


Report on Lessons for Metro Vancouver from Road Pricing Schemes around the World

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Report on Lessons for Translink from Road Pricing Schemes around the World

Translink Vancouver

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Executive Summary

TransLink is undertaking research into road pricing as part of the Regional Transportation Strategy development. Halcrow has been asked by Translink to identify key lessons that can be drawn from existing urban road pricing schemes from across the world and present these in a short report. This report presents a summary of these lessons from urban road pricing schemes across the world and is intended to inform the regional debate on transportation policy. The report is structured into three chapters. Chapter one reviews the road pricing advice that TransLink has received to date. Chapter two presents a summary of the lessons that can be learnt from road pricing schemes around the world. These lessons have been drawn from schemes in London, Singapore and Stockholm and from proposed schemes that were not implemented including those in Manchester, Edinburgh and New York. Chapter three presents the implications of these lessons for Vancouver.

The lessons have been categorised into the following six categories:

- the objectives of road pricing and the extent to which these have been achieved;
- governance and legal powers necessary to enable implementation;
- how issues of public acceptability were overcome;
- planning and project design;
- technology employed; and
- payment, compliance and privacy issues.

The key lessons that have been identified in the report are summarised in the following table.

Objective setting	<ul style="list-style-type: none"> • Road pricing needs to be based on clear objectives • Monitoring and scheme adjustments are required to ensure ongoing success
Governance and legal powers	<ul style="list-style-type: none"> • A political champion is necessary to support a successful scheme • A united voice amongst politicians and public figures is required • Legal powers are required to establish a road pricing scheme and to support the daily implementation of a scheme
Public acceptability	<ul style="list-style-type: none"> • Engage the public throughout the planning and implementations process • Trial periods are key for public support, feasibility and successful long term implementation • Value must be evident to customers • Introduce the schemes at the same time as wider transport improvements
Planning and project design	<ul style="list-style-type: none"> • Schemes need to be integrated with wider transport planning initiatives, and transport alternatives must be available • Conduct research into the local context in order to identify the most appropriate scheme for the city • Project design considerations include: location of charging zone, approach to charging, pricing for vehicle types, social considerations, revenues, and phasing the implementation.

<p>Technology</p>	<ul style="list-style-type: none"> • There are several key types of technology, these vary across the different forms of road pricing scheme. The current technology available includes: automated number plate recognition (ANPR) cameras, dedicated short range communication (DSRC) and distant technology such as GPS • Technology needs to be appropriate to the type of scheme and the context • The cost effectiveness of these technologies varies
<p>Payment, compliance and privacy</p>	<ul style="list-style-type: none"> • Flexibility of payment options is needed • Penalty measures are required to ensure public compliance

1 Summary of existing advice to Translink on road pricing

This chapter summarises the existing advice on road pricing applications from around the World that has Translink had commissioned or prepared. The advice was provided in three documents:

- Greater Vancouver Regional District (GVRD) Policy and Planning Department (April 2007): Road Pricing: An Overview Of Current Practice, Metro Vancouver
- Deloitte (2010): Metro Vancouver Road Pricing Research Study
- Translink (2012) Road Pricing Briefing Slide Pack, (Unpublished slide deck)

Taken together, the advice covers two issues: the different types of road pricing applications and generic lessons from actual and proposed road pricing schemes. For both issues, the advice was presented in general terms rather than detailed references to actual schemes or proposals.

1.1 Forms of road pricing

The GVRD report identified four main forms of road pricing schemes. Variations of these forms can occur but all schemes can be traced to one of these four main forms:

- Area schemes: involving a charge for driving into and within a designated area, typically used in urban areas.
- Corridor schemes: the traditional approach whereby a toll is charged for the use of a bridge or section of a road.
- National schemes: involving the application of charging across a country's transport network.
- Integrated schemes: the most advanced form of road pricing which is interconnected with wider transport, for example with the use of a single payment method for road pricing, parking and public transport use.

1.2 Key lessons from the reports

The existing reports that have been prepared for Translink on road pricing collectively provide some key lessons. The following bullet points summarise these lessons. The points have been drawn from across all three of the documents.

1. It is important to have **clear objectives** for a road pricing scheme (for example in respect of congestion relief, revenue generation or the environmental improvement/ emissions reduction).
2. While precedent can provide valuation lessons, road pricing objectives need to be **customized** to the local area. Research and analysis of the local context is required to inform the planning and evaluation of schemes, rather than simply replicating existing schemes in new areas;
3. A committed **political champion** to lead the scheme is essential to ensuring concerted and ongoing support and maintaining cohesiveness. In addition to this, enabling legislation and governance structures are a pre-requisite for successful implementation;

4. Extensive public **consultation and stakeholder engagement** is required throughout the process of planning, designing and implementing a scheme with the benefits consistently made clear;
5. Schemes that are **simple and clear** are likely to gain more public support. In particular, the pricing structure should be easily understood, fair and transparent;
6. **Equity** was raised in the reports as an important consideration. It was identified in relation to the need for rebate systems and discounts for reducing the impact on disadvantaged groups, such as lower income road users. However, the question runs much deeper than this to issues of equality in the availability of alternative transportation options between different areas;
7. Schemes typically have a **long lead in time** and can take over five years to implement. They require intensive planning and the development of a procurement strategy to plan out the costs of the scheme, a business case, and strong project management and contract management;
8. Schemes must be designed to be **secure and enforceable** with the opportunities for fraud or non-compliance kept to a minimum;
9. Schemes need to be **adaptable** in order to adjust to changing circumstances over time;
10. A variety of proven technologies are available, however the **capital and operating costs** vary greatly between the different types of technology and schemes and needs to be taken into account in benefit - cost analysis;
11. Urban road pricing schemes need to be implemented alongside wider transportation improvements, with **transit alternatives** made available in advance of implementation; and
12. **Ring fencing road pricing revenues** for reinvestment into the transport system is essential to counter the potential public perception that road pricing is “just another tax”.

Conclusions

The advice provided to Translink to date has been very high level and more detailed analysis of road pricing options in the local context is required. Whilst the differentiation of road pricing schemes and proposals into four broad types may be useful for presentation simplicity, it is important to understand the significant differences between, and uniqueness of, road pricing schemes and proposals. Each scheme is different in a number of ways.

In terms of lessons, those summarised above are often referred to when discussing road pricing schemes. However the lack of references and detail on road pricing schemes or proposals in the reports means that it is not possible to understand whether the lessons are cross cutting, based on the experiences from a number of schemes and proposals, or relate to just one or two schemes or proposals.

In terms of advice on appropriate schemes for Vancouver, the Deloitte report, which was based on a very high level review of different scheme types, concluded that further work is required to identify the most appropriate scheme for the region. It recommended more research would be required into the possibilities of implementing coordinated tolls at bridges and major waterways, and full network tolling. It rules out two schemes as being inappropriate for the local context, these were Localized Area Schemes and Controlled Access Highway Tolling.

2 Lessons from specific road pricing projects

This chapter presents lessons from existing and proposed road pricing schemes across the world. Though the chapter focuses on **area-wide pricing** (which typically requires payment by drivers wishing to enter or travel within a defined area), there are various other types of road pricing including:

- **Facility or corridor pricing** – can apply to one or more highways, bridges, or tunnels;
- **Lane pricing** – applies to one or more highway lane that offers a better level of service than the adjacent free lanes; and
- **Distance-based charges** – vehicles are charged per km driven, with information potentially collected through on-board units.

