Suivi de Zurich countries.

In the following, we summarize the main results of LEGALP regarding EU law, the CH-EU transport agreement as well as the national frameworks (Waldeck Rechtsanwälte et al. 2012):

- **European Union law:** In general, pricing mechanisms are seen as appropriate instrument for internalization of external costs. The pricing approach is in line with major EU principles (non-discrimination, free movement of goods, etc.). The Eurovignette Directive provides the major framework with infrastructure (including mark-up) and environmental cost charging (air quality and noise, mountain factor 2). For more details refer to chapter 2.3.  
→ If the design of a Toll Plus system shall go beyond the existing framework of the Eurovignette Directive, a revision of the Directive becomes necessary. A new revision round of the Directive is already foreseen starting from 2015 (Article 11,2).
- **CH-EU bilateral agreement:** The mechanisms of cost-relatedness of transport charging is also set forth in the CH-EU Transport Agreement. Since the already existing HGV fee has been agreed upon in the existing Agreement, Toll Plus could be introduced as a supplement to the HGV fee without a bilateral adjustment of the Agreement only if the set maximum price ceilings are not exceeded.  
→ If price ceilings of the existing agreement are exceeded: adjustment of CH-EU agreement becomes necessary.
- **Austria:** The Toll Plus concept is generally in line with the overall Constitutional Act. However, an application to single corridors would have to be justified. The potential for optimization is limited under the existing Eurovignette framework as the mark-up is deducted from external cost charges. Especially for the Brenner corridor with its ban of high-emitting HGV, this deduction rule does not leave any room for toll increases.  
→ Currently, external costs are not covered by the relevant toll regulations. If external costs shall be charged on the overall motorway network, an adjustment of the legal framework would be necessary. To gain additional potential for the Brenner corridor, this would however require an extension of the Eurovignette Directive.
- **Switzerland:** The current framework foresees the implementation of an ACE as additional steering instrument. The implementation of a Toll Plus system is not foreseen.  
→ Implementing a Toll Plus system would require an amendment of the Federal Act on the Transfer of Transalpine Heavy Goods Traffic from Road to Rail (Güterverkehrsverlagerungsgesetz) as well as the provision of a separate legal basis for an enactment of Toll Plus by parliamentary act.
- **France:** Toll Plus is generally in line with the overall Constitution and legal principles. The element of external cost charging is already considered with the new ecotaxe poids lourds (implementation is pending). This new ecotaxe needs to be considered when discussing the design of Toll Plus on the French-Italian corridors.

- Still, the implementation of Toll Plus would require a new law that ensures the consistency with the French Roads Code.
- Italy: The implementation of Toll Plus could be in contrast with existing regulations for road transport as it could lead to an economic burden and hamper free circulation of goods transport. However, the national implementation of the Eurovignette Framework, in principle, leaves room for external cost charging.
- An implementation of Toll Plus would require modifications of the concession agreements

The LEGALP analysis shows that the implementation of an ambitious Toll Plus system that goes beyond the current framework of the Eurovignette Directive requires several adjustments of legal frameworks on EU and national level. As all relevant frameworks already exist and as Toll Plus seems to be in line with major principles on EU and national level, the legal adjustments seem manageable:

- On EU level, a review and revision of the Eurovignette Directive is already foreseen. An extension to a Toll Plus system seems, in principle, possible. However, an extended Directive still needs to consider the principle of cost-charging. It would thus be necessary, to provide the scientific evidence for a Toll Plus system (e.g. up-to-date estimates on external costs in mountain areas, information on infrastructure costs).
- On national level in France, Austria and Italy, the Eurovignette Directive has been transposed into national law. The legal basis is thus already available and could be amended to develop a Toll Plus framework.
- In Switzerland, the implementation of an ambitious Toll Plus system would require an adjustment of both the national framework and the bilateral agreement with the EU. The current Monitoring report on modal shift already mentions that the optimisation of the HGV fee will be analysed in detail in 2014, already opening the discussion on legal adjustments.

A more recent legal analysis of Prof. Epiney (2013) focuses on the compatibility of an Alpine Crossing Exchange with EU law. It is shown that:

- An ACE would be compatible with primary EU law: it can be justified as a measure to reduce environmental burdens. Its implementation on the main Alpine corridors would be in line with the EU principle of proportionality (due to its high effectiveness). Also, it would meet the criteria of coherence (Alpine corridors North-South face highest transport volumes so that a focus on these corridors is possible), necessity (all other measures are less effective) and appropriateness (if enough rail capacities are provided).
- An ACE would also be compatible with secondary EU law. The criteria defined in the Eurovignette Directive would not apply, as an ACE would not fall within its scope.
- Concerning the compatibility with the bilateral agreement between Switzerland and the EU, it is noted that this agreement would need to be revised to include an ACE.

