

# Tolling Asia Pacific:

## Trends, trials, and transformations

Executive Summary of Report TOL-24-004  
Shannon Minehan and Xinchun Li



# **TOLLING ASIA PACIFIC: TRENDS, TRIALS, AND TRANSFORMATIONS**

## **An Executive Summary of Report TOL-24-004**

Shannon Minehan and Xinchun Li

### **Aurora Insights**

research@AuroraInsights.co.uk

## **INTRODUCTION**

Facing unique challenges and exciting opportunities, the Asia-Pacific region is emerging as a key player in the tolling world. From congestion in densely populated cities to innovative plans to address funding gaps, the region is increasingly implementing efficient, sustainable, and safe tolling and road user charging solutions.

These efforts were showcased at the Road User Charging Conference Asia Pacific 2024, an annual gathering of tolling, mobility pricing, and transportation management professionals within the area. Offering attendees exclusive insights into global road user charging and tolling, the event brought together key public and private sector stakeholders from across the region to discuss global and local aspects of tolling, pricing, and road user charging. With 16 speakers representing 12 countries, attendees delved into how revenues raised by user-financed transportation – including tolling, pricing, and road-usage charging – can enhance transportation infrastructure, improve road safety, and support wider sustainability initiatives and decarbonization efforts. Throughout the conference, several key themes emerged such as electronic toll collection, sustainability, data security, and public acceptance, highlighting the region's latest challenges and developments in implementing transportation solutions.

## **MANUAL TOLL COLLECTION TO ELECTRONIC TOLL COLLECTION**

The Asia Pacific is rapidly moving towards a digital transformation as countries within the region switch from manual toll collection (MTC) to electronic toll collection (ETC). With ETC automating the collection of tolls through the identification and classification of vehicles using electronic systems, this transition has been driven by the numerous benefits ETC provides compared with MTC.

Dr Vu Minh Khuong from the Lee Kuan Yew School of Public Policy, National University of Singapore, discussed how interoperability and the facilitation of extensive data collection have driven this shift, enabling seamless toll collection, supporting digital infrastructure growth, and promoting data-driven decision-making. Further, Vu outlined some of the broad benefits ETC offers to various stakeholders, including but not limited to reducing travel time and fatigue, supporting transport planning, conserving fuel, reducing operational costs, increasing management efficiency, and promoting societal benefits such as reduced emissions and improved resident health.

With such benefits expected, numerous countries are shifting to ETC. Philip Maluping from the Department of Public Works and Highways in Manila discussed how the



Philippine Government are switching to ETC as a strategy to enhance toll road efficiency, while Dr Zafar Khan from the Highways Infrastructure Trust provided insights on India's major shift from MTC to ETC to overcome challenges related to long queues, delays, and overall inefficiency.

Speakers also discussed the technologies required for ETC, including radio frequency identification (RFID), automatic number plate recognition (ANPR), global navigation satellite systems (GNSS), and dedicated short-range communication (DSRC). Khan analyzed India's FASTag system, which uses RFID technology to provide a seamless, nationwide toll payment solution, while Amit Ranjan Chitranshi, chief operating officer of the Indian Highway Management Company at the National Highways Authority of India, noted that the Indian Government is actively exploring advanced technologies such as GNSS to further enhance the efficiency and reach of the existing ETC.

## **ASSET MONETIZATION MODELS AND PUBLIC-PRIVATE PARTNERSHIPS**

Several speakers discussed asset monetization models. Alok Deepankar of the National Highways Authority of India and Dr Zafar Khan from the Highways Infrastructure Trust explored a range of monetization models for funding and managing major highway projects, including build operate transfers (BOT), public-private partnerships (PPP), and toll operate transfers (TOT), each serving distinct roles in infrastructure development and revenue generation. BOT and PPP were highlighted as particularly effective for funding new road projects, while TOT was increasingly recognized for its potential to extract value from existing assets.

Notably, PPPs were particularly popular within the region, helping government authorities manage high operational costs and address limited public funding, a pressing challenge across the Asia-Pacific region. Dr Vu Minh Khuong emphasized that PPPs allow governments to harness private sector expertise and select the most effective technologies to enhance tolling efficiency and accelerate ETC deployment. Similarly, Philip Maluping from the Philippine Department of Public Works and Highways showcased how the country is strategically using PPPs as a solution to limited public funding for expressway projects.



Several speakers stressed the importance for governments to take an active role in facilitating asset monetization models. In the Philippines, the Department of Public Works and Highways (DPWH) play a pivotal role in developing PPP frameworks, coordinating partnerships, managing project planning, securing rights-of-way, enforcing quality standards, integrating network systems, maintaining access roads, and providing regulatory support. Ultimately, speakers argued, without government support, asset monetization models, especially PPPs, can be less appealing to private investors and therefore less successful.