The chapter includes an assessment of area-based schemes in London, Singapore, Stockholm and Oslo, and from proposed schemes that were not implemented including those in Manchester, Edinburgh and New York and a national scheme in the Netherlands.

The lessons have been categorised into six core topic areas. These are:

- the objectives of road pricing projects and the extent to which these have been achieved;
- governance and legal powers necessary to enable implementation;
- how issues of public acceptability were overcome;
- planning and project design;
- technology employed; and
- payment, compliance and privacy issues.

Financial figures have been converted into Canadian dollars based on a conversion rate of C \$1.00 to GB £0.63 and EU €0.79.

2.1 The objectives of road pricing projects and the extent to which these have been achieved

Setting objectives

Road pricing schemes need to have clear objectives and these need to be understood by both users and non-users of the scheme and should be used to establish that road pricing is, in fact, the solution which best meets these objectives, and its ability to satisfy these objectives during its lifetime. This is vital to secure initial and ongoing public acceptability. Such objectives may include demand management, as well as economic, financial, environmental and social goals. The majority of road pricing schemes have multiple objectives. Most area based schemes have been introduced with the primary goal of demand management, in particular relieving congestion in central areas of a city. (Facility or corridor based pricing [road or bridge tolling], on the other hand, is often used as a means to raise revenue for infrastructure or level of service improvements.)

The original objectives of the London Congestion Charge scheme are outlined in the Mayor's Transport Strategy 2001, a central aim being congestion reduction and improved transport efficiency through reduced journey times, as well a reducing negative environmental impacts arising from congestion. Additional objectives include revenue generation (with revenues required to be reinvested into the transport system), integration with and support for other parallel initiatives, and to make central London a more pleasant place. The strategy also aims to encourage a "move to greener transport". In addition to these objectives, the Mayor's Strategy

outlined targets to be achieved by 2011, including a 15 per cent absolute reduction in weekday traffic in central London; zero traffic growth across the rest of inner London; and a reduction of growth in outer London by a third, with the aim of achieving zero traffic growth in outer London town centres. Since the implementation scheme the scheme objectives have generally remained unchanged.

A similar set of objectives was developed for the Stockholm scheme, the design of which was informed by the lessons learned from a full-scale trial undertaken prior to the development of the final scheme. The focus of this scheme was to reduce congestion and also to generate revenues which were required to be reinvested into the transport system in the city.

The aim of the Area Licensing Scheme that was introduced in Singapore was to regulate traffic, reduce congestion, increase traffic speeds, and thereby to improve economic competitiveness. Under this dynamic pricing scheme, fees are increased as the traffic speeds drop. As with London and Stockholm, the Singapore pricing scheme was part of a wider package of transport planning measures and transport improvements.

One area-wide road pricing scheme that did not have congestion reduction as its primary objective was the Oslo electronic road toll system, introduced in 1990. The main objective of this scheme, which consisted of a ring of 19 tolling stations on arterial roads entering the centre of the city, was to raise revenues for investment in road construction and public transit infrastructure. The Norwegian parliament match funded the net revenues generated and these funds were invested in the construction of new roads. Although not designed with the intention of affecting the road congestion in the city, the scheme did lead to a 6 percent reduction in road traffic. It was planned to cease operating in 2001. However, it was continued beyond 2001 with the revised objective of committing all the revenues to public transit initiatives, and remains in place today. While facility or corridor pricing schemes are primarily for revenue raising, area-wide road pricing schemes have historically been primarily for demand management purposes, the Oslo scheme may be seen as an example of a hybrid of the two.

The objectives of failed schemes have been largely similar to those of successful schemes. For example, the scheme in Edinburgh was proposed as a solution to demand management, in particular to reduce congestion and enhance opportunities for alternative road users such as cyclists. Additional objectives included the protection of the historic centre, and revenue-raising. The objectives for the proposed New York scheme were to reduce traffic and congestion; to improve air quality; and benefit public health. It is important to note that the failures of these schemes were not due to scheme objectives *per se*. Rather this was due to the approaches adopted in the early stages of scheme development and the consultation strategy employed. This issue is discussed later in this chapter.

The background to these schemes, their rationale, the regulatory context, the politics, and the local conditions all impact ultimate scheme objectives. In the case of the London Congestion Charge, for example, legislation specifically restricted the purpose of the road pricing scheme to relieving congestion. Generating revenue was thus a secondary benefit of the scheme. It would not have been politically or socially acceptable for revenue raising to be the primary reason for the introduction of road user charging in this context.

In summary, it is important that the objectives are straight forward, understandable to the public and are linked clearly to the benefits of implementing the scheme.

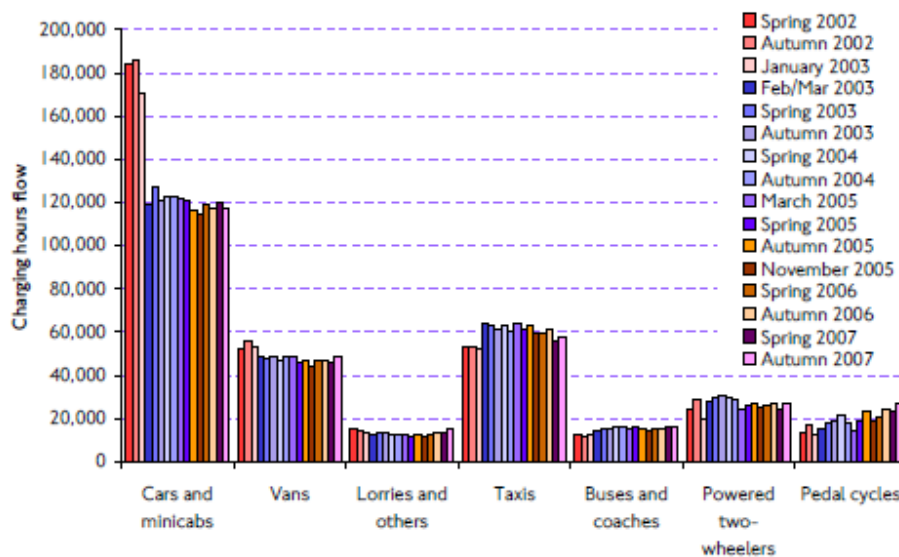
Monitoring schemes

Schemes require careful and ongoing monitoring to ensure that they are achieving their objectives and to inform decisions about what changes may be necessary. The London scheme involved an extensive monitoring program which included the publication of annual monitoring reports until 2008. Transport for London (TfL) had projected that traffic would reduce by 10-15% as a result of the scheme:

- Interestingly, even before the scheme commenced in 2003, the behaviours of road users had changed. Between 2000 and 2002 there was a reduction in car travel journeys, with vehicle kilometres falling by 7% by 9% for vehicles that would be subject to the congestion charge. In the year leading up to the charge, scheduled bus kilometres increased by 10%.
- In the first year of implementation, central London experienced a 30% drop in congestion. This occurred as a result of the 18% reduction in the number of 4 wheeled vehicles entering the charging zone, and a 15% reduction in traffic volumes circulating within the zone.
- Public transit successfully absorbed change in travel modes. The number of bus passengers increased by 38% between the autumn of 2002 and autumn 2003 with the actual number of buses increasing by 23% during this period. The number of London Underground passengers declined by 8% (as a result of improved bus services).

The impact of the scheme on traffic entering the congestion zone is presented in Figure 2.1.