Even if the new study focuses on the ACE, the analysis considers several links to the Eurovignette Framework. Especially, it is shown again that the pricing approach and the cap-and-trade approach are two different approaches, also from a legal viewpoint. While a Toll Plus system can build on the existing framework, a cap-and-trade approach would require a completely new legal framework.

## 6 SWOT analysis, recommendations and further steps

### *Overview - SWOT analysis from the regional viewpoint*

The previous chapters have analysed a potential Toll Plus system from the regional viewpoint. The discussion made clear that the discussion need to be differentiated between EU and Swiss regions. In Switzerland, the LSVA is already designed as internalisation instrument with an important financing component. In the EU regions, this level of ambition yet needs to be met. To gain support from the overall iMONITRAF! network, a Toll Plus system needs to be designed so that it also generates new opportunities for the Swiss regions. Several options have been illustrated in the previous chapters.

As an overview, the proposed design features and strategic approaches for a common Toll Plus approach are evaluated with the help of a SWOT analysis.



## TOLL PLUS SYSTEM – SWOT ANALYSIS FROM A REGIONAL VIEWPOINT

	Viewpoint of EU regions	Viewpoint of Swiss regions
<b>Strengths</b>	<p>Toll Plus leads to better internalisation of external costs and sets incentives to use less polluting HGV and leads to important financial means to facilitate modal shift .</p> <p>Price increase also sets incentives for modal shift (but difficult to estimate)</p> <p>Starting points are available: Eurovignette Directive and discussion within Suivi de Zurich process</p> <p>The system can be extended to passenger transport.</p> <p>Low implementation and administrative costs as existing technical installations can be used.</p>	<p>A differentiation of the LSVA according to spatial characteristics would strengthen polluter-pays-principle.</p> <p>Revenues of the LSVA have been earmarked to major rail projects which are partly finalised. With the help of a Toll Plus, new modal shift projects could be launched.</p> <p>Further aspects: see EU regions</p>
<b>Weaknesses</b>	<p>No direct steering of transport volumes possible (need for cap-and-trade instrument remains).</p> <p>Calculation of an appropriate mark-up factor is very project-specific and leaves much room for discussion (with regard to systems delimitation)</p>	<p>No direct steering, modal shift objective still requires additional instruments.</p> <p>An ambitious Toll Plus approach would not be compatible with the current bilateral transport agreement CH-EU.</p>
<b>Opportunities</b>	<p>Through regional revenues: extension of transport infrastructures, better accessibility for passenger transport, higher living conditions.</p>	<p>Differentiation of LSVA for mountain regions is a step forward for a modern pricing-approach (best practice).</p> <p>Revenues for projects with special regional interest: e.g. financing of noise protection infrastructures along Gotthard corridor</p>
<b>Threats</b>	<p>Some limited impacts on regional and local transport are possible. Need to consider hardship cases.</p> <p>Unwanted traffic shifts if Toll Plus is not harmonised across corridors.</p> <p>Energies of the iMONITRAF! network should not focus completely on Toll Plus approach. Sequencing of instruments, especially of cap-and-trade instruments remains important.</p>	<p>Political momentum for Alpine Crossing Exchange could be further reduced (→ challenge for communication and scoping).</p>

Table 6

### Recommendations – essential Toll Plus elements from a regional viewpoint

Summarising the findings of this discussion paper, we recommend the following priorities for a Toll Plus system which should be taken forward from a regional viewpoint:

- All regions should lobby on national level towards full use of existing optimisation potentials (especially the integration of external cost charges as provided by Eurovignette Directive).
- From the iMONITRAF! viewpoint with a focus on reducing environmental burdens of transalpine freight transport, Toll Plus should focus on a more appropriate external cost charging in mountain areas by lobbying towards:
  1. more appropriate mountain factors for air quality and noise as restricted approach
  2. inclusion of additional external cost elements, especially elements with overproportional impacts in the Alpine Space (nature & landscape, accidents)

3. a shorter exemption period for EURO VI HGV to ensure the polluter-pays-principle (Directive includes exemption until 2018, could be shortened to 2016).
- Further, a regional statement should argue for a clear separation of the mark-up concept and the external cost charging concept of the Eurovignette Directive. Currently, there is a considerable overlap between those elements. External cost charging allows for a much more specific internalisation of external costs, strengthens the polluter-pays-principle and is overall much more transparent than the mark-up concept. The mark-up concept should much more focus on over-proportional infrastructure costs in Alpine regions.

