Commission for Integrated Transport

World Review of Road Pricing
Phase 2

Final Report

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CfIT World Review of Road Pricing

Phase 2

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Background to Phase 2 of the World Review of Road Pricing

The Commission for Integrated Transport (CfIT) completed Phase 1 of a World Review of Road Pricing in summer 2006. This looked in detail at 22 locations which had at that stage implemented some form of pricing for road use.

Phase 2 of the World Review has extended this research to identify and examine emerging Road Pricing schemes. These are schemes that are currently still at the stage of planning and development and have not yet been implemented.

Objectives and Approach

The key objectives of the review were to:

- Identify geographical locations worldwide currently considering a Road Pricing scheme;
- Provide case studies, summarising the current status of political thinking and progress on Road Pricing in these locations; and
- Examine where the UK Government's thinking on Road Pricing stands in relation to these locations, including benchmarking where the UK stands in relation to the progress being made on emerging Road Pricing schemes worldwide.
- The review was undertaken using desk-based research to identify a long-list of existing Road Pricing schemes or emerging Road Pricing proposals outside the UK. A short-list of 17 locations was selected as the basis for more detailed case studies. The research involved reviewing available reports and information and interviews with transport experts and policy-makers in the case study locations.

Definition of Road Pricing

Road pricing can, strictly, cover a wide range of means of paying for road use. This review has focused on area-wide pricing schemes such as those implemented in London and Singapore, rather than link-specific pricing as typically applied to toll-roads or bridges.

The Role of Road Pricing in Travel Demand Management

Phase 1 of the review concluded that locations that had implemented Road Pricing had done so primarily to: control rising congestion levels; deter further growth in car use; and to address the negative impacts of traffic and congestion on transport efficiency and the environment. Some of the cases highlighted in Phase 1 demonstrate how successful Road Pricing can be as a travel demand management measure, notably:

- In Singapore where Road Pricing has been operating successfully since 1975 (with Electronic Road Pricing (ERP) introduced in 1988). The ERP scheme reduced traffic in the area by around 13% and increased average speeds by up to 20%;

- In London, where the Central London Congestion Charging scheme has been successful by reducing traffic in the central London charging zone by up to 16% and congestion by up to 30%. A western extension to the existing charging zone is to be introduced in early 2007;

- In Stockholm where a six month trial of Road Pricing ended in July 2006 with a referendum on the potential implementation of a permanent scheme held in September 2006. Overall, 51% of residents of the Stockholm area voted in favour of a permanent Road Pricing scheme, though the level of support varied between city and suburban areas; and

- In Trondheim, Norway, where a Road Pricing system operated between 1991 and 2005 and reduced traffic by up to 10%.

Progress on Road Pricing in the UK

The UK would appear to be at the forefront of the continuing evolution and development of Road Pricing for a range of reasons:

- The successful implementation of Road Pricing schemes in London and Durham;

- The completion by the Department for Transport (DfT) of a Feasibility Study in July 2004 examining how a new system of charging for road use could help make better use of road capacity; and

- Research and development into Road Pricing funded by DfT both on a local and national level through projects such as DIRECTS and most recently the Transport Innovation Fund (TIF) which has supported the planning and development of Road Pricing schemes by local authorities.

Progress on Road Pricing Worldwide

The number of locations where some form of Road Pricing scheme has recently or is currently being considered is large. It would appear that a very wide range of locations, including towns and cities in nearly every continent and of different sizes of urban area, now have Road Pricing on the agenda as a tool for addressing transport issues.

National Road Pricing schemes

Only two emerging Road Pricing schemes can be considered as national in their proposed coverage – those for England (as set out in various DfT policy statements) and the Netherlands.

Neither of the two schemes can be considered committed.

There is no definite proposal for a national scheme in England and the UK – though a study of the feasibility of such a scheme was undertaken by the DfT in 2004.

In the Netherlands, while plans are more developed, there is also no firm commitment to implementation. It is noted that partial national schemes already exist in Germany, Austria and Switzerland in the form of lorry road user charging schemes, with the Czech Republic and Slovakia also expected to implement lorry charging schemes.

