Technology Fact Sheet

Electronic Road Pricing[i] /http://climatetechwiki.org/technology/erp
http://www.slocat.net/wp-content/uploads/2009/11/TRL-Jakarta-final-report.pdf/

General description

Road pricing is an effective economic instrument to reduce congestion, and to limit the growth in private vehicle travel demand. It has been successfully implemented in cities such as Singapore and London, resulting in substantial improvements in the urban environment and transport system. The largest barrier for electronic road pricing (ERP) is public opposition by car users. However acceptance often increases after implementation. Important success factors are clear communication of the benefits to society and complementary policies regarding public transport and parking.

Road pricing is an economic instrument that applies direct charges for the use of roads. It can serve three purposes: 1) as a tax to manage travel demand, 2) as an incentive to guide more efficient investment decisions, and 3) as a source of public revenues, e.g. to finance roads and public transport (Lindsay, 2009). Road pricing can be implemented in several ways, including (VTPI, 2010):

- Road tolls: a (usually fixed) fee paid for driving on a particular road
- Congestion pricing: a variable fee depending on the level of congestion in a certain area
- Cordon fees: a fee applied to a certain area, e.g. an urban centre
- Distance-based fees: a vehicle fee based on the number of kilometers travelled

Toll booths or vehicle passes are common methods to collect the road fees, and have been used for decades in countries around the globe. A strong drawback is the inconvenience to the user, as the vehicle has to stop for paying the fee, possibly adding to congestion. Electronic road pricing (ERP) aims to minimize the inconvenience to the user, as well as providing flexibility as to the level of the charges. ERP methods include (VTPI, 2010):

- Electronic tolling, which bills a charges to users when passing a point on the road;
- Optical vehicle recognition, which uses an optical system to bill the user;
- GPS, which tracks the location of vehicles and bills based on the distance driven.

Implementation

Electronic road pricing, that uses electronic or optical tolling, is a mature technology. It has been successfully implemented in cities such as Singapore, London and Stockholm, and for highways, e.g. in Canada and the US (VPTI, 2010). Several countries in the developed and developing world, including Indonesia and the Netherlands, are considering ERP.

Implementation barriers

- The largest barrier for ERP is probably political and public acceptance, particularly before implementation (Gehlert et al, 2008);
- In general vehicle users are considering themselves worse off when charged for something previously perceived as being free of charge;
- In addition, there may be a general distrust in government agencies resulting in a fear that the instrument only serves to increase public revenues (VPTI, 2010);
- A referendum may be needed to decide about ERP application (for example, Stockholm, Harsman and Quigly, 2010);
- Lack of investments to implement ERP technology;
- Additional investments in public transport and non-motorized transport infrastructure are needed to absorb the increasing number of passengers (use of public ERP revenues for public and non-motorized transport);
- Implement a flexible and convenient payments collecting system.

GHG emissions reduction (megatons CO_2 equivalent) – 97 thousand tons CO_2 by 2030.

ERP contributes to reduction of traffic congestion by 13-30% and of GHG emissions by 15-20% (Source: Pike, E. (2010) Congestion pricing. Challenges and opportunities. The International Council for Clean Transportation. April 2010).

Impact on development priorities (Pike, 2010; VPTI, 2010):

a) *Social*

- congestion reduction, i.e. travel time savings;
- increased road safety due to less road accidents;

b) *economic*

- increased energy security of the country;
- improved balance of payments.

c) *environmental*

- improved air quality (CO, NOx, SOx and particulate matter)
- reduced noise.

d) *other*

In order to move to a more sustainable transport system, a combination of strategies is required, also called the Avoid-Shift-Improve approach, which 1) avoids or reduces the need for unnecessary travel (Transport Demand Management), 2) shifts private vehicle use to more sustainable modes, and 3) improves the environmental performance of modes. ERP is considered an important and effective instrument in the 'Avoid' strategy, i.e. limiting the growth in travel demand, while also contributing to a modal shift.

Vehicle use has been shown to be rather sensitive to tolls, with price elasticity from -0.1 to -0.4 for urban highways, i.e. a price increase of 10% results in a 1-4% automobile use reduction. The impact is however highly case specific, and may depend on many factors such as the type of toll, the availability of alternatives and on consumer preferences. Estimates for impacts of road pricing on vehicle trips vary widely, from 3% to 15% (VPTI, 2010; Dalkmann, 1010). However even if total travel demand was affected only to a limited extent, road pricing could significantly reduce congestion if only a small share of total traffic shifted from peak to off-peak hours with estimates for several cities in the range of 10% to more than 30% (VPTI, 2010; Pike, 2010). In Singapore, the ERP has decreased road traffic by 25,000 vehicles in peak hours, and increased average road speeds by 20%. Bus travel and car-pooling also increased.

Investment

The ERP payback time is less than 5 years (Dalkmann, H. (2010) Case study of a transport MRV NAMA: TDM Measures in Jakarta, Indonesia. Applicability of Post 2012 Climate Instruments to the Transport Sector (CITS) Project).

According to research made, the investment in an ERP system are estimated at $ 130 million (Pike, E. (2010) Congestion pricing. Challenges and Opportunities. International Council for Clean Transportation).

Operation and maintenance costs– operation and maintenance costs were estimated at 25% of the initial investment or $32.5 million /year (Pike, E. (2010) Congestion pricing. Challenges and opportunities. International Council for Clean Transportation).

GHG reduction costs– 370 $/ton CO_2.

Technology lifetime– 40 years.

Other

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[i] This fact sheet has been extracted from TNA Report - Technology Needs Assessment for climate change mitigation - Republic of Moldova. You can access the complete report from the TNA project website **http://tech-action.org/**