Road Pricing – Past, Present and Future

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Road pricing not new. Allowed Industrial Revolution

- Toll roads 2700 years old
  - Susa–Babylon highway: 7C BC
  - Holy Roman Empire: 14C
- Industrial Revolution
  - more transport demand, expansion in highways, better road maintenance, increased economic activity
  - Led by private sector, not HMG
  - Supported by turnpike roads 1663
  - Railways not started until 1820s

25Nov15
Roads for a Modern Britain - Road Pricing
Background

• “Road Pricing”: charge drivers for costs (congestion delay, road damage, pollution) imposed on others. Two-fold effect:
  – changes road user behaviour; people respond to price signals – drive off-peak, take the bus or bike, or skype – incentivises ‘good’ behaviour
  – provides revenue to authorities, toll-road managers for infrastructure investment (for cars or bikes or public transport).

• Technology proven by successful RP schemes in Singapore, London, Stockholm & truck charging schemes.

• Replace regressive vehicle ownership & fuel taxes by more effective ‘Pay As You Drive’ schemes.

• But hard to convince people of benefits.

Objectives of today

• RP acceptable, relevant to taxation, energy, congestion, pollution, climate change, & should return to the transport agenda.
Expected benefits of road pricing

• The public
  – The “user pays” principle. Those who use scarce road space & create pollution should pay proportionately, and know that they are paying.
  – Not just another tax – especially if existing taxes are reduced.

• Businesses
  – Reduced transport costs (Evening Standard)

• The economy – annual congestion costs
  – US $124B (Inrix, 2013)
  – UK £20B (FoE, CBI 2011)
  – Europe €120bn, 1% of GDP (EC 2009)

• The environment - climate change
  – Pricing to reduce travel & charge extra for CO2 emissions

• Public Health – premature deaths due to particulates & NOX
  – London - NO2 concentrations in 2008 - follows roads
  – 50000 deaths (UK), 4300 (London) (HoC Environmental Audit C’tee)
  – £8-17 billion economic costs (UK HMG)

• Schemes must be cost-effective: reduce set-up/running costs
Road pricing – scheme types

• Point-based charging (toll bridges)
• Cordon charging (Stockholm CBD)
  – Charge to cross the cordon
  – Also charge by time of day
• Area charging schemes (London)
  – Charge to drive in area, irrespective of crossing cordon
  – Can have multi-cordons/zones
• Distance-based charging schemes
  – Motorway tolling (between junctions)
  – True Time-Distance-Place charging
    • Time of day
    • Exact distance
    • Location and/or type of road
Microwave FreeFlow Tolling

On-Board Unit (on windscreen)

Vehicle licence plate, account number or electronic fee sent from on-board unit to roadside system

DSRC 5.8GHz Microwave Link

Communications Beacon

Enforcement Camera

Charge levied or account number validated and sent to Back Office

ANPR: Licence plate of vehicles not equipped or not paying correct charge are recorded

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Wide area Systems (GNSS/CN)

Global Positioning System satellites

On-Board Unit calculates position or distance travelled, & matches to digital map of charged roads

cellular radio link

Enforcement Camera

Charges accrued by On-Board Unit transmitted to Back Office

Licence plate of unequipped vehicles or those not paying the correct charges are recorded

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Stockholm Congestion Tax

• Microwave cordon trial Jan-July’06 showed the benefits
  – Charges SEK 10 - 20 (85p-£1.70).
  – Traffic fell 28% (>> predicted); no diversions.
• Pre-trial opposition 62%, but fell during trial.
• Post-trial referendum: majority voted to reinstate scheme; reintroduced in Aug’07 (ANPR-only). Support now 74%.
• Extra buses from Aug’05, but no effect on road traffic until Congestion Tax began in Jan’06
Effect of Stockholm Congestion Tax

Before & after start of trial (02 & 03 January 2006)

Before & after end of trial (31 July & 01 August 2006)

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UNIVERSITY OF SOUTHAMPTON
School of Civil Engineering and the Environment
Gothenburg Congestion Tax

- 2013. Based on Stockholm. Aims:
  - Raise investment
  - Reduce congestion
  - Improve the environment
- But not easy to copy Stockholm:
  - Scheme design difficult; needs a local transport model.
- Traffic across cordon down 12%:
  - Commuters -> public transport
  - Others: changed destination & trips
- Income 71M€ pa, costs 12M€ pa
- Consultative referendum (Sept14); 57% voted “no”.
  - But Council to keep charges & look at other measures
2005 Edinburgh referendum