Local Road Pricing schemes

The remaining Road Pricing schemes identified may be viewed as local, focusing on a single town, city or urban area. These represent the vast majority of emerging Road Pricing schemes identified.

Current Status of Emerging Schemes

There are no new emerging schemes which are expected to be implemented imminently anywhere in the world. Short-term expansion of Road Pricing is limited to changes to those schemes already identified in the Phase 1 review as operational plus, potentially, a new trial scheme. These comprise:

- London, with an extension to the current scheme due to become operational in 2007;
- Stockholm – which at the time of the Phase 1 review was being trialled and following the results of the September 2006 referendum is currently considered likely to re-start in 2007; and
- Milan – where it has recently been announced that a trial scheme focused on the city centre is to be introduced in early 2007, though full details are limited.

Schemes identified in all other locations appear to be some way off implementation with their status ranging from very outline concept – the vast majority of emerging schemes identified – through to a broadly defined implementation plan even though, in some instances, aspirational implementation timescales seem bold. Additionally, none of these emerging proposals appear to have the necessary legislative frameworks in place to enable them to be implemented imminently.

There is therefore a substantial gap between the status of existing operational Road Pricing schemes and the sizeable pack of emerging schemes.

This gap is also evident in the development of Road Pricing schemes in the UK where local schemes being developed under TIF are currently only at an outline planning stage. While the UK has clear advantages over many other locations in developing Road Pricing schemes, for the reasons noted above, there is no evidence to suggest that the UK is forging ahead in delivering new Road Pricing schemes compared with the rest of the world.

Equally, there is no evidence to suggest that other countries and locations are themselves forging ahead with Road Pricing at a pace faster than that in the UK.

The only exception to this is the Netherlands which is at a more advanced level in progressing national Road Pricing than in the UK, though there remains no firm commitment to implement the scheme and the scale of a national scheme in the Netherlands is very much smaller than that for a national scheme covering England. Additionally, it would appear that the planning of the national Road Pricing scheme in the Netherlands has suppressed the development of local schemes – such as those that at one stage were being considered in Rotterdam and The Hague.

Key Attributes of Emerging Road Pricing Schemes

Policy Framework

The evidence from the case studies shows that the majority of the emerging world Road Pricing schemes are framed by local and/or regional policy but not national policy. Again, the exception to this broad conclusion is the Netherlands, where the policy framework for the national scheme is set at a national level.

Within England, a national policy framework does exist to promote the development and eventual implementation of local Road Pricing schemes that is embedded within regional and local policies and plans. In terms of interoperability the UK is in a strong position by developing a framework for local schemes in England to operate under. This is intended to enhance usability and interoperability and act as precursors to a national scheme. Norway is the only other location that has operated a number of local schemes in a similar way. Across the case studies it is reasonable to conclude that the English national policy framework to develop and implement Road Pricing schemes at a local level in a way that addresses issues of interoperability between locations is unique.

It is apparent from all the case studies for locations that are advancing local Road Pricing schemes that, in general, responsibility for planning and delivery of the scheme lies with a single authority. Contrasting this with emerging schemes in England suggests that many of the schemes that may emerge from authorities granted TIF pump-priming funding will need to cover multiple planning authorities.

There is also a wider issue in terms of control and deliverability of complementary public transport measures that may be critical to the acceptability and implementation of Road Pricing. Most of the authorities in locations worldwide that are considering Road Pricing schemes have more direct control and influence over their public transport systems than do the authorities currently progressing local Road Pricing schemes in England – excluding London.

Legislative Framework

In all the emerging schemes examined, new legislative powers are still required in order to implement Road Pricing schemes.

In the UK, implementation of a national scheme would still require new legislation. However, the Transport Act 2000 does provide local authorities with the necessary powers to implement Road Pricing schemes subject to Secretary of State's approval. The ability to implement emerging local Road Pricing schemes in England is substantially greater than in other locations worldwide.

