

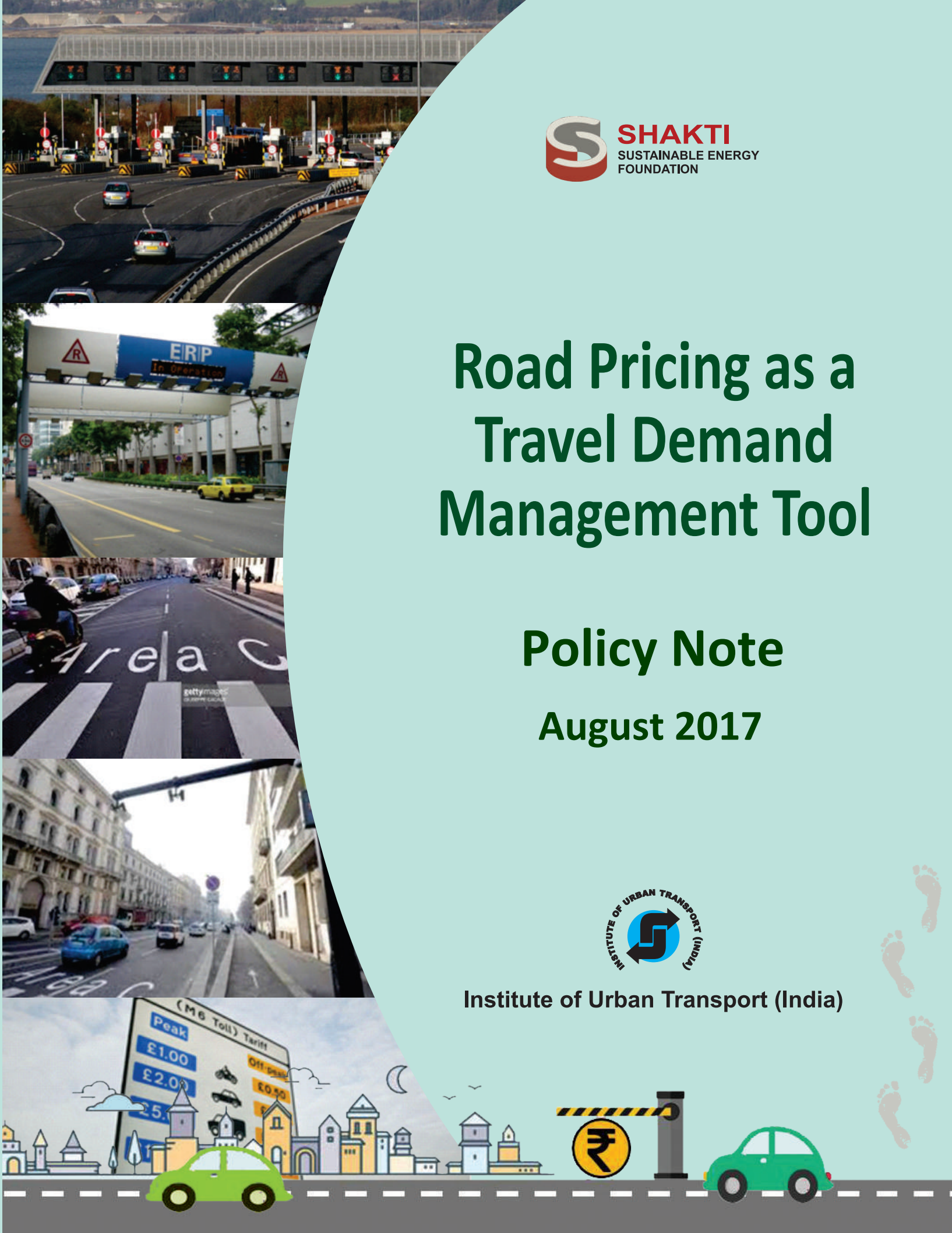
Road Pricing as a Travel Demand Management Tool

Policy Note

August 2017



Institute of Urban Transport (India)



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1st Floor, Anand Vihar Metro Station Building

Entry adjacent to Gate No 1

Delhi - 110 092

URL: www.iutindia.org



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Project Team

Authors

Ms. Sonia Arora

Urban Transport Expert, IUT (India)

Mr. Ankit Pachouri

Urban Transport Planner, IUT (India)

Ms. Baveena K V

Urban Transport Planner, IUT (India)

Checked by

Mr. M.L. Chotani

Consultant & RDO, IUT (India)

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What is Road Pricing?