Figure 2.1: traffic entering the central congestion zone (across all inbound roads), Charging hours, 07:00-18:00, 2002-2007

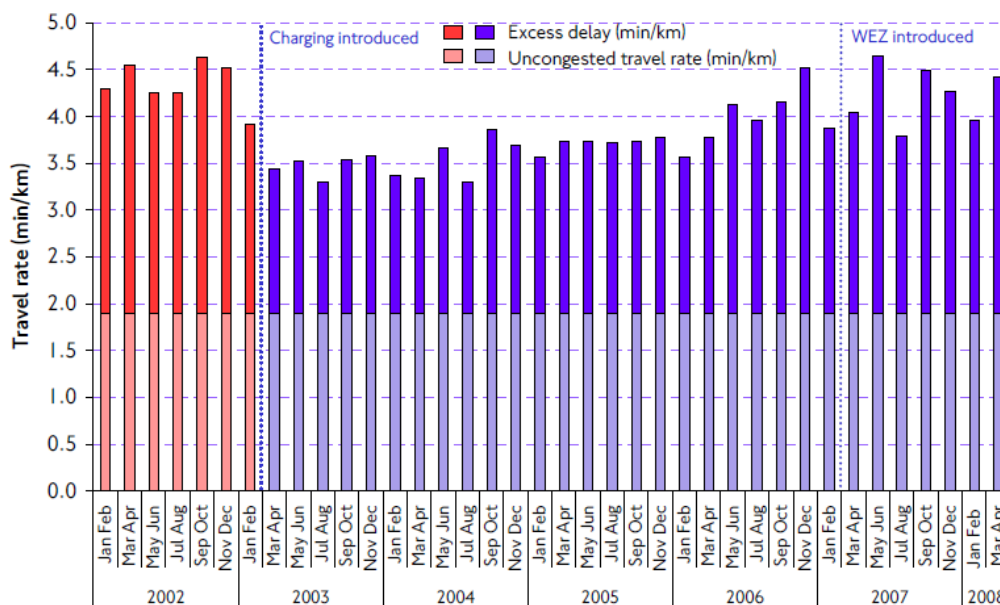


Source: Transport for London (2008)

Figure 2.2 shows the increase in traffic speeds after the scheme was introduced in February 2003 through to 2007. The graph appears to show a tailing off in traffic speeds over time as congestion begins to increase again post implementation. It is important to recognise the rapid growth in London's population over this period and to note that congestion / travel speeds would have been significantly worse in the absence of the scheme. The reduction in the traffic

speeds are thought to also have been affected by the introduction of other measures including bus lanes and traffic calming.

Figure 2.2: Traffic speed changes in London 2002-2008



Source: Transport for London (2008)

In terms of costs and revenues, the annual costs of the scheme in 2007/08 were C\$209 million and the gross revenues were C\$427 million. This left net revenues of C\$218 million which were reinvested into the transport network the majority of which was directed to bus network improvements.

Modest beneficial impacts on road related air pollution emissions were reported when the London scheme was being monitored. Although there were some reductions in emissions, there was no recordable reduction in air quality. Overall concentrations of PM₁₀ have remained stable since the introduction of the congestion charge and NO₂ has declined slightly. Arguably the air quality is better than the possible scenario if the scheme had not been implemented. CO₂ emissions have reduced by 6.5% as a result of the scheme.

Monitoring of the Stockholm scheme has not been as extensive as for the London scheme. Extensive monitoring and evaluation was conducted during a trial scheme in order to identify whether it was a viable option, and an academic evaluation was recently published assessing the impact five years on from the start of the scheme. A recent evaluation conducted by Borjesson *et al* found that congestion was 18% lower in 2008-2009 than the levels in 2005 (Borjesson *et al*, 2012). However, it becomes increasingly difficult over time to attribute the change in congestion to the scheme itself owing to the intervention of other factors. During the trial period there was a clear reduction in journey times both in the inner city and on approach roads. However, as is the case in London, congestion levels within the charging zone in Stockholm have begun rising again, partly due to population increase. The scheme generates net revenues of around C\$74 million per year, excluding investment costs, of C\$91 million, and

has also resulted in broader socio-economic benefits and well as increase transit fare box revenues.

The area licensing scheme in Singapore resulted in a 13% drop in vehicles in the charging area and generates around C\$89 million of net revenues each year. However toll rates are regularly reviewed and revised to ensure the scheme continues to meet its objectives. Published information on the monitoring and evaluation of the Singapore scheme is limited.

These three schemes are generally regarded as being successful. Ongoing monitoring is necessary to ensure that they continue to meet their objectives.

Co-benefits and Land Use and Business Impacts

Beyond the core objectives of the three schemes discussed, a number of additional co-benefits were realized as a result of these schemes, including small improvements to traffic safety, and impacts on urban activity patterns.

Monitoring of the impact on urban land use has been limited to date. One approach is to use real estate prices. Studies have found that this impact has been very small. Prior to the implementation of the London congestion charge, for example, it had been projected that housing demand and property prices would increase in the congestion zone and demand outside the zone would decrease. But following scheme implementation, there has been limited evidence of impact on residential and retail property prices.

The impact on businesses has been assessed through several surveys which have yielded varying results. Value Added Tax (VAT) registrations and de-registrations are an indicator of business activity. There have been more VAT registrations than de-registrations in London since the congestion charge was introduced, indicating that the scheme has not adversely affected business activity. Nevertheless, in terms of the impact on retail activity, there has been a noticeable change in shopping behaviour. For example, the 2008 London Congestion Charge annual monitoring report for the found that retail traffic had reduced on weekdays (when the charging scheme is in place) whereas, retail traffic increased during the weekend period. This change in timing for shopping trips largely balances out the variation in traffic. It is likely that the congestion charge was the cause for the change, but it can also be attributed to a change in Sunday trading laws allowing longer opening hours.

A social impact survey found that the scheme has also impacted online shopping. Around one fifth of Inner and Outer London respondents who shop online reportedly do so because of the charging scheme. A survey by the London Chamber of Commerce and Industry found that 76% of business respondents reported a decline in revenues year on year, and this was largely blamed on the congestion charge. However, despite these survey results, overall retail sales within central London overall have increased since the introduction of the scheme. A study into the impact of the road pricing scheme in Stockholm found that travel for shopping purposes decreased by 17% during the charging times. (Note that it is not possible to know exactly how much shopping habits and sales would have increased/decreased without the charge in place because a “counterfactual” was not assessed as part of the monitoring and evaluation process for either the London or Stockholm charges.)

2.2 Governance and legal powers necessary to enable implementation

The issue of governance and political support, together with the establishment of legal powers to implement road pricing, are essential to enabling implementation of road pricing.

Governance and political support

The importance of a political champion: It is widely viewed that in order to secure sufficient public support and momentum to enable a scheme to proceed, a political champion is required to lead the process. For example the London congestion charge was championed by the new Mayor of London. Before the introduction of scheme, legislative and governance changes enabled the creation of the new position of Mayor of London whose wide-ranging authority included transportation across the boroughs which make up the Greater London area. The first Mayor, Ken Livingstone, had largely focused his campaign for office on the introduction of a congestion charging system for central London. He focused the campaign on the need to ease traffic congestion, reduce travel times, and improve transport efficiency in central London and by persuading people to switch to alternatives to private cars. In order to do this, he proposed to introduce a congestion charge and proposed improve bus services. The focus of his campaign was on the issue of congestion relief rather than the other scheme objectives (such as environmental benefits or revenue raising). Once he was elected, the system was put into place.