Objectives of Road Pricing

The evidence from the case studies shows that most of the emerging Road Pricing schemes have multiple objectives, though with tackling congestion as the primary objective in all but one of the cases. The majority of the emerging schemes also define objectives to tackle problems of poor local air quality and address climate change with a smaller set also identifying an objective to sustain their economies and improve the urban environment.

Eight of the case study locations also explicitly identify using Road Pricing to raise funds to reinvest in transport.

Only two of the case studies have evidence that one of their objectives is to use Road Pricing revenues to modify the current means of road use taxation; the Seattle local scheme and the Netherlands national scheme.

In contrast, Road Pricing in the UK has the very clear primary objective of tackling congestion. While congestion clearly does impact on emissions and the economy this very exclusive focus on reducing congestion as the primary objective does make the approach to local Road Pricing schemes in the UK (outside London) stand out from the emerging schemes elsewhere in the world. While there is recognition that Road Pricing schemes can raise revenue to reinvest in the transport system there is, in England, no explicit recognition of this as an objective of introducing Road Pricing.

Revenue from Charging

Given that most of the emerging schemes are at an early stage of development, details of how revenues derived from Road Pricing might be used are not firm. However, none of the emerging local Road Pricing schemes are expecting to be revenue or fiscally neutral. All schemes expect to generate net revenues from charging.

There is evidence that the Netherlands national scheme would seek to modify the taxation regime to shift the basis of charging for road use from car ownership to car use.

Across the other emerging Road Pricing schemes the vast majority of the case studies plan to use net revenues from charging to improve local transport in the urban area within which the Road Pricing scheme would operate, with certain locations proposing to utilise revenues to fund specific infrastructure projects including road schemes.

Type of Scheme

There are few firm commitments to scheme type in terms of charging area, charging period and technology across the emerging schemes.

There is no definitive scheme type yet established for the Netherlands national Road Pricing scheme though the expectation is that it will comprise a distance-based charge using a GPS-based system. To an extent this mirrors the position in the UK where there is no firm idea of charging type and system other than a broad recognition that some form of distance-based charge is required. However, the evidence shows that the Netherlands is actively researching and considering scheme specifications with a view to being able to take political decisions on scheme type in 2007. The Netherlands is also linking technology availability and cost to its decision-making process on when to implement Road Pricing by monitoring system costs.

At the local level, the emerging Road Pricing schemes identified do represent a broad spectrum of different locations and issues. Most of the local schemes are considering cordon or area-licence solutions. In all instances where area-licence solutions are being considered so also are cordon-based solutions. Only three of the case studies identify distance-based solutions, including London, as a long-term option. Broadly, this is consistent with the approach being adopted by the authorities in the UK developing schemes

through TIF: looking at area-licence and cordon schemes but with distance-based charging as a longer term option.

The level of charge being considered in the majority of the worldwide locations is low relative to the levels charged in London or charge levels conceived in many of the studies on Road Pricing options in the UK. It is difficult to draw too many conclusions from this since charges need to be seen alongside the motoring costs prevalent and the level of planning and analysis that has been undertaken in each case study area.

Road Pricing and Other Measures

The evidence from the case studies overwhelmingly indicates that Road Pricing is being considered alongside a package of other measures to improve the transport system. For the vast majority of case studies this explicitly includes public transport. However, in certain locations measures include other demand management and highway network schemes. Broadly the approach being followed on TIF in England is consistent with this.

Awareness and Acceptability

The experience of London and now Stockholm clearly shows the importance of public and stakeholder acceptability in successfully implementing Road Pricing schemes. Measuring the extent of awareness and support of schemes examined by the case studies is difficult and the evidence inconclusive. There is no evidence to suggest that there is overwhelming support for Road Pricing in any of the locations examined or that any of these locations are more advanced than the UK. The possible exception to this is Stockholm, where the results of the recent referendum do indicate overall support for the Road Pricing scheme.