Introduction

Road Pricing means that motorists pay directly for driving on a particular roadway or in a particular area. It can directly benefit motorists through reduced congestion or improved transport infrastructure.

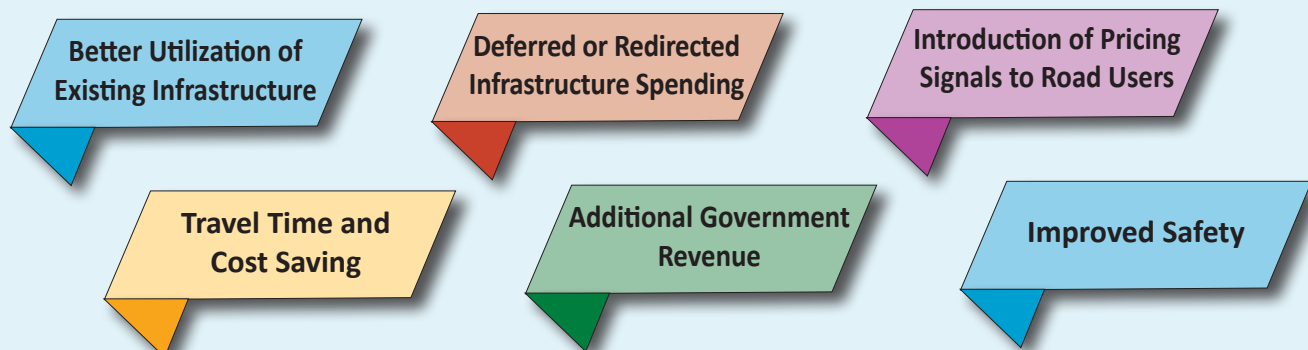
Road congestion has become one of the most pressing local issues in cities around the world and many developments have been made in road user charging schemes. These schemes:

- aims at benefitting the urban transport system as a whole, particularly where revenues collected are reinvested into the local transport system
- provides a good incentive to reduce car-use and consider alternative modes of transport
- can take different forms ranging from variable tolls in corridors or single roads to a complete congestion charging scheme

Objective

Road Pricing has two general objectives: revenue generation, congestion management and environmental benefits.

Key Benefits





In this something for us?

Research shows that this concept is likely to be implemented over time by more local authorities. It is a necessary step as simply providing new road capacity and/or new public transport capacity is not enough to turn the negative trend of increasing share of car travel and decreasing share of public transport travel in cities.

Key conditions for implementation:

- Favourable legal framework and taxation system
- Political support and champion
- Clear plan on revenue use
- Availability of alternative modes of transport.

The Congestion Charge continues to be highly effective in decreasing congestion in the Capital. Traffic levels and associated carbon emissions have been cut, bus services have improved, the roads are safer, and London's air quality has improved thanks to reduced vehicle emissions. The Congestion Charge provides vital funds which are invested back into London's transport system and into encouraging walking, cycling and greater use of public transport. Cities from across the world can look to our scheme as a benchmark for how to tackle the economic and social problems associated with congestion.

Ken Livingstone, Mayor of London

CHECKLIST

CHECKLIST	
City Size	Medium to big cities (> 5,00,000 population)
Costs	Local authorities should foresee a budget for:
	• Research, modelling, consultation and information campaigns
	• Equipment Costs (Camera, Toll Booths etc.)
	• Operating Costs (Call Centre Enquiries, Staff Costs etc.)
Implementation Time	• PT Improvement Expenses
	The elaboration of a pricing scheme takes some time but the impact on congestion should be noticeable quickly after launch. It may take a longer time for total benefits to outweigh total costs
Stakeholders Involved	Regional/Local Government, Transport Authority, Planning Authority, Transport Operators, Emergency Services and Users
Undesirable Secondary Effects	Social exclusion could become problematic if the pricing scheme is not designed correctly

Key questions before implementing road pricing scheme.