While political champions have played a pivotal role in successful schemes, other schemes which lacked such a champion have, nonetheless, also succeeded. For example the road pricing in Stockholm was a result of political pressure from an opposition party. When the Social Democrats came into power, the Green party demanded that a full scale road pricing trial be implemented in order for the Social Democrat-led national government to receive the Green party's support. The leader of the Social Democrats (Ms Billstrom) accepted the scheme trial, despite having committed previously to not implementing road pricing. This resulted in political discord, but the scheme was a success nevertheless.

A united voice: Successful schemes are those which are able to garner support from as many stakeholders as possible, while avoiding partisan politics. Evidence indicates that without widespread support, it will be difficult for a scheme to gain acceptance, though not impossible. In area-wide schemes that focus on charging for travel into the centre of the city, there is likely to be more opposition from peripheral municipalities who are typically more likely to be impacted by road pricing. Schemes in Manchester and New York were rejected largely because of the lack of a united voice. In Manchester, a road pricing scheme proposed by the City Council was based on a cordon system consisting of a C\$1.6 charge for outer areas of the city and an additional C\$3.2 charge for the core area. The local authorities in the areas around Manchester were opposed to the system. This gave mixed messages to the public. Residents of greater Manchester participated in a public vote, the results of which indicated that 79% were against the system. Had councillors and politicians in Manchester and its surrounding area voiced collective support for the proposed scheme, this might have provided the public with greater confidence. Given the potential opposition from outer jurisdictions, specific strategies aimed at improving support from within these areas should be considered. This issue is discussed more in section 2.3 below.

In New York, politicians and the public outside the proposed cordon zone were able to stop a road pricing system from being implemented in Manhattan, despite widespread support for the scheme within the city itself. The scheme was championed by the Mayor of New York who proposed daily fees of approximately C\$8 for cars and C\$21 for trucks entering Manhattan. The New York State Senate supported the scheme as did New York City Council who had voted to adopt it. The plan was supported by the Mayor, the State Governor, a collation of more than 130 civic, business, labour, environmental and advocacy groups, and major newspapers. However the four boroughs outside of Manhattan, particularly Brooklyn and Queens (which are more auto oriented, and do not benefit from the levels of transit service enjoyed by other areas), rejected the proposals. The proposal required authorization under state law; this was clocked

(without a vote being conducted) by the Democrats, who has control of the State Assembly. The disproportionate power of relatively small groups of opponents, who do not believe road pricing to be in their best interests, and the sway they have over elected officials were underestimated in this case.

Although it creates more of a challenge, political obstacles to a united voice can be overcome, as in the case of Stockholm, where the leader of the Social Democrats had initially committed to not implementing road pricing as part of their election campaign. In order to gain wider support for other policies from the Green Party opposition, the Social Democrats switched to supporting the implementation of a road pricing trial. This led to significant controversy for a long period of time even turning some political supporters against the scheme. However despite the controversy, the scheme was eventually implemented. The support for the scheme was achieved by introducing it alongside wider public transport improvements, clearly demonstrating the benefits of the scheme to society and individuals.

Political longevity: An issue linked to the need for a united voice is political longevity. Road pricing initiatives are at risk from changes in political leadership. For example a national road pricing scheme was proposed in the Netherlands in 2007. However the scheme did not go ahead. It was put on indefinite hold due to a change in government despite initial indications that there was public acceptability of the scheme.

Legal powers

In the majority of cases existing legal powers are insufficient to enable a congestion charge schemes to be successfully implemented. Special powers need to be given to local metropolitan authorities to enable the establishment of a scheme for their city. In addition, legal requirements need to be established to support the daily implementation of the scheme, for example to enable the appropriate technology to be integrated with vehicle fleet and other transport systems and to allow enforcement of the scheme.

Legal powers to establish schemes: In order to enable local authorities to set up local road pricing schemes in England and Wales, a national Transport Act was introduced in 2000 which provided local authorities (outside London) with new powers to introduce charging schemes. An earlier Act passed in 1999 (the Greater London Act) to create the position of Mayor of London enabled the Mayor to implement a charging Scheme in London. The Greater London Act also stipulated that the net revenues of any London congestion charge during the first 10 years of its operation would have to be reinvested back into improving London's transport network. These legislative changes required support for the principle of road pricing in Parliament.

The creation of legal powers at the local level to establish schemes has an impact on decentralisation and the balance of power between local and central governance. In the case of Stockholm the local generation of revenue from road pricing led to a discussion over how national infrastructure grants should be distributed. The politicians in Stockholm had argued

that the grants had been unfairly distributed. The availability of road pricing revenues led to concerns that Stockholm would have to spend a larger share of transport investment than previously. A solution to this was the creation of a “Cederschiold agreement” which ensured “the charge revenues were funding parts of a major transport investment package, where the national government also made a major funding commitment – much larger than had been the case for a long time”¹.

Legal powers to support the daily implementation of a scheme: Regulations are required to ensure enforcement of the scheme, including sanctions or penalties for non-compliance. A variety of mechanisms can be implemented. For example in Stockholm the authorities have the right to take money directly from the person’s bank account if they do not pay. An alternative to this, which is used in London, is the ability for Transport for London to clamp or impound the driver’s vehicle.

Development of national standards: Several schemes have involved the development of national standards to ensure their successful implementation. This enabled the schemes to use the best available technologies and business systems. For example Singapore created a legal requirement for all cars to be fitted with an in vehicle unit that could be used for paying the charge. This helped to standardise the system and reduce costs of the scheme. Open source standards are also recommended to ensure that data can be shared easily between systems of different types and manufacturers.

2.3 How issues of public acceptability were overcome

Public support is crucial to the success of a road pricing scheme. There are several examples of projects which have been unable to proceed due to a lack of public support. The following section therefore highlights key lessons that are important for improving public acceptability.

Engage the public throughout the planning and implementation process: Consultation with local residents and other stakeholders such as business-owners is essential for the success of a road pricing scheme. The form of public engagement employed varied across the schemes reviewed, and ranges from consultation to referendums.

- Singapore conducted a year-long consultation period at the same time as a trial pricing scheme. The consultation led to some modifications and improvements to the scheme design. An education program was also set up in schools to teach children about transport solutions and the benefits of road pricing.
- Broad based public consultation was conducted for the Stockholm scheme. A seven month trial was held followed by a city wide referendum.
- Public consultation was also a critical component of the London congestion charge although in this case a referendum was not held. Extensive surveys of Londoners were conducted to gauge public opinion. Example survey questions included: “Are there

¹ Borjesson et al, Transport Policy 20 (2012) 1-12

transport problems in London? How can we solve the problems? How should improvements be paid for?" Unlike the schemes in Europe a public vote was not held.

Pilot schemes have also proved a powerful tool for increasing public awareness of the objectives of road pricing, to demonstrate their technological implementation and to test potential impacts. For example, the Puget Sound Regional Council in the United States conducted a pilot scheme to test the travel behaviour impacts of a charging system in the Seattle metropolitan area during 2005-2006. One of the objectives was to familiarize people with a "real" application of road pricing and to test public attitudes to pricing.

Where referendums are held, the vote is generally based on a simple "yes" or "no". But, the consultation process leading up to the referendum generally covers issues in depth, identifying the trade offs of a scheme, demonstrating these through a trial, and consulting with the public on which trade offs are acceptable. The benefits of the scheme may include reduced congestion, improved travel times, improved safety, reduced air emissions, increased revenues, better transit services, new/ upgraded transportation infrastructure; while the potential costs include charges incurred for entering zoned and cordoned areas, and the need for changes to personal shopping and social habits.