Overall Conclusions

This review has identified that a wide range of locations worldwide are now considering implementing local Road Pricing schemes, but only the Netherlands and the UK are looking at national schemes.

The evidence indicates that the majority are at very early planning stages with very few having clear specifications of schemes. Other than locations that are extending or modifying schemes already in existence or proposing trials – there are no committed implementation plans across the sites reviewed.

The evidence indicates that most locations are developing local schemes on a bottom-up basis, not framed by wider national policy or backed up by legislation that would enable Road Pricing to be implemented. The exception to this is the Netherlands which does have a national framework supporting the development of its national scheme.

In contrast, the UK does have a national policy framework that is guiding the development of interoperable local Road Pricing schemes and does have legislation that would enable Road Pricing schemes to be implemented. Importantly, the longer-term aspiration for a national scheme is not hindering the progression of local schemes. The DfT is also providing funding to enable the development of Road Pricing schemes in England.

However, compared with other locations in the world the authorities in England progressing with Road Pricing schemes have limited ability to shape the public transport elements of an integrated package of measures to complement Road Pricing.

It is clear that the primary focus of Road Pricing in the UK is to tackle congestion, while the majority of schemes worldwide explicitly seek to achieve a wider range of objectives. As Phase 1 concluded, this single-objective focus was important in gaining public acceptability for schemes that have been implemented but there may now be a case for expanding the stated range of objectives Road Pricing can address.

England, with two operational schemes, has a clear advantage in demonstrating the benefits and feasibility of Road Pricing and gaining public acceptance. However, in most other respects local Road Pricing schemes outside London in the UK are at a similar stage of planning and development as elsewhere in the world.

Thinking on scheme design and technology in the UK also appears to be consistent with that of emerging Road Pricing schemes worldwide. However, the planning of a national scheme in the UK appears to be behind that in the Netherlands where, although there is no firm implementation date, progress is being made with the identification of options and engagement with stakeholders.

1. Introduction

1.1 Background to Phase 1 Review

1.1.1 The Commission for Integrated Transport (CfIT) completed a review of worldwide Road Pricing schemes in summer 2006. This looked in detail at 22 locations which had at that stage implemented some form of pricing for road use.

1.1.2 On the basis of the review a number of key conclusions were drawn which have direct relevance to the progression of Road Pricing both nationally and locally within the UK, as follows:

- Road Pricing has become a practical application and is being increasingly pursued providing real and verifiable results;
- Available technology is no longer the primary constraint in advancing Road Pricing but that acceptability, both public and political, is now the key hurdle to overcome when developing schemes;
- Objectives for implementing Road Pricing schemes tend to fall into two categories: either to raise funds for investment; or to improve traffic flows and reduce their social costs; and
- Many Road Pricing schemes are implemented in parallel with other measures such as reallocation of road space.

1.1.3 Case Studies of these locations and the full report on Phase 1 is available on the CfIT website: http://www.cfit.gov.uk/docs/2006/wrrp1/index.htm .

1.2 Phase 2 Review Background and Objectives

1.2.1 Phase 2 of the World Review has extended this research to identify and examine emerging Road Pricing schemes. These are schemes that are currently at the stage of planning and development and have not yet been implemented.

1.2.2 As well as providing a factual reference on emerging Road Pricing schemes across the world, Phase 2 of the World Review has sought to benchmark where the UK, and more specifically England, stands in relation to the progress being made on emerging Road Pricing schemes worldwide.

1.2.3 The key objectives of the review were to:

- Identify geographical locations currently considering a Road Pricing scheme;
- Provide case studies, summarising the current status of political thinking and progress on Road Pricing in these locations; and
- Examine where the UK Government's thinking on Road Pricing stands in relation to these worldwide locations.

Approach to the Review

1.2.4 The review was undertaken in 3 stages:

- Stage 1 used desk-based research to identify existing Road Pricing schemes or emerging Road Pricing proposals around the world and draw up a 'long' list of locations. Each location fell naturally into one of 4 key categories:

  (i) Schemes included as part of the Phase 1 Review;

  (ii) Schemes that appear likely to be implemented in the near future;

  (iii) Schemes that have no evidence of firm commitment but had been the subject of technical study; and

  (iv) Schemes that have no evidence of commitment but had been associated with the concept of Road Pricing at some stage.