## **SUSTAINABILITY**

Sustainability in the tolling sector is also gaining focus in the Asia-Pacific region, as highlighted by speakers throughout the conference. Sustainable toll road projects contribute to environmental and social benefits by reducing congestion, improving operational efficiency, minimizing waiting times at toll plazas, and encouraging modal shifts. Ghies Malik from the Dhaka Transport Coordination Authority discussed Bangladesh's approach to using road charging as a method of providing affordable, equitable, and environmentally friendly transportation options. The Bangladeshi Government has set clear sustainability goals within urban planning, aiming to address environmental challenges, mitigate global warming, and improve public health outcomes through toll road projects. Similarly, Dr Vu Minh Khuong highlighted Singapore's progress in using ETC to reduce travel and waiting times, leading to lower fuel consumption and significant reductions in CO<sub>2</sub> emissions.

Road user charging projects can also advance sustainability by encouraging modal shifts to alternative modes of transportation in densely populated areas. Reni Fatimatuz Zahro from the Indonesia Infrastructure Guarantee Fund (IIGF) highlighted that technology alone cannot resolve challenges of urban congestion and transportation. She argued a shift in mobility behavior is needed to meet the demands of growing urban populations.

Evidencing how road user charging can facilitate such a shift, Adrian Moore from the Reason Foundation discussed how tolls can be used to encourage residents to alternative transport modes, such as bicycles, buses, trains, and walking, as additional road user charging costs incentivize drivers away from personal vehicles and towards other modes of transportation. To support these modal shifts, Moore stressed governments must consider alternative infrastructure such as bus and train stations, sidewalks, and dedicated lanes for micro-mobility services like bikes and scooters. Governments must prioritize road infrastructure which accommodates a wide array of mobility options while ensuring seamless transitions between such transportation modes.

Digitalization was also identified as another key instrument for sustainability improvements. Zahro and Shamil Muzaffarli emphasized that digital technologies, including intelligent transport systems and data analytics, are vital for the tolling sector to achieve its decarbonization targets. These technologies enhance the ability of toll



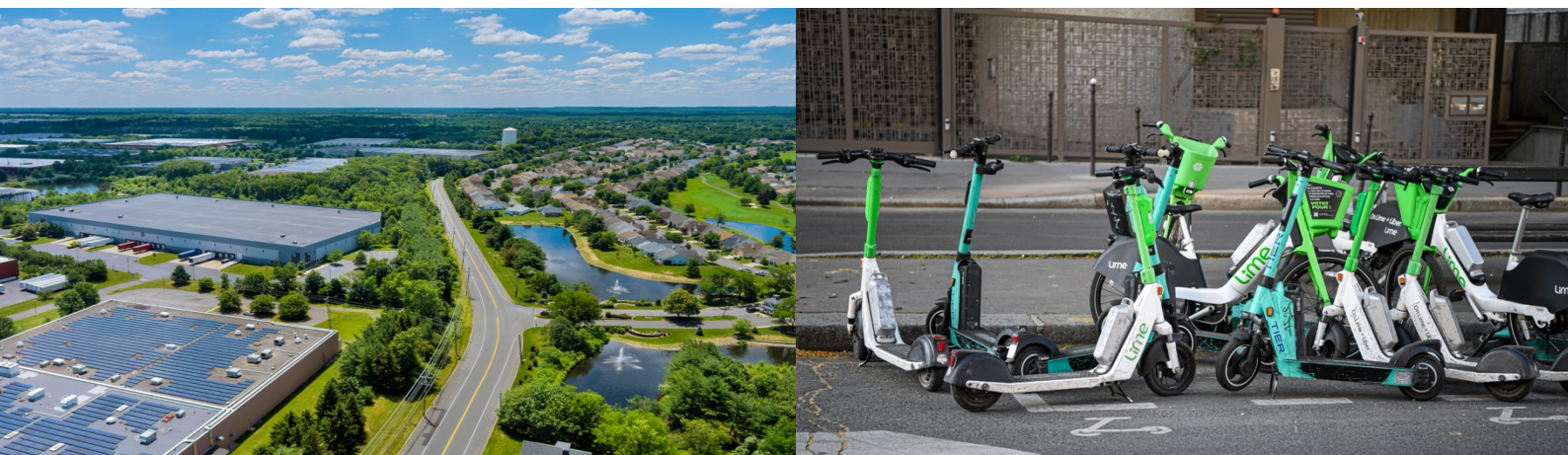
systems to manage congestion sustainably while supporting broader environmental objectives.