- Public voted against by 3:1 so planning for scheme abandoned
- Car use determined voting; drivers strongly opposed; others - weak support
- Limited understanding of scheme increased opposition
  - Maximum charge £2 but 38% thought it was higher
  - 20% of journeys not charged but people thought they were
  - 37% wrongly thought that outbound traffic was charged
  - scheme complex – dual cordon, exemptions
- People not convinced of reduced congestion & improved PT.
  - Needs simple scheme to convince residents, esp. PT users, of benefits
- A similar result in Manchester referendum 2008 - 4:1 against
Acceptability varies with time

- New idea, no justification
- Sufficient support to go ahead
- Fall-off as detail emerges
- Build up of support as benefits appear
- Increasing support for general idea
- Panic just before implementation

London
Edinburgh
Manchester
Stockholm
RP – the future - policy

- OBR: “£13.2B pa revenue loss from motor taxes by 2030”
  - fuel duty from 1.7% to 1.1% of GDP, VED 0.3% to 0.1%
- Increasing use of PAYD insurance, using GNSS/CN.
- Spread of HGV charging in Europe
  - Switzerland, Austria, Germany, Czech Republic, Slovakia, UK
    (HGV Road User Levy), Poland, Hungary… But not France!!
- US HOT lanes receiving driver approval.
- But UK 2014 National Policy Statement:
  - Not on Strategic Road Network unless new road capacity;
  - River/estuarial crossings OK; other roads - up to local authority
- Low Emission Zones (LEZ): pollution from vehicles an issue
  - Diesel: low CO2 but high NOX – so higher road charge?
  - ULEZ London 2020, 24/7 (Euro6 diesel, Euro4 petrol OK)
RP – the future – Oregon
http://www.myorego.org/

- OReGO: Oregon DoT road usage charge program.
  - Successful 2012 Pilot Program
  - Oregon Senate Bill 810: 5,000 vehicle trial from 01 July 2015
  - Participants pay for miles driven - a fair and sustainable way to fund road maintenance & improvements

- How does it work?
  - 1.5¢/mile on Oregon roads
  - Fuel tax paid at pump is credited back to your account.
  - Choose device & account plan to measure mileage
    - Electronic reporting from odometer
    - Vehicle location (all miles driven or Oregon public roads)
    - Smartphone option.
  - Manual reporting for mileage driven off Oregon public roads.
RP – the future – Western US

- Western Road Usage Charge Consortium (WRUCC)
  - Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, Oregon, Texas, Utah and Washington
- Explore feasibility of a multi-jurisdictional system
- Develop methods for remitting charges & models for regional & national interoperability
- Engage automakers & tech sector for mileage reporting
- Share public acceptance, policy & program results

- California State Senate Bill mandates RUC pilot 01/17-06/18
- (Massachusetts – 1000-volunteer trial?)
Lessons learned

• Road Pricing schemes acceptable to public if:
  – equitable – which they are, compared to alternatives;
  – revenue-neutral, or revenues reinvested in transport;
  – Low cost overhead;
  – people have experience that road pricing works.

• Note:
  – large traffic reduction with low charges;
  – no diversion onto other routes;
  – improved public transport won’t get people out of cars;

• RP should be integral part of transport policy.

• ‘The potential for benefits from a well-designed, large-scale road pricing scheme is unrivalled by any other intervention’ (Eddington, 2006). DfT agreed
Conclusions, Recommendations

• RP inevitable: best tool to manage congestion; fuel duty revenue declining: efficient engines, alternative-fuels.

• Road pricing acceptable, it works & costs falling; but ignorance and misunderstanding; education is needed.

• Can also control pollution – Low Emission Zones. – More acceptable than congestion charges?

• To inform people, repeat Stockholm trial in UK city. But not technology demonstration – must involve real people & real money to ensure meaningful results.

• Hold referendum, if you must, AFTER scheme trial, so people vote based on real knowledge and experience.

• National road pricing. Start with cities choosing to adopt it. Provide incentives e.g. reduce/rebate motoring taxes. – Long-term aim is reform of regressive motor taxes.
References & Further Reading


- Walker J (2013) “Opinion: 10 things Transport Ministers should know about road pricing”, Tolling Review, A Supplement to “Thinking Highways” Vol. 8 No 4


- Contact: Dr John Walker, editor@luckmore.demon.co.uk
Questions?

