

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 reducing 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



- ✓ 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
- ✓ Incorrectly 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

