



Tolling Europe 2024: The future of road user charging

Summary Report of Report TOL-24-001
Aurora Insights



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Tolling Europe

An Executive Summary of Report TOL-24-001

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Executive Summary by Keith Mortimer

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Introduction

Policies and priorities aren't the same for road user charging across the world; but between the 25 speakers at the 21st Road User Charging Conference in Brussels, we witnessed a coming together of methods and motives, common concerns, and future visions. Change was in the air, evidenced from accounts by new RUC adopters feeling more confident to take advantage of proven approaches and standards, while established scheme managers planned ongoing development focussed on longer-term imperatives. Key take-aways from RUC Brussels include using RUC data to create value and protect privacy; making the most of digital technologies to achieve fiscal, environmental, and social goals; valuing diversity while realising interoperability across Europe; and building and deploying a framework for climate change measures.

Green light for EETS

Viapass is Belgium's kilometre-based truck tolling operator, accommodating three regionally distinct schemes for strategic highways in Flanders, Wallonia and Brussels. Into its eighth year of operation, Vice-President Bart Dewandeleer discussed the current system, one that has never experienced any outages. Presently, it requires an on-board unit and must show a green light; although Dewandeleer hinted that a distance-based ticketing option was on the cards.

Tolling Director Jan Strijk discussed RDW's new Toll Collection Division, creating 150 jobs in their Groningen heartland. Of special interest was the forthcoming truck tax, harmonising the Netherlands via EETS with the distance-based schemes of Belgium and Germany. The current major procurement was to be finalised in May for roadside equipment, and the main service provider awarded by November for operation from 2026.

Camilla Riff Brems, Divisional Head at the Danish Ministry of Transport's Centre for Climate and Analysis, outlined plans to set up the national GNSS-based HGV road toll. From January 2025, climate differentiation will feature in line with EC directives, plus a 'toll ticket' option for occasional drivers in vehicles over 12 tonnes. The scheme costs will be lowered by utilising available EETS service providers, and an enforcement-light approach requiring only six fixed and 18 flexibly-deployed mobile units.

Slovenia's state-owned motorway concessionaire, DARS, has the role of Toll Charger responsible for investment in future network so far covering 623km of motorways and

expressways, charged through 128 sections. ETS specialist Luka Babnik took us through plans for EETS implementation, with updating of the DARSGO free-flow scheme to complete shortly. It is expected that the first EETS provider, Telepass, will be joined in 2024 by Toll4Europe.

Bulgaria is the latest convert to distance-based charging. A case study by the National Toll Administration Director Georgi Temelkov of their new GNSS scheme addressed the strategic need to replace time-based vignettes for heavy vehicles. RUC brings positive benefits while enabling fairer charging for a high volume of cross-border users and opening a new dimension for highway safety.

Building for the future

ETC expert Franjo Bošnjak brought news from the Federation of Bosnia and Herzegovina. Politically and economically vital, the A1 motorway will stretch for 325 km with 138 bridges, connecting Bosnia with centres in Hungary and Croatia. So far 126 km has been built, joining cities in central Bosnia. The 70 km main tolled section serves Sarajevo and surrounding towns with 14 Toll stations, where innovative marketing helps to encourage greater ETC use in a cash culture.

For the last year, Ragnar Bjartmarz has led the setup of an Icelandic governmental RUC strategy centre. 'Our Roads to the Future' is an initiative to unify the efforts between three Ministries through a holistic national approach, focused on a vision for deploying RUC in Iceland, tailored to meet the country's infrastructure and mobility objectives. Aided by competitive green electricity prices, the nation's energy shift is accelerating. Despite increased road usage, a rapid decline in tax revenue now demands a compelling strategy. A kilometre tax will replace fuel taxes from 2025, registered via vehicles' odometer readings, ensuring fair charging whatever the fuel type.

"Smooth and effortless" Norway was the earliest developer of electronic tolling, building a network that today brings 15 billion NOK revenue. NPRA's Senior Adviser, Egil Andreas Aesheim, showed the way to "get the best from the tech." Robust and efficient, optimised AutoPASS technology enables both distance-based and zone-based tolling, and differentiation of vehicle classes and emissions. In an EETS-aligned model, after recent reforms toll charging is delegated to five regional service providers, while NPRA retains governance together with, most importantly, ownership of the national hub for transactional data processing.



EETS just got greener

Delegates also learned how RUC will encourage meeting Europe's target of 30% reduction in CO₂ emissions by 2030. The good news was that ASFINAG has done the hard work, with implementation on time in Austria and Germany. Managing Director, Bernd Datler, was on hand to "de-complicate" the Directive's legal framework, tariff allocation and data exchange with EETS providers. Vehicles are assigned to one of five CO₂ emission classes, the tariff depending on their CO₂ emissions. "Evolution, not revolution" enables flexibility for future changes. ASFINAG provides a customised 'CO₂ calculator' service for determining the tariff. Allocation from a central system with vehicle manufacturer's data means that that re-personalisation of on-board equipment is not needed. Datler reported that early results in Austria met expectations with active OBU (GO-Maut, Toll2Go, Emotach and EETS).