- Which system to use?
- How to set the pricing structure?
- What will be the Economic impact on road users?
- Where to spend the revenue?
- What are the impacts of pricing schemes?
- What all data is to be collected?
- What will be the Public View on RoadPricing and acceptance?



What are the Options?

There are various scales and types on how we can apply Road Pricing

Choosing the right size and design of a pricing scheme is essential. Several alternatives are possible:

- **Corridor approach:** a charged stretch of road that provides a means of transport from one point to another
- **Area scheme:** charging for driving in an area with a closely integrated road system
- **National and transnational system:** the charged area extends to a wider road network, rather than an individual zone.



Each scheme involves a different target group that is extended as the zone becomes larger. When building a pricing scheme, it is crucial to identify the users targeted and ensure the fairness of the scheme for all. Indeed, one of the major criticisms of road user pricing is that it is unfair to certain groups of people, ranging from low-income drivers to residents living the charged area.

Indian Policies

National Urban Transport Policy: Mobility for all

12th Five Year Plan:

1. **Transport Demand Management:** congestion pricing, parking fee and transit tariff.
2. **Control of Personal Motorized Vehicles:** Economic instruments
3. Suggestion- **Pilot schemes** to reduce the use of personal motorized vehicles should be taken up by MoUD/IUT

Advisories by MoUD:

1. **Introduction of Congestion Charging in Central Business Areas / Congested Areas in Indian Cities**
2. **Reserving a lane for public transport/high capacity bus system/high occupancy vehicles on all new road links or widened**



Option	Road Tolls	Facility Based Charging	Road Spacing Rationing	Vehicle use fee	HOT Lanes	Cordon Pricing	Corridor Pricing
What it is?	It is a fixed fee for driving on a particular road. Such tolls are a fee-for-service, with revenues dedicated to roadway project costs.	Areas flocked by a large number of volatile road users, which may use the transport related facilities like parking lots, may be charged for the facilities they are provided.	Rationing of peak period vehicle-trips or vehicle-miles using a revenue-neutral credit-based system.	Distance-Based Charges incur charges on distance run by vehicle users. Pay-As-You-Drive Vehicle prorates premiums by mileage so vehicle insurance becomes a variable cost, which gives motorists an incentive to reduce traffic impacts, but provides no additional revenue.	High Occupancy Toll (HOT) lanes or High Occupancy Vehicle (HOV) lanes is a restricted traffic lane reserved at peak travel time for exclusive use of vehicles with a certain minimum occupancy level.	Charges are levied for vehicles entering a defined zone within an urban area. In order to succeed, cordon pricing is best applied where private vehicle travel is focused heavily on a particular centre.	Pricing is applied to various major roads (or portions of roads) within a network. May also include High Occupancy Tolling (HOT) lanes, where high occupancy vehicles may use a lane for free while single occupant vehicles pay for using the lane. Potential to apply variable pricing through peak periods.
Advantages	Tolls are often structured to maximize revenues and success is measured in terms of project cost recovery.	Efficient utilisation of scarce resources for equitable division among all the road users.	Increased average speed during morning and evening peak hours.	Distance based charges such as mileage fees can be used to fund roadways or reduce traffic impacts, including congestion, pollution and accident risk.	Encourages car pools, public transport as they get priority.	Motorists who choose not to pay the charge change their travel behaviour, reducing traffic.	Revenue is raised through those who continue to use their vehicles and pay charges during busiest and most congested periods.
	Reduction in travel time and cost.	Revenue generation for development of transport infrastructure.	Encourage public transport and other measures like carpooling etc.			Revenue is raised through those who continue to use their vehicles and pay the charge.	Motorists who choose not to pay charges use alternative routes or change travel behaviour, decreasing demand on major arterials.
						Reduced congestion can result in improved travel times.	Reduced congestion can result in improved travel times and more reliable journeys.