25Nov15  Roads for a Modern Britain - Road Pricing
National networks national policy statement: Road tolling & charging

Strategic Road Network
3.23 The Government’s policy is not to introduce national road pricing to manage demand on the Strategic Road Network, comprising the motorways and key trunk roads for which the Secretary of State is responsible.
3.24 The Government will consider tolling as a means of funding new road capacity on the Strategic Road Network. New road capacity would include entirely new roads and existing roads where they are transformed by an improvement scheme.
3.25 River and estuarial crossings will normally be funded by tolls or road user charges.

Other roads
3.26 Proposals for tolling or user charging to fund new capacity and/or manage demand on roads or proposed roads that do not form part of the Government’s Strategic Road Network are a matter for local and other traffic authorities.
3.27 Where tolls or road user charges are proposed as part of a highways project that is the subject of a direction given under section 35 of the Planning Act 2008, the Government will expect the applicant to demonstrate that the proposals are consistent with this NPS, the relevant development plan and relevant statutory transport strategies and plans.
DfT acceptability study (2008)

- 440 people from 8 UK LAs considering RP, met several times
- Principle of road pricing:
  - Initially seen as extra cost, no benefits; objective = revenue
  - Not effective? Drivers find other routes, congestion displaced
  - No trust in authorities. How is revenue spent? Fairness?
  - But with more information, attitudes changed; congestion must be tackled & RP was the most effective way.
  - But some still negative (young males & C2DEs)
- Perceptions on specific schemes:
  - Cordons easier to understand than distance charge. But fears: unclear boundaries; hospitals, stations, P&R charged?
  - ANPR understandable, cheap, works. All cars have plates. No equipment inside car. Detection only at camera sites.
  - Tags perceived (wrongly) as complex, costly, easier to track
Public support for proposals by 67% to 29%.
- Including newspapers;
- If revenue used for transit improvements.

Blocked in State Assembly
- Opposition from outer-boroughs;
- Impact on auto users;
- “Social engineering”.

Key issues
- Promise of transit improvements;
- Geographic equity;
- Lack of perceived driver benefits.

(Bruce Schaller, Deputy Commissioner, Planning & Sustainability, New York City Dept of Transportation)
Gothenburg Congestion Tax (1)

- Modelled on Stockholm: same technology & charges
  - Started 2013. Three aims:
    - Raise investment
    - Reduce congestion (though no target)
    - Improve the environment
- Assumed easy to copy Stockholm system design.
  - But scheme design difficult; use a transport model based on local conditions.
  - 2X as many checkpoints
Gothenburg Congestion Tax (2)

- Traffic across cordon reduced 12% during charged hours
  - Commuters switched to public transport
  - Discretionary travellers changed destination & fewer trips
- Revenue 71M€ pa, system cost 12M€ pa (17%)
- Consultative referendum (Sept14) – 57% voted “no” (though support increased after charges introduced, as in Stockholm).
- City Council will keep charges despite referendum result. Key factor for political support was major financial package from National Government, leveraged by charging.
- Largest investment is an unbeneficial rail tunnel under Gothenburg (BCR 0.45) (reducing support for charges?)

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Proposed Ultra-Low Emission Zone, London 2020, 24/7

- Existing Low Emission Zone – out to M25 — Diesel trucks
- Proposed ULEZ in central London
  - Meet ULEZ emissions standards, or pay daily charge.
  - Car, small van - Euro 6 diesel (<5 years old in 2020) & Euro 4 petrol engines (<14 years old). Non-compliant vehicles can drive in zone but pay £12.50/day.
  - Large van, minibus – E-6 diesel, E-4 petrol. Non-compliant £12.50/day
  - HGV, bus, coach – E-VI (<6 years). Non-compliant £100/day
  - Motorbike – E-3 (<13 years old). Non-compliant £12.50/day
Congestion charge revenues
Gothenburg & London

- Gothenburg
  - Population 543,005 (city), 973,261 (metropolitan area)
  - Scheme area 16 sq.km.
  - Revenue 71M€ pa, system cost 12M€ pa (17%)

- London
  - Scheme area 10 sq.km.
  - Net revenue (2012/13) £132M
  - 2003-13 gross revenue £2.6B, £1.2 billion invested in transport
    - £960M (bus), £102M (roads & bridges), £70M (road safety), £51M (planning), £36M (sustainable transport/environment).

