

Evolution of Road User Charging and its Future

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Abstract

Road user charging (RUC) has a long history as a mechanism to recover infrastructure maintenance and capital costs. The range of fees and charges include: import taxes, licence fees, registration, stamp duty, direct toll charges, congestion levies and fuel taxes. Frequently these charges are opaque at best and the revenue generated from road users does not always find its way back to investment in transport facilities. In recent years the fuel tax has been the most popular method of charging users in many countries. Changing road user behaviour, travel demands and expectations as well as technology changes all point to the need for alternate mechanisms for road charging that encompass broader concepts integrating traffic demand management measures, efficient and sustainable revenue sources that balance economic, environmental and social considerations. Current charging measures are struggling to meet these multi-stakeholder multi-objective mechanisms with issues for heavy vehicles (HV) such as transparency, cross-subsidisation, environmental concerns and reducing revenue due to the likes of lessening fuel tax as vehicles become more efficient. This all results in insufficient revenue to cover cost of critically needed infrastructure.

This study reviews the evolution of RUC with more emphasis on heavy vehicles and evaluates strengths and weaknesses of the present RUC mechanisms implemented in the world with respect to stakeholder problems and demands of the freight industry. Further, this review describes and highlights the need for a more appropriate, practical and sustainable approach which can be used in the future. Promising schemes are also described.

A systems approach is used to analyse the problems, identify key issues, propose a valid solution and describe the need for improved decision support to determine the level of charging. A model is proposed that is transparent and considers direct usage based charging addressing most of the weaknesses highlighted in the models reviewed. Further, it considers externalities produced by heavy vehicles into account. The model has the potential to provide answers to key stakeholder issues and will lead to more sustainable freight transport system in future. Encouraging fuel efficient and safe vehicles or modes of transport, optimization of loading, routing and logistics systems, and long-term land use planning are a few of them.

Keywords: road user charge, heavy vehicles, externalities, city logistics, policy, systems approach

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