Option	Road Tolls	Facility Based Charging	Road Spacing Rationing	Vehicle use fee	HOT Lanes	Cordon Pricing	Corridor Pricing
Disadvantages	<p>Tolling authorities may discourage development of alternative routes or modes.</p> <p>Scope to levy toll even after cost recovery as forecasted traffic surpasses the expected volume in the concession period.</p>	<p>Underutilised facilities may turn out to be dark spots for unsocial elements.</p> <p>Ill maintained facilities could encourage encroachment.</p>	<p>Can be applied only to cities having higher ATL where motor trips constitute the major trips generated.</p> <p>If not implemented properly may lead to shift of congestion pockets on non-priced corridors.</p>	<p>Vehicle use fee provides no additional revenue as it is an incentive mechanism.</p>	<p>With one lane dedicated to HOVs, other vehicles have to share the reduced number of lanes.</p> <p>LoS of the roads would degrade due to limited road space for majority of vehicles.</p>	<p>Capacity of public transport in major centres already reaching its limit, giving motorists limited opportunities to change their mode.</p> <p>Can impact upon existing private motorway concessions.</p> <p>Can cause increase in traffic in surrounding non-charged areas.</p>	<p>Public resistance at paying for something previous perceived as 'free' may need to be offset by reductions in fixed motoring costs.</p> <p>Can impact upon existing private motorway concessions.</p> <p>Can increase traffic on surrounding local roads.</p>
Can it work in India?	<p>Yes, it is one of the forms which exist in India.</p>	<p>Yes, but mostly are priced aptly there by not reaping the desired output.</p>	<p>Yes, but would be limited to metro cities.</p>	<p>Yes, but it is complex to implement and would need auxiliary systems to implement.</p>	<p>Yes, as BRTS are already in implementation in many Indian cities. HOV is also a possibility.</p>	<p>Very likely. The high density and increasingly decentralised nature of Indian cities is likely to work along with the effectiveness of a cordon charge. Congestion would tend to be dispersed rather than focused on a single centre.</p>	<p>Yes. Many State and National Highways are already subjected to tolls, thus infrastructure required is already in place. However there would need to be a more holistic view taken on its application.</p>

Option	Road Tolls	Facility Based Charging	Road Spacing Rationing	Vehicle use fee	HOT Lanes	Cordon Pricing	Corridor Pricing
Case Studies	Implemented in Indian National Highways –Approx 18,807 Km road toll in India with revenue generation of Rs.17,250 Crore until FY 2015-16 .	Facility charges like Parking charges exists in most of the Indian cities. The parking fee starts from Rs. 2 and Rs. 5 onwards for 2 wheelers and 4 wheelers.	<p>Delhi- Odd-even scheme implemented twice.</p> <p>Bogota - restricts traffic access into a pre-established urban area for vehicles with license plate numbers ending in certain digits on pre-established days and during certain hours.</p>	Switzerland- Swiss Heavy Vehicle Fee (LSVA) was introduced for heavy vehicles of 3.5 tons or more travelling on all Swiss roadways. The current fee for a vehicle with a maximum weight of 40 tons	California - State Route 91 Express Lanes in Orange County has been segregated as HOT lanes. Two toll lanes in each direction were built in the median of the existing eight lane freeway. Toll rates vary with the time of day to ensure that the toll lanes remain uncongested at all times.	London- introduced in January 2003 and promoted by mayor with aim to relieve congestion in the heart of capital. The scheme is included in the municipal transport strategy approved in July 2001.	Seoul-According to the Urban Traffic Readjustment Promotion Act, a congestion charge is to be levied on road segments according to travel speed and average delay. Applied at Namsan Tunnel 1 & 3.

¹ Ministry of Road Transport and Highways website accessed on Feb 2017





How the Pricing can be?