- Stage 2 comprised a review of the 'long' list to identify a 'short' list of locations for further research. Locations were selected so as to provide as diverse a range of issues and contexts as possible, covering emerging schemes or existing schemes in the process of being modified.

- In selecting locations a focus was placed on schemes with some evidence of development rather than those merely with a level of 'noise' that may have been generated in the media; and

- Stage 3 comprised a detailed review of the 'short' list locations as case studies. This was undertaken by reviewing published reports and conducting interviews with transport experts and policy makers in each of the short-listed locations.

1.2.5 The case studies are presented in Appendix A.

1.2.6 Due to the politically sensitive nature of road pricing proposals, and in some cases the limited development of proposals into concrete plans, it should be noted that the amount of official information obtained as part of the study was limited in some cases. In categorising and researching the locations, we have used information obtained from interviews and secondary sources to inform our assessment.

Definition of Road Pricing

1.2.7 Road Pricing can, strictly, cover a wide range of means of paying for road use. This review has focused on area-wide pricing schemes such as those implemented in London and Singapore, rather than link-specific pricing as typically applied to toll-roads or bridges, such as on the M6 or the New York Port Authority Bridges.

1.2.8 It is also noted that terminology for Road Pricing schemes varies between locations; to the USA it's Congestion Pricing; to New Zealand it's Road Pricing; and to London it's Congestion Charging. For the purpose of this report the term Road Pricing will continue to be applied to all schemes considering a cordon, network or area based vehicle charge as a travel demand management (TDM) measure.

1.3 Report Structure

1.3.1 This report builds on the Phase 1 review and describes the findings from the research approach described above. The remainder of the report is structured as follows:

- Chapter 2 considers the policy context and progress of emerging Road Pricing schemes around the world and in the UK.

- Chapter 3 presents an overview of emerging Road Pricing schemes around the world and provides a summary of the key findings from the case studies, considering key elements of the emerging schemes according to a number of themes (e.g. the current status of the proposal; the aims and objectives of a scheme; background to the transport policy and political considerations; the form of any proposed scheme; and the current position regarding the public, media and stakeholders). Similarities and comparisons across locations are drawn out to understand how the World is progressing Road Pricing.

- Chapter 4 compares Road Pricing proposals in the UK against the other case studies. The development of each element of a scheme is considered and specifically what has helped progress or hinder schemes so that lessons for the UK can be applied in order to improve the implementation of Road Pricing in the local and national context.

1.4 Acknowledgements

1.4.1 Atkins and CfIT would like to thank all participants around the world who have made this report possible through their valued and insightful contribution to the Case Studies.

2. The Growing Need for Road Pricing

2.1 The Role of Road Pricing in Travel Demand Management

2.1.1 Phase 1 of the CfIT review concluded that locations that had implemented some form of Road Pricing had done so primarily to:

- Control rising congestion levels;
- Deter further growth in car use; and to
- Address the negative impacts of traffic and congestion on transport efficiency and the environment.

2.1.2 Road Pricing is just one of a number of measures that can influence travel behaviour to help reduce the current reliance on the use of the private car. Many major cities are forecasting increases in population and employment levels over the next 20 years. This in itself will generate greater levels of travel, particularly in areas such as South America and China where increased accessibility to and use of cars will result in substantial traffic growth. Table 2.1 below indicates the level of traffic growth anticipated in a range of locations around the world.

Table 2.1 – Estimated Forecast Traffic Growth Rates in Selected Locations

Location	Estimated Forecast Growth in Traffic 2006 - 2020
London	+11%
Cardiff	+21%
Stockholm	+6%
Helsinki	+18%
Copenhagen	+21%
Rome	+12%
Netherlands	+28%
Seattle	+14%
Shanghai	>+100%
Auckland	+28%

Source: Provided by contacts where not available in Transport Strategies. Estimates for London and Rome include impacts of current Road Pricing schemes. Growth forecast extrapolated/interpolated to 2020 where 2020 forecasts not available.

