Reducing Congestion and Funding Transportation Using Road Pricing

American Association of State Highway and Transportation Officials
Federal Highway Administration
Federal Transit Administration
National Cooperative Highway Research Program
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US Road Pricing Context

1. Traffic congestion in major urban areas is a significant and growing problem
2. Lack of sustainable funding sources for multimodal surface transportation is a growing concern
3. Enhanced environmental, sustainability and livability concerns related to the roadway network and its use
4. Variable road pricing limited primarily to High Occupancy Toll (HOT) lane projects and a few existing toll road facilities. No large area or regional variable road pricing projects have been implemented
5. Opportunity to learn from the experience of others who have implemented road pricing as a transportation demand management tool and/or for revenue generation
Purpose of the Scan

Identify new ideas and workable models for integrating variable road pricing approaches into state, local and regional policies, programs, and practices.
Why Road Pricing?

**Revenue Generation**
Pay for roadway infrastructure, operations and/or transportation system capacity with charges road user charges (i.e. flat toll rates, variable charges, distance based user fees)

**Demand Management**
Reduce traffic congestion, promote environmental goals, improve cost of doing business, and support community livability based on amount of traffic reduction sought (i.e. congestion pricing, cordon/urban area pricing, facility pricing)
Scan Sites

Demand Management
- Stockholm
- London
- **Singapore**

Revenue Generation & Demand Mgmt.
- **Netherlands**

Revenue Generation
- Germany
- Czech Republic
Singapore

Population: 5.0 million  
Land Area: 275 square miles
Key Challenges

- Increasing travel demand
- Scarcity of land
- Road infrastructure accounts for 12% of land use vs. 15% for housing

2008: 8.9 mil journeys/day
2020: 14.3 mil journeys/day
Demand Management

Combination of Ownership and Usage Controls

Ownership (fixed) □
Vehicle Quota System

Usage (variable)
Electronic Road Pricing

1. Limit ownership ➔ COE
2. High Fixed Cost
   • Registration Fees
   • Excise duty
   • Road taxes

1. Electronic Road Pricing (ERP)
2. Gas Tax (50% of price of gas)
Vehicle Quota System (VQS)

- Regulates vehicle population growth at a rate that can be sustained by road network
  - 3% per year from 1990 to 2008
  - 1.5% per year from 2009 to 2011

- A Certificate of Entitlement (COE) required to register a new vehicle, valid for 10 years
  - Cost for a COE in Nov 2009 ranged from SGD $16,500 (US $11,800) to SGD $18,300 (US $13,100)
  - Open online bidding for COE
Cost to Drive Toyota Corolla off the Showroom Floor

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost (SGD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dealer Price</td>
<td>$17,852</td>
</tr>
<tr>
<td>Customs Duty (20%)</td>
<td>$3,570</td>
</tr>
<tr>
<td>General Sales Tax (7%)</td>
<td>$1,500</td>
</tr>
<tr>
<td>Registration Fees (100%)</td>
<td>$17,852</td>
</tr>
<tr>
<td>Other Costs</td>
<td>$12,467</td>
</tr>
<tr>
<td>COE</td>
<td>$16,747</td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td><strong>$69,988</strong></td>
</tr>
</tbody>
</table>

Cars Cost 3 to 4 Times the Dealer Price!!!
Electronic Road Pricing (ERP)

- **Purpose**
  - Congestion Management (primary)
  - Promote Transit (secondary)

- **Key milestones**
  - Introduction of Area Licensing Scheme (1975)
  - Conversion to Electronic Road Pricing (1998)

- **Description**
  - Cordon around city center, with expressway pricing
  - Transponder based with value-added services via smart card
  - Few exemptions (military & emergency vehicles only)
  - Integrated with land use and transit planning
Electronic Road Pricing

- ERP is a congestion management tool
- Equitable - motorists pay for congestion costs imposed on others or choose to travel at different time, routes or use public transport
- ERP rates determine based on local traffic conditions, location and time of the day
Pricing Setting

- ERP Rates reviewed every 3 months to ensure optimal use of road space

**Expressways**

- Optimal Speed Range: 45 km/h
- Increase rate
- Decrease rate
- 65 km/h

**Other Roads**

- Optimal Speed Range: 30 km/h
- Increase rate
- Decrease rate
- 20 km/h
- 30 km/h
ERP’s In-Vehicle Units

motor vehicle, including motorbikes, registered in Singapore.
Singapore Charging Point
Results of ERP

- Smart card technology protects user privacy
- Achieved target speeds of 45-65 kph on expressways 20-30 kph on arterials
- No affect on retail sales when implemented in Orchard District in 2005
- Net revenues of SGD 100 million ($75 million) in 2008, with excess revenues rebated to vehicle owners
- $1 increase in ERP equivalent to $3 increase in gas tax
The Netherlands

- 16,034 square miles
  - slightly bigger than Maryland
  - 5 times smaller than
- 16.4 million people
- Heavy traffic congestion
Netherlands Distance-Based Charge

Purpose
- Reduce Congestion, Generate Revenue to replace fixed taxes, shift to “User Pays” Principle (primary)
- Promote Transit and Reduce Emissions (secondary)

Description
- Shifting from purchase and ownership tax to a distance-base fee structure
- GPS based with DSRC interrogation and license plate reader enforcement
- Fee based on distance, vehicle type, emissions class and time of day
Netherlands Distance-Based Charge

- **Key milestones**
  - All trucks (2012)
  - All vehicles (2018)

- **Forecasted Results (2020)**
  - 10%-15% reduction in VMT
  - 10% reduction in CO₂ emissions
  - 6% increase in usage of public transit
  - Revenue neutral (offset by reduction in other transportation taxes)

- Program on hold due to dissolution of coalition government, future implementation to be determined post June 2010 elections
Major Findings

1. Clearly defining and communicating policy goals make them achievable
2. Thorough planning and performance measurement ensures achievement of overall goals
Major Findings (cont)

3. Linking the pricing structure to benefits received by users contributes to public acceptance and helps to avoid the potential negative impacts from traffic diversion.

4. Public outreach and communications key component of the program at every stage.
Major Findings (cont)

5. Equity and privacy concerns can be addressed through exemptions, revenue use, technology, and business rules

6. Effectiveness of road pricing is increased by integration with public transit investments and land use planning
Road Pricing is the Ultimate Demand Management Tool!!!
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