Charging Mechanism

There are various mechanisms used for charging and evaluation for selection based on the following parameters:

Type	Description	Equipment Costs	Operating Costs	User Inconvenience	Price Adjustability
Pass	Motorists must purchase a pass to enter a cordoned area.	Low	Low	Medium	Poor to medium.
Toll Booths	Motorists stop and pay at a booth.	High	High	High	Medium to high.
Electronic Tolling	Electronic system bills to users as they pass a point on the road.	High	Medium	Low	High
GPS	Track vehicle location and data are automatically transmitted to a central computer that bills users.	High	Medium	Low	High

Singapore Area Licensing Scheme 1975 charged entry of vehicles to the restricted zone. Road side enforcers at 28 entry points identify the violators not having the **entry pass on the windshield** purchased from the roadside booths, retail outlets etc. Before implementing scheme new Park-and-Ride lots with shuttle service, expanded bus service and a decrease of parking rates.

The scheme was later modified to Electronic road Pricing 1998. The vehicles are charged with the In-vehicle units with visual displays and audio signals to inform the driver about deducted charges or low balance.



London Access to the area is monitored by 170 access points equipped with cameras automatically reading the plates of vehicles. Drivers can pay the charge on the web, by SMS text message, by telephone or via AutoPay, a system of automatic payment allowing a discount of £1 (which is the most popular channel, with 40% of transactions). The charge can be paid daily, weekly, monthly or yearly with differential penalty rates. Buses, taxis, private hire vehicles, alternative fuel vehicles that meet strict emissions criteria, motorcycles are exempted. Vehicles used by residents of the zone can register for a 90% discount.

This system is managed by Transport for London, which also manages the Low Emission Zone, aimed at reducing truck emissions and improving air quality on a wider area.

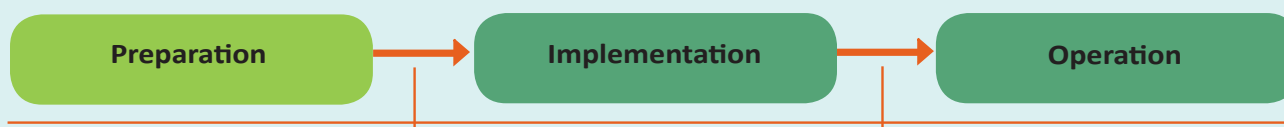




From Concept to Reality

Preparation Phase

The implementation of a road pricing scheme requires a great deal of preparation as early success with the scheme is crucial for a good public acceptance.



Key aspects at this stage

- Set the agenda and start discussions at the local/ regional (and in some cases national) level. The goals of the system need to be decided upon.
- Perform feasibility study to clarify the city's context, conditions and needs of the system.
- Decide how to allocate the revenues of the system. Should the revenues be used for infrastructure or what other it should be spent for?
- Map the legal framework to have a clear view of how a road charging system can fit.

Success Factors and Barriers at this stage

- Achieve unanimity within the city administration and the decision makers about the goals of the system.
- How to allocate the revenues of the system, for example by financing road and/or public transport or by reducing taxes.
- Prepare background material, expert support, analysis of the expected costs, benefits, revenues, etc. of the system to convey accurate information about congestion charging and overcome some potential initial criticism.

Stakeholder Involvement

- National, regional and local decision makers: information about the plans, debates and discussions.
- Non-governmental organizations: NGOs can be important for keeping the discussion alive.
- Legal administration: important to map the legal framework.

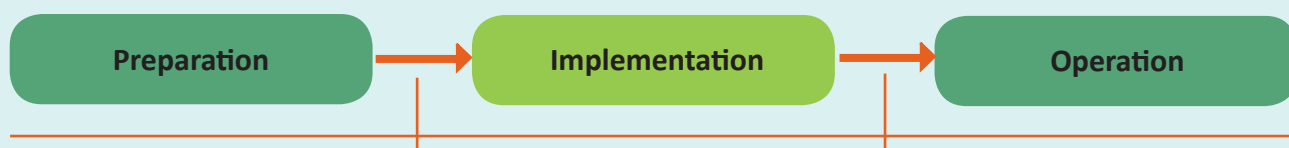
Ready for Implementation	✓
Bring The Question to the table	
Decide on the objectives	
Perform Feasibility Studies	
Check the legal framework	
Involve regional/national decision makers	
Involve NGO's and other stakeholder groups	
Engage in Public Debate	

- Awareness of the problem
- Legal framework and defined approaches to enforcement
- Make it part of an integrated strategy
- Select the correct perimeter plan and geographic structure for pricing
- Recruit an influential champion
- Consult the public and stakeholders and keep them informed



Implementation Phase

Implementing a pricing scheme requires a range of technical infrastructure in order to define the area, to ensure enforcement and facilitate payments. It also requires a good level of co-operation between all actors and some investment to improve or develop transport alternatives to cars.



