Road Tolls and Road Pricing
Innovative Methods to Charge for the Use of Road Systems

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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 debited 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 32 km/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