It is important to take on board the results of all consultation to ensure successful implementation of a scheme and to improve its acceptability. For example, an extension to the London congestion charge in the west of the city was imposed in 2007, despite widespread and strong local opposition. When the new Mayor of London, Boris Johnson, came into power in 2008 he undertook a new round of consultation with local residents in respect of the unpopular extension. The consultation revealed that there continued to be strong opposition to the extension with 68% of local residents opposed to the scheme. As a result, the western extension was removed in 2011. The change in political power, as well as the lack of public support, and the fact that the area was largely residential was the reason for the removal of the extension.

Consultation needs to be handled very carefully. The failed schemes in Edinburgh and Manchester had public consultation components, but both failed the last hurdle: the referendum. The public failed to back these schemes for two key reasons. The first was the schemes were very extensive. They both included two charging zones in the inner city and the outer city. Charging in the outer areas, where there was less congestion and a larger residential population, was generally considered to be less acceptable than proposals for the inner city zone. However, because these zones were conjoined in a single scheme, resistance to charging in the outer areas meant that the charging scheme in the inner areas could not proceed. Secondly, neither scheme implemented a trial period. Evidence from Stockholm (see below) indicates that public acceptability of a scheme can increase following such a trial which provides the opportunity for the public to see the scheme work and can lead to a more positive outcome at a referendum.

In general road pricing projects are controversial at the planning stage but once they are implemented this controversy dies down, often very quickly. For example the London Congestion Charge (excluding the western extension) is no longer a political issue and is widely accepted by the public, who recognize its benefits. In Stockholm, just 40% of the public supported the congestion charge prior to the trial. After the trial period 53% supported the charge, and once the scheme was introduced permanently, support rose to 66%. By 2010 support has risen to 74%.

The public engagement process needs to be very clear so that the public are fully aware of what the road pricing scheme will involve, how it will impact upon them, how the proceeds will be

used, and the benefits it will have. Where a referendum is required or proposed, both the scheme parameters and the guidelines for voting need to be clear. In the case of Edinburgh, for example, the referendum was confusing. Three quarters of the voters voted “no”, but the congestion charge was only one part of a wider package of transport changes that were being proposed and only one vote was given to the public to cover all of the proposed developments.

Implement a trial period for a new scheme: Trial periods are a features of several successful road pricing schemes. A trail gives the public an opportunity to experience the impact of a scheme in practice, to see the benefits that a scheme can have and to ascertain the impact of road pricing on their daily lives. Stockholm held a seven month trial period for their road pricing scheme in 2006, which generated C\$104 million in revenues. Directly after the trial a city-wide referendum was held to decide on the future of the scheme. A majority of 53% of voters within the Stockholm municipality voted in support of the scheme. Although 14 other smaller municipalities voted against the scheme, the positive vote from the Stockholm municipality was sufficient for the Government to implement the scheme on a permanent basis.

The consultation and referendum process and requirements vary in different countries dependent upon legislation. If a referendum is required to enable the go ahead of a road pricing scheme this should be carried out once a trial period has been implemented in order to ensure that that people’s views are based on a real understanding of what road pricing is and the impacts it will have on them, because, as mentioned above, popularity for schemes tends to be higher once a scheme has been implemented.

Introduce the scheme at the same time as wider transport improvements: Successful road pricing schemes have been introduced as part of wider improvements to their urban transport networks.

- In Stockholm the public transport network in the city was enhanced by the provision of new buses, bus routes and more departures from bus and underground stations in order to offer alternatives to car use. Park and ride schemes were also increased in the region. A total of 2,800 new spaces were provided for the park and ride services in the region in conjunction with the introduction of the road pricing scheme.
- The scheme in Singapore was part of a wider package of reforms to further encourage public support including a park and ride service and double-decker buses.
- Transit services in London were also improved by adding bus services and bus lanes alongside the congestion charge. In London in the first two years of the congestion charge there was a year-on-year increase of 29,000 bus passengers entering the zone during the morning peak period. Sufficient additional transit services were provided in order to cater for this modal shift. In addition, the London Congestion Charge was implemented over a public holiday to reduce disruption.

Note that transportation improvements (proposed and actual) were also features of failed schemes. In the UK, the the Department for Transport (DfT) encouraged city-regions to adopt charging schemes in return for significant public transit investment. However, one of the reasons for the failure of both the Manchester and Edinburgh Congestion Charging schemes, for example, was considered to be insufficient connection between these investments and the scheme itself.

2.4 Planning and project design

Planning and project design are critical components of any urban road pricing scheme. The following points highlight some of the main considerations that would need to be covered in any scheme.

Project planning

Integration with wider transport and land use planning objectives: As mentioned above road pricing needs to be integrated with the wider transport networks within a city. When a scheme is implemented it needs to be introduced along with other measures in order to provide alternatives and help reduce car use. Transit needs to be increased for example additional buses and routes, additional trains, and more cycle routes. This can also assist with public acceptability as the population recognize the benefits associated with the scheme.

The integrated nature of road pricing with other transport improvements needs to be clear in plans and strategies for a city region. At the same time the scheme needs to be presentable as a stand-alone initiative with the connections to other improvements made clear. For example the referendum on the Edinburgh Congestion Charge was based on a single “yes” or “no” vote for multiple transport improvements including traffic calming measures. This led to confusion over what the public were voting for.

Monitoring of schemes also needs to cover the impacts of the wider transport improvements. Monitoring data from road pricing schemes can be used to inform the planning of public transport services and traffic control. In this regard Singapore, leads the way. They have a fully integrated road user charging (RUC) smart card system which people use to pay for the congestion charge, bus services and parking. The system enables planners to monitor the various transport journeys by mode and use this information to optimise routes, schedules and fares to better meet demand. Approximately 20 million trip related transactions per year are monitored by the system.

Fit with the local context: The need for research has been raised in previous road pricing studies (see Chapter 1). Road pricing systems need to be appropriate to the local context; they cannot be simply lifted from one city and copied in another. Surveys and analysis are required to identify specific local transport issues, potential solutions, and the acceptability of various approaches. Cost-benefit analysis is also necessary to assess the impacts of different options. In addition an assessment of the technology that is most appropriate for the local context is necessary.

Ongoing monitoring and updates: Successful road pricing schemes are not static. Continual monitoring and ongoing planning is required to ensure that the schemes remain fit for purpose, providing the most effective service for reducing congestion in the city (if this is an objective) or fulfilling other objectives. Singapore, for example, continues to apply the lessons learnt from system implementation and monitoring, to evolve the scheme and tolling structure to meet changing demands and address the target groups that are contributing to the traffic congestion. The scheme’s charges are adjusted up to 6 times a year.

Project Design

Design factors that require consideration include the location and type of roads to which the charge is applied; the pricing system to be applied (for example, multiple zoning, cordon based, or mileage based charges); pricing for different vehicle types; the technology to be

employed; whether exemptions and/or discounts will be given to certain users; the use of revenues generated; the days and times that the system is in force, and so on. The system can be made as complex or as simple as required dependent upon the city context and the objectives of the project.

The UK Department for Transport has prepared guidance on the feasibility and design of road pricing schemes (see: <http://www.dft.gov.uk/webtag/documents/expert/pdf/unit3.12.3c.pdf>). This comprehensive set of guidance documentation includes advice on the feasibility and optioneering stage, modelling of schemes, conducting appraisals and assessing the social and distributional impacts of schemes. The following paragraphs present some of the key topics of consideration for the design of road pricing schemes.