Key aspects at this stage

- Assign roles and responsibilities.
- Ensure a successful debut.
- Ensure a high level of public transport and other Mobility Management measures and transport alternatives.
- Secure cooperation from third parties.
- Addressing equity and fairness Concerns.
- Good marketing and communication plan and media support.
- Use proven technologies.

Success Factors and Barriers at this stage

- Issue of acceptability by the common people.
- Fear of adverse impacts on retail is a common concern. There have been several attempts to track such effects but the results show that the effects are small or non-existent.

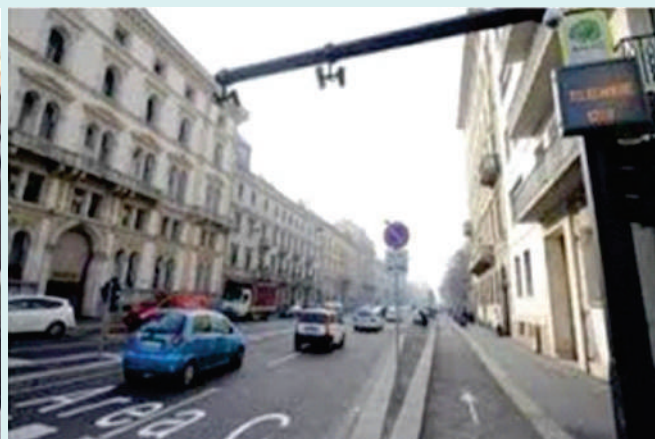
Stakeholder Involvement

In the implementation process, the same stakeholders who are present in the preparation phase need to be

involved again. In addition, other stakeholders could include:

- User groups: information campaigns, public debates, etc.
- NGOs: Can be used as a channel for information and can also help to increase acceptability of the scheme.
- Car registry: discussions connected to license plate recognition.
- Banks: which payment channels are possible within the scheme.

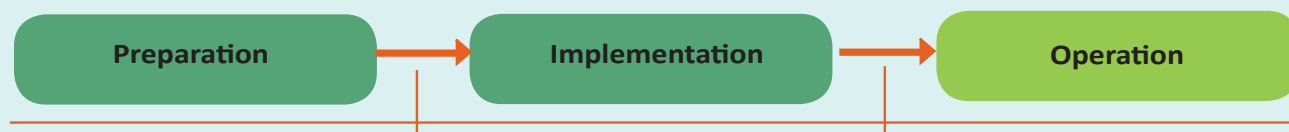
1. Meetings with key stakeholders and hearings to educate interested parties.
2. Public consultation.
3. Publication of the final transport strategy based on outcome of dialogues with stakeholders and public concerns.
4. Publication of legally binding documentation of the scheme by the transport agency with further consultation.
5. Regular monitoring of impacts after implementation.





Operation Phase

Pricing schemes have been successfully implemented in cities like London and Singapore. In the long term, such schemes are likely to be taken up by more local authorities as they bring on real improvements in quality of life. The following elements are seen as key in order to ensure a long-term efficiency of the scheme.



Key Aspects at This stage

- Information is one of the most important aspects when the measure is moving into operational phase. The users must be aware of how the system works, how and when to pay, etc. Inhabitants of the city where the system is installed can be addressed directly but information also needs to be disseminated to surrounding areas. Information signs when entering the city might also be necessary in order to inform drivers who are from other cities/countries.
- Monitoring is another key aspect. In order to measure the effects and compare with the situation before the measure was implemented, detailed information gathering is necessary. Also, this information can be used to identify potential for further improvements and can give valuable input to future modifications of the system.