2.1.3 The Government has stated that it is not possible to build our way out of congestion. One of the most successful ways of reducing congestion is considered to be a package of travel demand management (TDM) measures including some form of Road Pricing - a system which could significantly alter travel behaviour. As well as reducing congestion, many of the international case study Road Pricing schemes can

raise significant revenues that can be reinvested to further improve the transport network, such as public transport provision.

2.1.4 Within the case study locations, the governing authorities have recognised the threat that congestion causes to their economy and ability to sustain growth and are considering to some extent or another how Road Pricing can be implemented in their city or country to meet their own transport objectives. It is also interesting that not all these cases are considered to have unmanageable congestion at present but are considering the potential in Road Pricing to manage forecasted growth. Shanghai is a prime example of this.

2.2 Recent Developments in Road Pricing Schemes

2.2.1 Some of the cases highlighted in Phase 1 of the CfIT review demonstrate how successful Road Pricing can be as a Travel Demand Management measure. Some of these schemes have operated over a substantial period although most have undergone varying degrees of change or adjustment.

2.2.2 Road Pricing has been successfully operated in Singapore since 1975 (although the Electronic Road Pricing (ERP) arrangement was not introduced until 1988). The ERP scheme reduced traffic in the area by around 13% and increased average speeds by up to 20%.

2.2.3 In London the results of the Central London Congestion Charging Zone have been widely studied and Transport for London (TfL) has published the most recent results of their monitoring programme in the *4th Annual Impacts Monitoring Report*. The area-licensing scheme is viewed as having been successful by reducing both traffic in the zone by up to 16% and congestion by up to 30% and raised over £290 million for reinvestment in transport in the first three years of operation.

2.2.4 The original scheme as implemented in 2003 has been continuously reviewed and subsequently undergone several variations to improve operations and maximise impacts, including:

- Increasing the level of penalty charge and adjusting the payment period to encourage compliance;
- Adjusting fleet scheme conditions to improve operations and limit impacts on business; and
- Increasing the standard charge from £5 to £8 with the result of increasing revenues for reinvestment and maintaining improved traffic levels.

2.2.5 An extension to the existing zone is to be introduced in early 2007 when at the same time the hours of operation will be adjusted to end half an hour earlier to minimise any impact the scheme may be having on the evening tourist economy. TfL has also undertaken an extensive review of available and suitable technologies that could improve flexibility of the scheme, general usability and tie in to any plans for a national Road Pricing scheme.

2.2.6 Recently, attention has been focused on Stockholm where a six month trial of Road Pricing was completed in July 2006. The potential implementation of a permanent scheme in Stockholm was to be decided in a referendum in September 2006 on the completion of the trial. Overall, the residents of the Stockholm area voted in favour of a permanent Road Pricing scheme: 51% voted in favour of the scheme; 46% voted against the scheme; and 3% of votes were blank or invalid. However, in the city of Stockholm, 53% voted 'yes' to the introduction of a permanent scheme and 47% voted 'no'. Outside the city, in the commuter belt, voters were against the charge by 52% to 48%. The referendum took place in conjunction with a General Election that saw a change in political control within Sweden. It was therefore left in the hands of the newly elected Alliance government to decide to ratify the results of the Stockholm referendum. It has chosen to continue with Road Pricing including hypothecating funds towards building a relief ring road around the Capital.

2.2.7 Another area of focus has been Norway which operated several cordon based charges. In particular, Trondheim which was the first location to use ERP to charge drivers on a cordon basis, has had a system in place since 1991. However, this was not operated with the intention of reducing congestion but was implemented over a 15 year period in order to gain funds largely for road investments. This period ended in 2005 and as such Trondheim is the first city ever to stop collecting tolls. During operation the scheme did reduce inbound traffic by up to 10%. Despite a long standing interest in Norway in Road Pricing there are no plans to resurrect the scheme. Proposals are currently under debate however, even though traffic conditions are not been viewed as problematic.