Location of charging zone: The specific location of the congestion charge needs to be carefully considered. Which roads will be covered? For example, will the charge be restricted to the downtown or will it be extended to outer arterial roads? The scheme in Singapore covers both the central business district and arterial roads whereas the scheme in London is restricted to the area of the city within the inner ring road. In London a free 'through route' was provided when the Western Extension was added. If the intention is to reduce congestion, then clearly it is the congested areas/ routes which must be targeted by the scheme.

Approach to charging: There are four broad types of charging.

- Area-wide pricing – requires payment for drivers wishing to enter or travel within a defined area.
- Facility or corridor pricing – can apply to a highway, bridge or tunnel with fees varied by time or day.
- Lane pricing – fees applied to one or more highway lanes that offer a better level of service than adjacent free lanes, often referred to as High Occupancy Toll Lanes – or HOT lanes.
- Distance-based fee – a fee is charged per km or mile travelled with various technologies available to collect the relevant information.

The London Congestion Charge is a simple area-wide scheme whereby a blanket fee of C\$14 is charged for entering the congestion zone. This approach is straightforward and easy for road users to understand. Singapore, by contrast, has a more complex system of cordon charging. Charges are set to ensure the free-flow vehicle speeds (45 to 65 km/hr for expressways and 20 to 30 km/hr for arterial roads) are maintained for 85% of the traffic. Charges vary according to location, time of day and speed of traffic. A typical trip through the charging zone at peak time passing through five gantries will cost around C\$11. Germany has introduced a distance based toll for freight trucks, employing GPS technology. (This scheme is focused on trucks only and has been successful in promoting more efficient freight operations, although its impacts on freight mode shift have been limited.)

Pricing for vehicle types: Pricing can vary according to the objectives of the road pricing scheme. For example, the Oslo scheme was introduced primarily to raise revenues rather than to discourage travel and consequently the toll was set at a low price. Where schemes are focused on discouraging car use for example in London the prices tend to be higher. The toll in Singapore varies according to the level of congestion and traffic speeds. Pricing can also be set by type of vehicle that is being driven. The Singapore system has six different in-vehicle units which vary depending on the type of vehicle. The categories are: Exempt; Heavy Goods Vehicle; Taxi; Private Car; Light Goods Vehicle; Motorcycle

The table below presents an extract of the charges for the scheme.

Figure 2.2: Singapore road pricing charges

	Bendemeer Road southbound after Woodsville Interchange	Kallang Road westbound after Kallang River	Thomson Road southbound after Toa Payoh Rise
Time			
Gantry No.	40	41	39
7.00am - 7.05am	\$0.00	\$0.00	\$0.00
7.05am - 7.25am	\$0.00	\$0.00	\$0.00
7.25am - 7.30am	\$0.00	\$0.00	\$0.00
7.30am - 7.35am	\$0.00	\$0.00	\$0.00
7.35am - 7.55am	\$0.00	\$0.00	\$0.00
7.55am - 8.00am	\$0.00	\$0.00	\$0.00
8.00am - 8.05am	\$0.50	\$0.00	\$0.50
8.05am - 8.25am	\$0.50	\$0.00	\$1.00
8.25am - 8.30am	\$0.50	\$0.00	\$1.00
8.30am - 8.35am	\$1.00	\$0.50	\$1.50

Source: Halcrow International Partnership (March 2011)

Certain vehicles are often exempt from road pricing charges. For example in the case of Stockholm emergency vehicles, buses over 14 tonnes, motorcycles, green vehicles (for example those using biofuels), taxis, and vehicles for people with disabilities are exempt. In Singapore, unlike other schemes, the only vehicles that are exempt are emergency and military vehicles.

Equity: Social costs and benefits also need to be taken into account in order to gain public support for a scheme. Issues of alternatives and affordability of the congestion charge, particularly for city to low income residents and commuters, need to be considered in system planning and design. In a study of the proposed Edinburgh scheme, it was found that although only a quarter of households in the lowest income quintile own a car, up to 10% of this quintile could potentially suffer some hardship as a result of the scheme (RAC Foundation, 2011). It is difficult to vary charges based on income as information on road users' income is not always readily available. However, varied charging based on vehicle type, as a proxy for income, is one approach to overcoming this issue.

Nevertheless, the principle equity goes beyond economic considerations or income-based equity. The distribution of the costs of road pricing is typically more equitable if managed through CBD wide or area-based road pricing rather than concentrated to a small number of corridor tolls. The beneficiaries and losers of road pricing schemes have been assessed for the London and Stockholm schemes. A social impact survey conducted to assess the London scheme found that once the survey respondents had experienced the scheme in practice they found that it did not really impact on them to any great extent and in fact made little difference to them. Those that were most likely to say they benefit from the scheme were from higher income households without a car. People that were most likely to say they had been adversely impacted were from lower income households that drive within the congestion zone. Note that the availability of transit services in London, for example, is generally good. Thus most people had access to an alternative. Spatial inequities in access to alternatives can be an issue there is an uneven allocation of transit services across a region.

The Stockholm scheme found that the way the scheme is branded has an impact on the public acceptability and the view on winners and losers. The wider benefits to society such as environmental benefits were important as well as the impacts on the individual.

Revenues: The revenues generated by a scheme can be reinvested back into operation and maintenance of the scheme itself, with net revenues invested in the wider transport network. In London, a Bill was passed to ensure that net revenues generated by the congestion charge are reinvested into the wider transport network in the city. In the case of the London congestion charge the total costs of scheme operation were C\$209 million in 2007-08, while and the total net revenues were C\$218 million. The net revenues available for reinvestment into the transportation system amounted to just \$ 9 million - a very small proportion of Transport for London’s operating expenditure which is in the region of C\$ 9 billion.

Figure 2.3 Costs and Revenues of the London Congestion Charge (2007-2008)

Costs	
Scheme operational, publicity and enforcement costs	91
Other costs: TfL staff; traffic management; TfL central costs	40
Total costs	131
Revenues	
Standard daily vehicle charges (£8)	146
Fleet vehicle daily charges (£7)	37
Resident vehicles (£4 per week)	12
Enforcement income received	73
Total revenues	268
Net revenues	137

Source: Transport for London (2008) Annual Monitoring Report

Phasing of implementation: The implementation of charging schemes should be carefully phased. In the case of the London Congestion Charge, a small central area of the city was allocated for the charge initially. The size of the area was then expanded over time. One of the key reasons for the failure of the Manchester and Edinburgh Schemes were that the comprehensives schemes covering the inner and outer areas of the city. When the public were consulted in Edinburgh, 50% were in support of the central area charge but the majority were against the outer charging zone. As a result the scheme did not go ahead.

2.5 Technology employed

The main technologies that are currently available and the key lessons that can be learnt from existing systems are presented here.

Types of technology

The technologies employed in road pricing schemes typically vary according to the type of scheme: zoning/ area based schemes, cordons (corridor schemes) and distance-based schemes.

Zoning/ area based: Where blanket charges are applied across a defined zone in the city, Automated Number Plate Recognition (ANPR) camera technology is generally used, for example in London. The cameras are deployed at the entrance to the zone and within the zone in order to capture vehicles travelling through the zone. The cameras need to be positioned in locations where there is a restriction on the road to ensure all vehicles are captured. They also

require manual adjustment to factor in lighting and other environmental factors. The data is processed electronically at the roadside or from a central location. Roadside processing is generally preferred as it avoids the costs associated with constructing remote processing sites and connecting cables. The percentage read rate of ANPR cameras used in the London Congestion Charge scheme is in the high nineties (95% accuracy would imply that every 2 million reads will lead to 100,000 inaccurate readings). Inaccuracies are reduced by using a system whereby users pay for the charge in advance, and where cameras monitor both front and back number plates. Costs of ANPR technology have reduced over time, and are currently estimated to be around C\$3,900-\$9,400 for one camera module monitoring one or two lanes. (Note that the London scheme experienced high operating costs initially due to the need for manual verification of non-payers. With the introduction of new automated technology costs have been reduced.)