Success Factors and Barriers at This stage

- As in the implementation phase, addressing public opinion is central. Experience (from Stockholm) has shown that the public tends to become more positive towards congestion charges once they are introduced. However, the debate is likely to continue for quite a long time.
- Finally, unexpected negative side effects could arise as a result of the scheme — for example increased traffic and associated problems in some areas due to rerouting traffic. To address these problems and try to find a solution can be important for the acceptability and in the end, to the measure being viable and maintained in place.



- ◆ Clear principles of compliance and Enforcement
- ◆ Focus on customer relationship Management
- ◆ Honest reporting of results
- ◆ Maintain flexibility

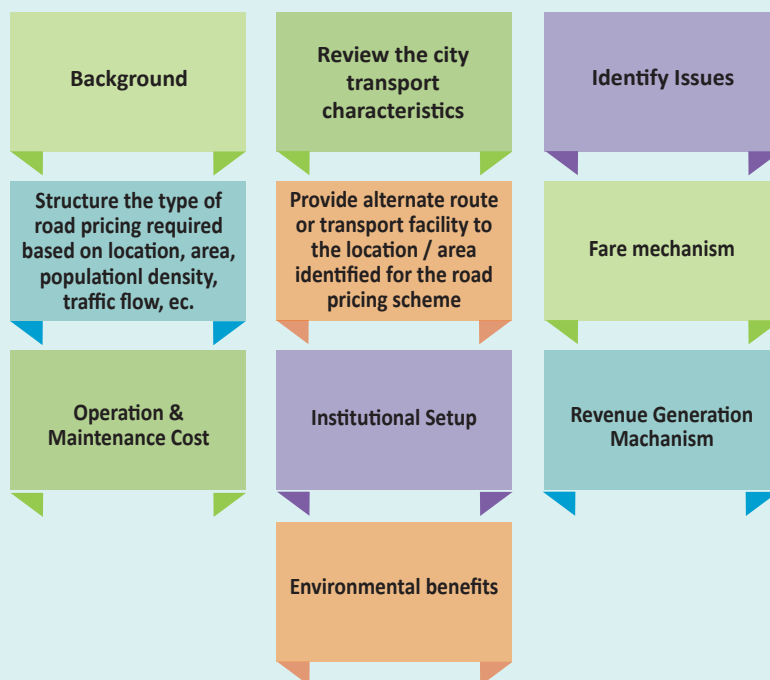


Question of Acceptability?

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Acceptability Enhancing Measures

- Should be cost effective and convenient.
- Use variable pricing.
- Avoid significant discounts for frequent users.
- Provide travel alternatives.
- Integrate pricing with other TDM strategies and other transport policies.
- Public participation and interaction with the various stakeholders including political support.
- Communication and marketing for better project development.
- Issues of “fairness” should be addressed.
- Revenue should be reinvested in public transport/transport infrastructure.



An effective and fair road pricing system should reflect the following principles:

User Perspective	Traffic authority Perspective	Society's Perspective
<ul style="list-style-type: none"> • Easy for users to understand. • Convenient – does not require vehicles to stop at toll booths. • Transport options – consumers have viable travel options available (i.e., alternative modes, travel times, routes, destinations). • Payment options – easy to use with multiple payment options (cash, prepaid card, credit card, etc.) • Transparent – charges evident before trip is undertaken. • Anonymous – privacy of users is assured. 	<ul style="list-style-type: none"> • Traffic impacts – does not require each vehicle to stop at toll booths or in other ways delay traffic. • Efficient and equitable – charges reflect true user costs. • Effective – reduces traffic congestion and other transportation problems by changing travel behavior. • Flexible – easily accommodates occasional users and different vehicle types. • Reliable – minimal incorrect charges. • Secure and enforceable – minimal fraud or non-compliance. • Cost effective – positive return on investments. • Implementation – minimum disruption during development phase. Can be expanded as needed. 	<ul style="list-style-type: none"> • Benefit/cost – positive net benefits (when all impacts are considered). • Political acceptability – public perception of fairness and value. • Environment – positive Environmental impacts. • Integrated – same charging system can be used to pay other public service fees (parking, public transit, etc.)





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