- (Greater) Reading
  - Population 160,000 – 320,000.
  - Area N of M4 (Jn10-12), Caversham, Sonning =100sq.km.
    - As proposed for Reading under TIF programme

- Should a scheme be “revenue-neutral” (reduction in other taxes) or generate extra revenue for transport infrastructure?
RP – the future - technology

- Only GNSS/CN can do Time-Distance-Place (TDP) charging.
- Germany, Slovakia use GPS/GSM-based truck-tolling.
- Belgium, Bulgaria, Hungary, Russia - GNSS/CN for HGVs?
  - Belgium - preferred bidder T-Systems (Satellic)/Belgacom.
    - Go-live 2016, trucks >3.5 tonnes.
- Singapore a world pioneer in congestion charging.
  - 1975 - paper-based road pricing scheme.
  - 1995 - microwave DSRC “Electronic Road Pricing” (ERP).
    - But prohibitive upgrade cost
  - 2020 - GNSS/CN – 3 consortia short-listed by LTA.
    - More equitable distance-based pricing
    - Value-added services (real-time location-based traffic information, electronic payment for parking, …).
- Alternatives: 5.8GHz DSRC, 6C sticker tags, ANPR
John Walker

- Worked for UK electronics company (Racal/Thales) from 1980 to retirement in 2010
- On ITS since 1983 (Alvey programme)
- On Road Pricing since 1996
  - Motorway tolling (Conservative Government, 1996)
  - DIRECTS trial in Leeds (Labour Government)
    - Funded by DfT, 1999-2005
  - CEDAR Project Manager (2007-10)
    - “Charging Electronically by Distance And Road”
    - Road pricing GPS technology trials, Reading/Swindon
Road pricing – past, present and future

Stephen Joseph, Chief Executive
Campaign for Better Transport
Campaign for Better Transport

• Charitable trust promoting sustainable transport
• Support from wide range of interests
• Co-ordinates environmental and other NGOs concerned with transport
• Commissions and publishes research
• Conducts public campaigns
• Promotes pilot projects and good practice
Why might road pricing be a good idea? Here’s an inconvenient truth

It’s not possible to build enough roads for everyone to drive where they like, when they like as fast as they like!
And there are other impacts

- Noise
- Air quality: new research shows worse impacts
- Landscape and biodiversity
- Road casualties
- Health impacts from less physical activity
- Community severance
- Social exclusion

Many of these result from car dependence – where car use is a necessity not a choice
And there is also climate change...
So road pricing might be a good idea

- It can help manage demand
- It can therefore contribute to cutting pollution, noise and intrusion
- It can help fund alternatives to the car
- It can therefore cut car dependence and hence obesity and other health problems

And income from existing road taxes is disappearing
But road pricing is politically difficult

- Moving from roads free at point of use to charging
- Privacy and data issues
- Distrust of Government/ Treasury - will other taxes get cut or money raised get spent on transport?
- Boundary issues – motorways/ zones

2007: 1.8m sign petition against road pricing
And there have been other setbacks

- The Edinburgh and Manchester referenda
- The abolition of the Western Extension to the London charge
- The withdrawal of charging for the A14
- The record of the M6 Toll
So where can we make progress?

- Workplace parking levies
- Extending pay-as-you-drive insurance
- Lorry charging
- Devolution
- Air pollution
Workplace parking levy

- Operating in Nottingham
- Has helped pay for public transport
- Charged on all employers with more than 10 spaces
- Simple to operate
Lorry charging

- A vignette scheme now exists
- Could be extended to charge by distance, time, type of road etc
- Will raise questions about UK versus foreign lorries
- Revenue neutral?
Devolution, cities and pollution

- Air pollution is huge issue in UK cities, with huge public health impacts
- Road charging could be one way of tackling this
- Cities are getting more powers over local roads and more funding as part of devolution
So cities may go for charging and sell it on pollution benefits
Conclusion

 ► Road pricing could in principle help tackle transport and other issues
 ► However it is politically very difficult and in the UK it has faced intense opposition
 ► Workplace parking levies might be easier to sell
 ► Building on pay-as-you-drive insurance and lorry charging may be the best way forward
 ► The need to control air pollution may be a new context for charging
 ► Devolution to cities and sub-regions offers an opportunity to at least debate options

And the reductions in income from other taxes will help make the case.
For more information

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