Circular economies also emerged as another popular approach to achieving sustainability goals. Reinvesting road user charging revenue into sustainable infrastructure was highlighted as an effective strategy for addressing urban transportation challenges. Moore, Zahro, and Muzaffarli discussed how road user charges, particularly those targeting externalities, can be reinvested to improve infrastructure and mitigate negative impacts, thereby delivering direct benefits to road users. They also emphasized the appeal of circular economies within asset monetization models for sustainability, where toll revenue is channeled back into sustainable transport initiatives. In Azerbaijan, for example, PPP frameworks require private investors to allocate a portion of their profits toward environmentally sustainable investments, promoting long-term benefits for the transportation sector and supporting environmental goals.

## **DATA SECURITY**

Despite digitalization systems such as ETC offering numerous advantages, speakers shared that it also poses significant challenges. One of the key challenges is ensuring data security. Although ETC systems improve traffic management by providing transparency compared to MTC through the collection of real-time data, they also heighten concerns over data vulnerabilities. Risks such as system failures, outdated software, weak encryption, and insufficient security protocols leave these systems exposed to potential breaches. Such security risks raise public concerns about the potential exposure of personal and financial information.

Tory Damantoro from the Indonesia Transportation Society identified data security as a critical hurdle for Indonesia's ETC implementation. Indonesia currently lacks a robust regulatory framework to support the rapid evolution of ETC technology while safeguarding user privacy, making it challenging to ensure effective user protection and build public trust in ETC systems. Meanwhile, Vu showcased that the Vietnamese Government are focusing on implementing robust data management and security policies to maximize the utility of the data collected by ETC systems. These efforts aim to enhance traffic management, improve urban planning, inform policymaking, and foster public acceptance.





## PUBLIC ACCEPTANCE

Another prominent challenge discussed at the conference was public acceptance. A panel discussion featuring Dr. Vu Minh Khuong, Tory Damantoro, and Philip Maluping emphasized that fostering public acceptance is crucial for the successful development and adoption of toll roads in the Asia-Pacific region. Without broad public support, tolling projects may face significant obstacles, leading to the underutilization of toll roads. This is a substantial political challenge for Asia-Pacific countries, where ensuring equity for all socioeconomic groups and increasing public acceptance is essential. Shamil Muzaffarli suggested one potential approach, which involves proactively promoting the benefits of advanced tolling systems to the public. By raising awareness of how tolling systems improve traffic efficiency, reduce congestion, and save fuel, governments can make these systems more appealing, fostering broader acceptance and encouraging road use.

## CONCLUSION

This executive summary underscores key trends in Asia-Pacific tolling, including the shift towards ETC, PPPs, and sustainability. The full report delves into these topics further, providing a comprehensive examination of each presentation while also exploring themes within the region and beyond the conference.

With comprehensive coverage of the expanding tolling market across the Asia-Pacific region, including potential challenges and opportunities, as well as innovative trial projects, this report is essential for anyone seeking to gain a thorough understanding of the current landscape.

**TO ACCESS THE FULL REPORT, PLEASE SCAN THE QR CODE BELOW OR VISIT US AT**  
[WWW.AURORAINSIGHTS.CO.UK](http://WWW.AURORAINSIGHTS.CO.UK)





## Table of Contents

Introduction .....	4
India's Journey to GNSS Tolling: From Cashless to Barrierless .....	6
Independent review of tolls for the New South Wales government in Australia.....	7
Panel Discussion: Asset Monetization of Highways .....	9
Progress, Challenges, and Opportunities for Transport Payment Collection in Indonesia .....	11
RUC and Megacity Mobility .....	12
Azerbaijan's toll roads: a journey of sustainability .....	13
Panel Discussion: The future of electronic road pricing in Asia and the Pacific .....	14
Tolling the Path to Climate Action: Innovative User Charges for Sustainable Mobility .....	16
Electronic Toll Collection (ETC) Deployment on Highways: Global Patterns, Estimated Gains from the Case of Vietnam, and Policy Discussion .....	17
Transforming Tolling: Insights from India's FASTag Revolution .....	18
Panel Discussion: Sustainability in the tolling sector – is it attainable?.....	20
Transforming Connectivity: The Development and Challenges of Toll Roads in the Philippines .....	22
Transport Planning and Road Charging Schemes of Bangladesh .....	23
Panel Discussion: Toll Road Safety in the Asia-Pacific Region.....	24
Conclusion .....	26
Acronyms .....	31
Bibliography.....	32