First experiences as an EETS provider in Germany and Hungary were reported by Peter Tschulik of Toll4Europe, whose members (T-Systems, Daimler Truck, DKV and Shell) have pioneered satellite-based tolling in Europe. So far, limited data has been available from vehicle manufacturers. Parameters not previously used for tolling are not straightforward to verify, with no clear way to obtain the required vehicle data across all member (and non-member) states. Tschulik expressed concern that plans to progress EETS-ready toll domains might be negatively impacted. Vehicle classification should be done once and then be valid in each toll domain. In addition, such significant tariff changes increase the costs of financial guarantees. In most countries no compensation is offered for development costs incurred when recertifying OBU changes. He recommended that countries should set realistic timetables and avoid proprietary national solutions, learning from Austria and Germany, who had been responsive with helpful explanations, tutorials and timely specifications.

Fedor Unterlohner, Freight Manager at the expert group Transport & Environment, offered another view of the EU rules on CO₂ based tolling and impact on the trucking sector. "If they were a country, HGVs would be the fourth largest emitter." This would put them behind China, the USA, and India, but ahead of Russia and Japan. Obligations for member states wishing to toll vehicles are central to the greening of Europe, meeting challenges of clean air, climate change, and congestion. This decade's timetable included the tolling of small trucks and ending the use of time-based charging, with a look ahead showing the positive environmental impact of planned measures.

Living for the city

The northern English city of Bradford sports the UK's second biggest Clean Air Zone. Andrew Whittles, Air Quality Programmes Director, said that the city has recorded its lowest level of air pollution since records began, with monitoring at 400 locations. Charges made to polluting vehicles were offset by £32m grant funding made available for those wishing to upgrade affected commercial vehicles. In 2018, limits were exceeded in 36 locations, however, this is now down to three. Overall NO₂ levels have halved, tracked by reduced hospital admissions for cardio/respiratory and pulmonary illness.

"Helmond is a city on the move with a 'hands on' mentality." René Spaan, Smart Mobility leader, described the city as a living laboratory, highlighting its part in the current pan-European C-ITS pilots. The ongoing C-Roads (Antwerp-Helmond) project was designed to

show how integrating cooperative ITS with urban vehicles has the potential to be the next move for all. The main use cases involved intelligent speed adaptation (ISA) and urban vehicle access (UVAR) elements. Connected ITS, UVAR and RUC complement each other, relying on accurate data analysis, and matching digital to physical infrastructure to help improve the liveability within the city.

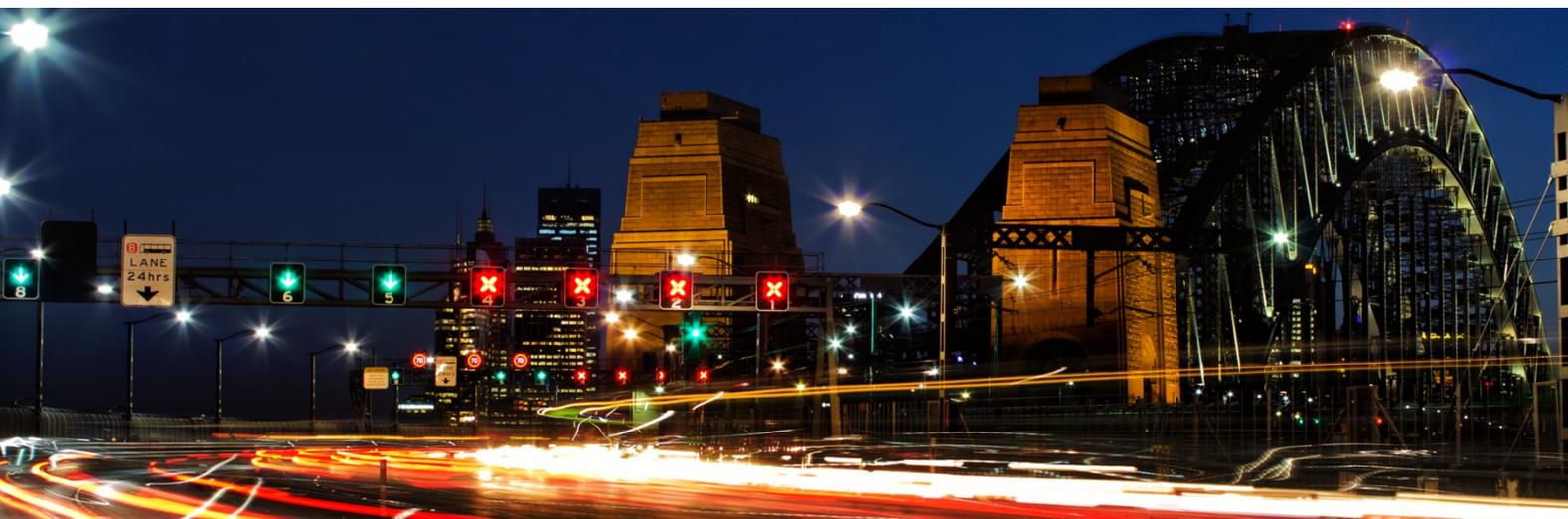
Dr Sven Marivoet, Project Coordinator for Transport & Mobility Leuven, brought a similar message: “Our mission is to help society by offering scientifically sound advice.” Analyses of OBU-data from Belgium’s kilometre charging provide insights useful to decisions about parking, congestion, and road usage. The mapping of anonymised journeys, such as delivery stops and speeds, results in strong quantitative prediction models, creating confidence by linking theoretical findings with practical knowledge.