Cordons: Cordon systems typically consist of multiple zones with different charge rates for each zone. Typical technologies include a combination of ANPR cameras and a vehicle transponder such as a Dedicated Short Range Communication (DSRC). Transponders are fitted to the vehicle windscreen and can be either microwave or infrared based. Each transponder has a unique ID and can be linked to a credit card account or prepay card. The ANPR cameras are used to capture the vehicle registration mark of vehicles that do not have a transponder fitted. ANPR cameras are used in Stockholm and achieve a 95-99% success rate using both front and back cameras. The Stockholm trial implemented both ANPR cameras and Radio Frequency Identification (RFID). The trial revealed that the ANPR had a higher rate of capture than was envisioned and consequently the RFID was dropped to reduce costs. Investigations have been undertaken into the possibilities of using alternative technologies such as DSRC for zoning systems. Accuracy of the DSRC system is higher than the ANPR cameras at around 99.9%. Inaccurate readings are very rare. In Singapore DSRC technology is used at cordon points across the CBD.

Distance: Information on vehicle distance travelled can be captured through a variety of different technologies from basic (reading an odometer), to non-GPS on board units, to GPS on board units. The more basic measures of data capture do have potential disadvantages (for example in respect of tampering and the inability to detect whether or not a vehicle is travelling beyond the boundaries of a charge zone. Remote technology such as GPS can be used to assess the location of vehicles at any point within the charging zone as well as distance travelled. GPS technology thus allows more sophisticated distance based charging including:

1. The same charge to all roads within a particular zone
2. Road classification specific charges.

The system requires each vehicle to have an inbuilt unit similar to the DSRC. The inbuilt unit can assess the level of charge by the type of road. This can also be done from a central location. A two way communication system between the central location and the in vehicle unit can permit any changes to the tariff to be transmitted to the units. This approach is used in Germany for their HGV charging system.

Lessons learnt

Technology needs to be appropriate to the objectives of the scheme and the context: The costs of the technology vary and consequently an assessment of the most appropriate and cost effective technology for the scheme is needed.

Preferred technology for area-based facilities is DSRC: The technology that is available for road pricing has been tried and tested. The DSRC system scores best on effectiveness and cost efficiencies is for area-based facilities

The world’s leading urban road pricing scheme (in Singapore) uses the DSRC technology in combination with ANPR cameras. London currently uses ANPR cameras but aspires to using DSRC in the future. ANPR cameras are an affordable and effective option. But the use of these cameras is dependent on the reflective standard style number plates that are issued in Europe, and the number plates that are used in other regions are not necessarily compatible with this technology. The accuracy rate of ANPR cameras is also limited. The DSRC system in comparison has a higher accuracy rate.

The RAC Foundation recommend that the ANPR may be sufficient for an urban situation but tag and beacon (such as DSRC) is more effective and would be better for larger scale schemes.

The costs effectiveness of technology varies: Capital and operating costs can be reduced by ensuring that the design of road pricing systems provides the right balance of equipment for payment collection and enforcement, avoiding duplicate systems and not introducing onerous processes to collect tolls or enforce non-payers.

The following table presents an estimate of the costs and benefits (revenues) of different schemes. However, note that comparing schemes by cost can potentially be misleading and lead to unfair comparisons. Consequently the table below should be regarded as a broad comparison, and treated with the necessary caution. The running costs in London are higher than average due to the age of the technology being used which has for a long time been non-automated.

Figure 2.4:

Scheme	Running costs/ revenues	Technology	Comment
London	42%	Camera + ANPR	Operational scheme
Stockholm	21%	Camera + ANPR	Operational scheme
Germany	12%→25%	GPS & manual declaration	Operational scheme
Austria	11%	DSRC	Operational scheme
Switzerland	6%	Tachograph & GPS & DSRC	Operational scheme
Norway	8–14%	DSRC	Operational scheme
Singapore	20–30%	DSRC	Operational scheme
Netherlands	3–5%	GPS	Vodafone estimates
US modelling	8–16%	DSRC	Spreadsheet modelling
San Francisco	20–30%	DSRC ('Fastrak')	Proposed scheme

Source: RAC 2011

2.6 Payment, compliance and privacy issues

The final section of this lessons chapter is focused on issues related to the payment and compliance of car users to urban road pricing schemes. It also discusses transparency and privacy issues.

Flexibility of payment options: Payment of the congestion charge needs to be made as accessible and flexible for road users as possible. Several existing schemes use a prepay method where payment is made prior to entering the congestion zone. With this approach, monitoring using ANPR or DSRC is only required to identify non payments. For example the London congestion charge allows road users to pay up to 90 days in advance, on the day of travel or by midnight of the following day. The charge can be paid on line, by text, phone or at convenience stores. ANPR cameras are used to identify vehicles and their drivers that have not paid the charge. A similar approach is used in Stockholm.

The Singapore scheme uses a Smart Card to pay for the congestion charge. This is a pre pay card topped up in advance at shops, petrol stations, ATMs, online and over the phone. The card is inserted into the in car unit and the charge is automatically deducted when the vehicle enters the charging zone. The card is multi-purpose and can be used to pay for parking and public transport.

Payment for urban road pricing schemes should not be via toll booths. This would slow down the speed of traffic and counteract the value of the scheme for reducing congestion. It would also introduce additional infrastructure and add unnecessary expenditure to the system.

Compliance: In order to ensure compliance penalty measures are required for charges that have gone unpaid. The range of penalties varies across countries. In London there is a C\$19 fine for not paying by midnight on the day of entering the zone. A penalty charge of C\$190 is issued after the second day the charge remains unpaid. The authorities are able to seize the driver's vehicle if it remains unpaid. In Stockholm the authorities have the right to take money directly from the person's bank account if they do not pay.

Transparency: Transparency of the charging system is an important consideration. The public need to be aware of exactly what are the charges that they will need to pay. London has a relatively simple system and consequently can easily be made transparent. There is one set charge of C\$14 (for those who pay by direct debit) or C\$16 (non-direct debit payments) when a vehicle enters the charging zone. More complex systems are less transparent. In Singapore, for example, the rates vary across the city, depending on the road and time of day, and it is harder to estimate how much a driver will pay for their journey.

Issues of privacy can be overcome: The issue of privacy has often been raised as a concern by the public during consultations on road pricing. In Singapore the issue of privacy was raised and was overcome using the DSRC technology: personal data is not stored on the system. The details of the journey that have been made are recorded on the system but it is not possible to identify who specifically made that journey. In London and Stockholm there are now no public concerns over privacy issues related to the charging schemes.

2.7 Conclusion

This chapter has presented the lessons learned from existing road pricing schemes across the world. It has built on the existing information that Translink has received providing details on specific schemes from Europe, North America and Asia. The implications of these lessons for the Metro Vancouver context are identified in the following chapter and more detailed work

needs to be carried out on this as part of the ongoing work to test various options for potential road pricing schemes in Metro Vancouver.

The experience of existing schemes has shown that the objectives and rationale for introducing a road pricing scheme are largely very similar, but the political and public reaction are very different. The overriding factor for the success of a scheme depends upon the way that the scheme is developed and the approach taken to getting to the implementation stage.

