Road Tolls and Road Pricing

Innovative Methods to Charge for the Use of Road Systems

by

Daphnée Benayoun &

René P. Cousin

The Louis Berger Group, Inc.

Introduction

Major challenges facing now the road transport sector

In a context of:

- Sparse public budget & projected decrease of revenues generated by fuel taxes
- High road transport travel demand growth rate

Major challenges:

- Finance highway infrastructures
- Mitigate growing road traffic congestion
- Improve road safety
- Reduce pollution & Environmental disturbances of road transport

Innovative methods to road user charging

- **Traditional methods**

  Set tariffs to achieve cost recovery

- **Innovative methods: introducing road pricing**

  Set tariffs to achieve cost recovery, manage transport demand and optimize utilisation of infrastructure capacity

Innovative Methods to Road User Charging

Three different approaches

1. **Electronic toll collection systems**

   Using new technologies to minimize collection costs and be able to use varied tariff structures

2. **Managed lanes & Mileage-based user charging systems**

   Using Road Pricing methods to combine cost recovery goals with traffic demand management objectives

3. **Urban tolls**

   Using Road Pricing to reduce traffic congestion and disturbances in severely congested metropolitan areas

Electronic Toll Collection Systems

Eliminating waiting time at toll booths and reducting collection costs

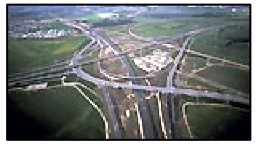
- Automatic Number Plate Recognition (ANPR) captured by camera
  - Significant billing error rate
  - Significant cost of transaction processing

- User identification via in-vehicle transponders
  - Major start-up investment if paid by the agency
  - Major customer deterrent if paid by vehicle user

Electronic Toll Collection Systems
Example: Cross- Israel Highway 6

- **First toll road in Israel**
  - ✓ 87km opened in January 2004
  - ✓ US$1.3 billion construction cost
  - ✓ Operated by Derech Eretz Highway Ltd Consortium (including Canadian Highways Infrastructure Corp.)

- **Main ETC characteristics**
  - ✓ Vehicle's identification: both ANPR and transponders
  - ✓ Invoicing: mailed to the vehicle's owner or debitted from subscriber's account
  - ✓ Speed limit = 110km/h
  - ✓ Tariff structure differentiates motorcycles, cars, buses, trucks and transponder's holders



- **Figures**
  - ✓ **2005 profits: NIS 89 million (US$ 22 million) or a 56% increase/ 2004**
  - ✓ **Total 2005 income = NIS 779 million (US$ 189 million) or a 137% increase/ 2004**
  - ✓ **80,000 vh per day in 2006 (or 14% increase/2005)**
  - ✓ **500,000 active subscribers' accounts**
  - ✓ **1.36 million individual users**
  - ✓ **Bill collection rate: 97%**

« Managed Lanes »
Approach

Actively managing and controlling traffic through a combination of access control, vehicle eligibility, and pricing strategies

- ***High Occupancy Vehicle lanes (HOV)***
- ***High Occupancy Toll lanes (HOT)***
- ***Congestion pricing***

Interstate 15 in San Diego, California
SR 91 in Orange County, California
N-VI Median reversible HOV lane in Madrid, Spain
…

« Managed Lanes »
SR91 in Orange County, California

Orange County Transportation Authority

- ✓ HOT (HOV3+) combined with congestion pricing
- ✓ 16 km long, 4 express lanes in median of the existing freeway
- ✓ Transponders are required
- ✓ Toll rates from US$ 1 to US$ 6.25 per trip depending on time of the day, day of the week, and direction (eastbound & westbound)
- ✓ HOV3+ vehicles drive free *(except between 6 and 8 pm eastbound)*

⇨Carry 49% of vehicles travelling on SR91 or 14.2 million trips in 2006

⇨Average speed at peak hours between 96 and 104 km/h >> 24 and 32km/h on general purpose lanes

⇨Revenues for the 2005 fiscal year = US$ 39.6 million (75% of which were toll revenues, 11% violation fees, 10% account maintenance fees, 3% FY 2004-2005 interest)

Towards Mileage-based Road User Charging

- University of Iowa// FHWA-sponsored Transportation Pooled Fund Program
- Based on GPS technology via satellite
- Measure the actual distance travelled by a vehicle equipped with GPS device

- Tariffs structure could then depending on
  - ✓ Actual distance travelled
  - ✓ Relative cost associated with a vehicle's specific use of a considered roadway
- ⇨ Encouraging environment-friendly vehicles,
- ⇨ Reflect road damages imposed by different classes of vehicles, etc.

- Major constraint to full scale implementation = in-vehicle GPS receivers are required

Urban Tolls
Rationale

Singapore, London (UK), Oslo (Norway), Stockholm (Sweden)

Reduce traffic, noise and pollution in severely congested and polluted metropolitan areas

- ❑ Discourage road users from using their vehicle

- ❑ Using generated revenues to:
- ✓ Develop public transportation
- ✓ Improve existing transport infrastructures

Urban tolls
The London Congestion Charge

- Managed by Transport for London (TfL)
- The Capita Group Plc « Capita » is in charge of the administration of the Congestion Charging Scheme
  - ✓ administration of core IT services, business, and enforcement operations (e.g. charges and penalties processing)on behalf of TfL
  - ✓ their contract with TfL has been extended to November 2009
- Introduced in February 2003 in the « London Inner Ring Road Area » + Western Extension in February 2007
- Automatic Number Plate Recognition system
- Daily charge €12 (£8) to registered motorists applicable between 7 a.m. and 6.30 p.m. from Monday to Friday

⇨30% drop in non-exempt vehicle (or 60,000 vh) in 2003/2002

- 50/60% of the drop = modal shift towards public transportation
- 20/30% of the drop = journeys avoiding the congestion charge area

⇨Journey times reduced by 15% in 2003/2002

But,

⇨Capita has paid equivalent of £7,500 in charges and fines for every day the toll has been in operation for:

- ✓ Failing to generate sufficient revenues to finance public transportation improvement
- ✓ Incorretly clamping cars for non-payment and errors in the « persistent evader » list
- ✓ Valid complaints from users, Call centers' problems, Late management reports, …

Main issues of innovative road toll systems

- **Socio-economic equity**

  Is the project affecting more low and middle income level socio-economic groups?

  « Lexus lanes » on SR 91, Orange County, California

  Urban tolls and commuters

- **Public acceptance**

  Studies shows that road users are willing to pay, to a certain extent, for improved travel time, traffic safety and highway infrastructure.

  In 2006, voters have approved Stockholm urban toll (51.7%) because the trial period showed:

  - 22% traffic drop

  - 5 to 10% drop in traffic accidents causing injuries

  - 14% drop in CO2 level in the inner city

- **Cost and time to full implementation**

  Higher administration, collection and violation enforcement costs +

  Time to properly equip vehicles with required devices

  The urban toll experience in Stockholm costed more than US$55 million. Total costs including US$ 33 million in toll operating costs.

Conclusion
Lessons learned and way forward

- Road tolls are not stand-alone miracle solutions

- Two different goals though sometimes combined
  - ✓ Cost recovery in a context of sparse available public funds
  - ✓ Traffic demand management and optimized utilisation of existing infrastructure capacity in a context of rising demand

- Is the project generating sufficient benefits to the community in terms of congestion relief, traffic safety, pollution decrease ?

Thank you for attention