Necessary framework/minimum requirements from regional viewpoint:

- Design: Tolls should be distance-dependent to support the polluter-pays-principle and to avoid over-proportional impacts on local and regional transport.
- Coverage: Tolls should be charged for HGV starting from 3.5 t to consider the general trend of ever smaller shipments and higher need for flexibility which has led to an increasing share of light duty vehicles (due to just-in-time production processes and increase of custom-made products). Also, an unwanted shift from HGV to LDV transport should be avoided.
- Corridor approach: toll rates should be calculated per corridor to consider differences in environmental characteristics and finance needs. Both the element of environmental cost charges as well as the mark-up depend on corridor-specific features.
- Revenues should be (at least) partly allocated to Alpine regions for financing of transport infrastructures and for turning economic burdens of a Toll Plus system into opportunities. This could also include a compensation of hardship cases.
- As focus, revenues should be used to further support combined transport. Financial support could be related to terminal planning and financing, to support pilot projects and specific supplies in addition to on-going EU and national programmes and efforts.

### ***Further steps towards the implementation of Toll Plus***

As mentioned above, this discussion paper shall provide the basis for developing a regional position on a Toll Plus system and for launching the debate on regional and national level. Toll Plus thus becomes the first element of the iMONITRAF! strategy of Lyon to be further developed. For the further process, we propose the following steps.

Debate on regional level:

- Results of this input paper should be presented on the next iMONITRAF! Transport Forum, especially recommendations and core elements from a regional viewpoint. If agreed within the network, the discussion paper could be handed out to all participants.
- Especially the recommendations and core elements could be discussed during a political roundtable which is planned in the frame of the Transport Forum. Representatives of the political roundtable could also discuss an approach to revenue management of Toll Plus.
- Based on political feedbacks, an official regional statement could be developed

Debate on national and EU level:

- To feed the regional viewpoint into the discussion on national level, the iMONITRAF! network should use its multiple contacts to the Suivi de Zurich group (via the Steering Committee, the new working group EnvAlp, direct contacts with members of the Steering Committee, etc.). It should be ensured that upcoming activities of the Suivi de Zurich on Toll Plus consider the regional viewpoint.

- In addition, the discussion paper and a regional statement on Toll Plus could be fed into relevant activities on EU level regarding the next revision of the Eurovignette Directive. For this, the regional offices in Brussels and existing contacts to Member of the EP could be used.

As next steps for specifying the regional proposal, a more detailed analysis on appropriate toll rates for Toll Plus is necessary. The case study results of this discussion paper only serve to get a first feeling on appropriate toll levels. A follow-up analysis would have to find a more harmonized approach.

### ***Outlook: Toll Plus on the pathway towards a cap-and-trade approach***

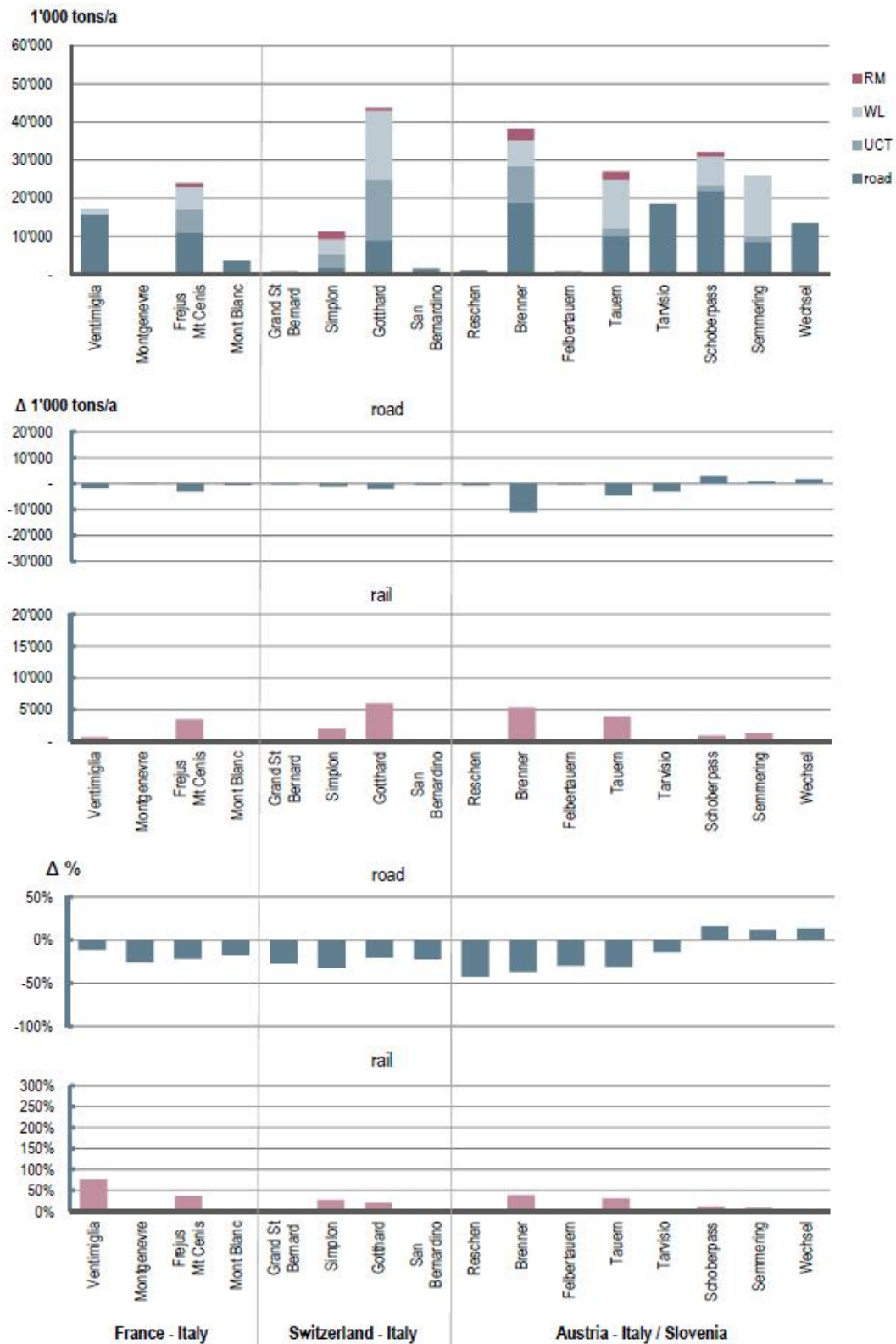
The iMONITRAF! strategy foresees a Toll Plus system as medium-term instrument and intermediary solution towards a comprehensive cap-and-trade approach. The strategy's target system for a cap-and-trade is based on the capacity approach, so that it only becomes effective when the new relevant infrastructures are available (base tunnels at Gotthard, Brenner, Mont Cenis). At this point of time, a cap-and-trade instrument shall be implemented for an effective steering of transport volumes.