Contextual issues such as political and public opposition pose real challenges but can be overcome through effective scheme planning and public consultation. Some schemes that have become a success such as Stockholm have faced more challenges from the public and politicians than those that failed, yet they managed to succeed in the end. Some key factors that have ensured success include:

- Ambitious schemes (such as those proposed for Manchester and Edinburgh) based on an “all or nothing” approach failed to be implemented because of opposition from the peripheral jurisdictions. As a consequence congestion charges in the central areas schemes could not be implemented even though these were generally perceived more positively (with 50% or more public support). Careful consideration of scheme boundaries is necessary. While a comprehensive road user charging plan is absolutely essential, a strategic approach to implementation is also a key ingredient of success
- Scheme trials can be useful in demonstrating road user charge benefits, allowing people to experience these first-hand, along with any presumed adverse effects. As demonstrated in Stockholm, experiencing road pricing first hand may sway public opinion in favour of the scheme and ensure that in any subsequent referendum, public voters are fully informed as to how they will be affected. Pilots can have similar benefits. Although typically these involve only a handful of participants who are able to experience the scheme first hand, with the use of public education and the transparent discussion of benefits and costs.
- Clear communication and consultation messaging prior to public engagement efforts or a referendum. In Edinburgh it was unclear on what the public were voting, and hence most voted against the scheme.

3 Implications of lessons for Metro Vancouver and TransLink

The Mayors' Council have recently identified road pricing as a future regional transportation funding source. This is outlined by an open letter from the Mayor's Council to the Minister of Transportation and Infrastructure, seeking a change in the provincial tolling policy to enable a comprehensive road pricing on roadways other than new bridges and infrastructure.² There is a general consensus amongst municipal political leadership that it is an option they may be willing to entertain. With these events in mind, this Chapter assesses the implications of the lessons that have been identified in Chapter 2 for Metro Vancouver and TransLink.

3.1 The importance of planning

The London, Stockholm and Singapore experiences provide concrete evidence that a well planned and responsive scheme can result in desired travel behaviour changes, lead to congestion relief, and generate revenues for investment in transportation infrastructure. Successful schemes are based on clear objectives and include tangible benefits at the outset (for example transit improvements and congestion reduction). The experiences of failed schemes, including those in Edinburgh, Manchester and Manhattan, highlight the difficulties in successfully promoting a road pricing scheme that covers a wide geographic area, where the benefits are not clear to those affected, or where there is an uneven distribution of benefits and costs.

Clear objectives

The road pricing proposals set out by the Greater Vancouver Mayors' Council are primarily focussed on revenue generation (rather than to relieve congestion or to derive associated environmental benefits). However, other objectives and benefits also need to be defined, understood and supported by both users and non-users in order to help secure ongoing public acceptability. Such objectives may include mode shift, congestion relief, economic growth, liveability, safety, and equity/social inclusion. An essential step in the planning process is to define these objectives and associated criteria explicitly. These can then be used in option development and assessment, scheme design and in communication with stakeholders and public. These objectives and criteria can also form the basis for future monitoring and revisions to the scheme over time.

²Letter to Minister Lekstrom, March 15, 2012, Mayor's Council on Regional Transportation

Integrated planning

Successful road pricing schemes are generally part of integrated transportation and land use planning strategies, and are supported by travel demand management measures as well as investment in transit (as evidenced by significant increases in bus service provision in London and Stockholm, for example). Within the Greater Vancouver context, a comprehensive road pricing scheme will need to be accompanied by significant transit investment to provide improved travel alternatives for existing auto users, especially in those areas where transit service levels are currently low (on a per capita basis) such as South of the Fraser. The provision of transit alternatives is also necessary in order to improve public acceptability of road pricing proposals by demonstrating the clear benefits of the scheme and by enhancing equity across the region. Particular attention should be given to the social impacts of any proposed road pricing scheme. Issues of affordability and access for low income residents and commuters are critical to public acceptability, and will need to be considered carefully in scheme planning. The assessment of equity impacts is not always straightforward, and stakeholder consultation is likely to be required in agreeing an approach. Revenues may need to be set aside to address equity concerns, either through offering discounts or exemptions to certain disadvantaged groups.

3.2 Overcoming issues of public acceptability

The importance of public support to the success of a road pricing scheme cannot be overstated. Extensive and well-timed consultation with public and stakeholders (including business owners) is essential to the success of a road pricing scheme.

A comprehensive engagement strategy

The experiences of failed schemes, including Edinburgh, Manchester and Manhattan, indicate the risks posed by a lack of public acceptance, party politics and differences of opinion between jurisdictions. The case studies point to the need for a comprehensive and well thought out strategy for communication, public engagement, and lobbying. The match between scheme proposals and transport objectives should be clearly articulated in public communications, along with analysis to support why the road pricing proposals are the best route to meeting these objectives, and clear evidence of resulting benefits. This will be a challenge in the Metro Vancouver region where travel during peak periods is dispersed (thus reducing the congestion relief benefits typically associated road pricing), and where the level of access to frequent transit varies dramatically across the region.

Trials and pilot schemes

Scheme trials (such as that in Stockholm) can be a successful mechanism for demonstrating benefits of road user charging, thereby changing preconceived attitudes and overcoming public resistance. In Stockholm, the public were able to experience road pricing first hand. This ensured that voters were fully informed in advance of the referendum, and helped sway public opinion in favour of the scheme. Pilot schemes can also have benefits. Although these typically involve a smaller group of participants, the outcome of pilots can influence scheme design. The incorporation of a pilot into a comprehensive public engagement strategy can facilitate public education, stimulate transparent discussion, and thereby influence public opinion. Pilot projects also generate important data to better understand the future outcomes of pricing policies.

Offsetting road user charges

Depending on the rates at which the charges are set and the scheme design, revenues derived from road user charging could be sizeable and could contribute to a long-term sustainable funding solution for the movement of both of goods and people in Greater Vancouver. However, there is a risk that in the absence of a comprehensive strategy and careful consultation, the imposition of road user charging could be perceived as a “money grab.” In order to reduce the risk of opposition from both public and businesses, a fuller understanding of what value road pricing can provide to different stakeholders is required.

3.3 Legal powers and governance

Legislative amendments

The *British Columbia Guidelines for Tolling* state that tolls can only be applied to major projects that result in significant increases in transportation capacity. Therefore, in order to facilitate a comprehensive road pricing scheme which could include tolling of existing roadways or bridges, legislative amendments would be required at the provincial level. Further, many of the facilities which are likely candidates for tolls are within the Province’s jurisdiction, thus agreement as to how potential revenues will be allocated will be required.

Further analysis

The current stance of the provincial government suggests that they are not considering any changes to provincial policy without further investigation and indication of public support of such scheme.³ Thus further analysis of the local context is required so as to demonstrate to the provincial government and general public, the impacts and effectiveness of road pricing within the Metro Vancouver context, including potential for revenue generation, reducing congestion and enabling parallel transportation improvements. In addition, consideration will need to be given to how the existing tolled facilities (including the Port Mann Bridge and the Golden Ears Bridge) as well as future improvements which may be tolled (such as the Pattullo Bridge) might be integrated into a regional road user charging strategy.

Open and ongoing dialogue

Open dialogue and direct channels of communication between TransLink, the Mayors’ Council and the provincial government are required in order to lay the groundwork for protocols and establish the criteria under which the Province would contemplate legislative changes to allow for the implementation of a region-wide road pricing scheme. Given the powers and mandate of the provincial government, they will need to be brought into discussions and planning as partners in the process.

³ Letter to Mayor Walton, April 10, 2012, RE: Mayor’s Council on Regional Transportation

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