Making data work

In Germany, by the end of its’ twentieth year of operation, distance-based truck tolling will have raised €100 billion, with continued extension of tolled routes and vehicle classes. As a first-adopter of CO₂ based charging, further revenue is forecast in the next three years, earmarked for infrastructure and mobility improvements. The country is also looking to extend the toll to 3.5 tonne trucks with CO₂ differentiation.

Stefan Koesling is the Head of Strategy & Business Development for Toll Collect. He brought a sideways look at the German Maut: a grand total of 53,000 km of federal roads must be kept safe; and the network’s 40,131 aging bridges represent a high cost for maintenance and renewal. Data collected from highway load measuring points and equipped vehicles has enabled a valuable service for infrastructure profiling, axle load determination and “intelligent control of mobility.” A legal framework was agreed to allow the use of anonymised data for statistical evaluation, and Toll Collect’s enhanced capability has found great demand from cities to enable independent, self-managed analyses to inform policies and priorities.

Wouter van Haaften of the Leibnitz Institute delved into the issues of personal privacy and the importance of solid legal protection as GNSS tolling takes hold in Europe. Data protection requires a privacy-by-design approach, meaning that it is built into the scheme’s technical and organisational fabric, transparent about explicit purposes for data usage,



embodying proportionate, time-sensitive risk awareness. User perception is key, so that RUC technologies are not seen as a tool of Big Brother, but operated with integrity and accountability.

Ireland returned to the conference with a cautionary tale. “An excellent and sobering presentation” was the verdict of Cathal Masterson, Director Commercial Operations at Transport Infrastructure Ireland (TII). Ken Pierce, Senior Manager of Tolling Operations, introduced the topic of “Smishing” to a startled audience. In early 2023 a wave of fraudulent attacks upon eFlow, Ireland’s nationally trusted service provider, prompted action. Pierce estimated that 190,000 people were affected, with 175,000 losing money on fake calls. He ran through a number of scenarios: demands for unpaid tolls and convincing online messages requesting that users ‘update their details’. A further problem of reputational damage led to customers ignoring legitimate messages, leading to non-payment of due amounts and escalating penalties. The remedy involved cross-functional teams, working with external parties, banks, and stakeholders to inform clients and bring down the perpetrators. He concluded that cybercrime is here to stay, so be ready and quick to adapt. Toll providers have a responsibility to limit exposure of customers and to “win the numbers game against criminals seeking to steal the most money for least effort.”

The message was reinforced by ARUP’s Kabira Allain, Security & Risk Skills Leader within TII’s commercial team, laying down a graphic portrayal of the fundamental pillars of governance, risk, and compliance (GRC). Good governance and risk mitigation must recognise key objectives, creating a roadmap for achieving operational resilience. The cyber threat represents a high risk to enterprise and the prospect of catastrophic reputational damage. Business continuity is achieved through robust planning, periodic testing, and use of realistic workshops.

Accurate, reliable information is the lifeblood of RUC, and stories from this conference feature the stretching of performance, making the most of technology to generate and process useful data. RUC partners respectively described best-of-class approaches to support tolling providers working towards a unified scheme across Europe.

Daniel Brunelli, Head of Product for in-vehicle telematics leaders Continental described powerful OEM-fitted and EETS-ready telematics, making use of Smart Tacho development to enable data access without the need for additional hardware. Benefits include enhanced efficiency, reduced hardware dependency and streamlined road user charging processes.

Daniel Scholz-Stein, CEO of Vitronic Machine Vision, introduced a smart sensor platform offering a leap forward in image-based analysis of vehicle classification, with accuracy exceeding 99%. The idea that the “Combined Convolutional Neural Network” is not just marketing was amply illustrated by a case study of automated enforcement for the new Polish toll collection system, e-TOLL, where 18 new free-flow gantries and 102 patrol vehicles replaced former toll plazas.

Winds of change

Across the Atlantic, RUC policy is also evolving, driven by environmental, fiscal, and social winds of change. All of these influences were debated, both during the sessions and informally between colleagues. Adrian Moore, Policy VP of the non-profit think tank Reason Foundation updated the proceedings with lessons learned so far during RUC updates in the USA. The focal point for the US pilot schemes is on the money to replace growing road fund deficits. Moore examined attitudes to RUC and its impacts; public acceptance of changing to per-mile charging, and how RUC affects rural and agricultural users. While there was still much technical evaluation going on, greater cooperation between states was seen, benefitting from shared experience and better interoperability. He presented the 'US RUC Self Help Guide' prepared with the TRB Research Center. Meant for agencies leading local RUC programs, as a resource for legislators and communicators, and a means for transportation professionals to explore options, this guide was not a snapshot but aims to be regularly updated.

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