Cap-and-trade is the most effective approach for reaching specific targets according as experiences with existing cap-and-trade systems (especially the EU emissions trading system) show. However, its effectiveness regarding internalization and financing depends on the price of allowances which can fluctuate considerably as shown by the EU ETS. A hybrid approach might thus be an option in the long-term: a cap-and-trade approach as steering instrument, supplemented by a Toll Plus system to guarantee a minimum toll price for internalization of external costs and to generate revenue for financing of new rail infrastructures and projects. Experiences with such a hybrid system are already available, for example in the UK which implemented a minimum CO<sub>2</sub>-tax as supplement to the EU ETS.

## Annex

Detailed information on ALBATRAS results for 2020: Effects of a toll plus scenario

Transalpine freight transport 2020 in Alpine arch C, in 1'000 tons/a, changes in 1'000 tons/a and in % (RM: Rolling Motorway, WL: Waggon Load, UCT: Combined Transport, Road: Lorries)



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## SUGGESTED READING FROM THE iMONITRAF! NETWORK

All iMONITRAF! publications are available in the section “publications” on the iMONITRAF! homepage:

[www.imonitraf.org](http://www.imonitraf.org)

### **iMONITRAF! Best Practice Guide (2010):**

The Best Practice Guide provides comprehensive information on Best Practice measures in all iMONITRAF! regions, including information on current pricing system. In its second section, it focuses on the transfer of good practices to other regions, illustrating the process in “Decision making aids” for selected measures.

### **iMONITRAF! Report on innovative approaches (2011)**

This report gives an overview on innovative approaches for transport systems in the Alpine Space. In addition to information on innovative technological approaches, the report analyses innovative steering instruments. This includes an analysis of Toll Plus.

### **iMONITRAF! DPSIR analysis – Alpine Transit Traffic – Policy Scenario 2020 (2012)**

As a decision making tool, iMONITRAF! has developed a DPSIR framework (Driver-Pressure-State-Impact-Response). For each of the indicators, a target value and evaluation scale is defined. In the DPSIR brochure, different policy scenarios are compared to the network’s target values – showing their ability to reach the target pathway. One of the scenarios includes a steering instrument (ACE).

### **iMONITRAF! Strategy of Lyon (2012)**

The iMONITRAF! strategy is the major milestone of the cooperation under the INTERREG framework. With their signature, political representatives of the Alpine regions define common principles, a common target system as well as specific common measures. Toll Plus is included in the strategy as mid-term instrument to support modal shift.

### **iMONITRAF! Annual Report 2013**

The latest publication of the network is the Annual Report 2013. It provides an overview on the network activities under the new organisational framework. Also, it includes a detailed update of Best Practices, including an Annex with factsheets. Regarding Toll Plus, also the section on developments on EU and national level is interesting.