2.3 Road Pricing Policy in the UK

2.3.1 Road Pricing has been on the agenda for Transport Policy since the 1964 report from the Department for Transport (DfT) on: *'Road Pricing: The Economical and Technical Possibilities,* more often referred to as the *Smeed Report* after the panel's chairman Ruben Smeed. This report found that charging vehicles for every mile travelled on congested roads would "yield substantial benefits". The proposed scheme was not implemented by the then Prime Minister, Sir Alec Douglas Home. His successor, Edward Heath, similarly rejected a second scheme which proposed a 50p charge for driving into large cities in the early 1970s.

2.3.2 The next step towards a Road Pricing scheme was when the Government provided the Mayor of London and London authorities with the opportunity to introduce congestion charging as part of the Greater London Authority (GLA) Act 1999 (the same legislation which provided for the establishment of the office of the Mayor of London, the Greater London Authority and Transport for London).

2.3.3 This devolution continued when The Transport Act 2000 made similar arrangements for local authorities outside of London, to enable them to introduce Road Pricing or similar Travel Demand Management schemes, subject to approval of such schemes by the Secretary of State for Transport.

2.3.4 Developments that have led to the current climate were largely spurred by the 2003 DfT paper "*Managing our Roads"* where the then Secretary of State, Alistair Darling, recommended that:

> *"As a nation we should begin to debate the implications this issue (RP) would have for the UK economy, and begin sensible planning and research work."*

2.3.5 This in turn led to a comprehensive study to examine how a new system of charging for road use could help make better use of our road capacity. The results of the Feasibility Study were published in July 2004 and concluded that a national Road Pricing scheme was feasible. However it recognised a number of barriers in terms of technology, the need for more considered proposals and public debate, and recommended a number of smaller local schemes to further develop our understanding of Road Pricing. This was supported by the Government's Future of Transport White Paper which further committed to:

- *"inform the public - beginning with this White Paper - about what road pricing is and how it might work, and undertake the further research recommended, so that people can engage with a clear proposition, not just an abstract concept;*
- *lead a debate on what would make such pricing acceptable to motorists;*
- *seek to build a public consensus around the objectives of road pricing, and how to use the revenues;*
- *work alongside forward looking authorities and areas, to help them put in place packages of measures which tackle local congestion problems. Resources from the new Transport Innovation Fund will be available to support packages which combine road pricing, modal shift, and better bus services (see Chapter 5); and*
- *begin a process which would lead to international standards for in-car equipment, taking account of current, market-led developments. "*

2.3.6 This has proved to be an impetus in forwarding development of Road Pricing particularly as mentioned through the Transport Innovation Fund (TIF) as discussed in more detail below.

2.3.7 The Government continues to focus on the need to address problems with increasing car use and congestion through Road Pricing as part of a wider package of measures. In one of his inaugural speeches in May 2006 the Secretary of State for Transport, Douglas Alexander, said:

> *"… a personal priority will be to advance the debate about a national system of road pricing in this country - moving the debate from "why" to "how" we might make a national system work in practice. Tackling congestion is a key long term priority in transport because it affects us all….*
>
> *That is why I am clear that we need to explore the scope for developing a national system of road pricing."*

2.3.8 Douglas Alexander went on to lay out the approach in order to achieve this commitment:

> *"First, we need to take a good look at technology available and what it can deliver in practical terms. The technology would need to be*

> *accurate to ensure that motorists have paid the correct price for the journey they have made….*
>
> *The second aspect of the work we will be taking forward is about working with local authorities to establish pilot schemes…*
>
> *I do not believe it would make sense for us to launch straight into a national scheme. All the work that has been done over the last three years confirms that what we should do is take a measured approach. Through pilots and pathfinders, of varying scale, we will develop our understanding, apply proven approaches where action is needed soon, and, importantly, be able to demonstrate what works."*

2.3.9 In order to achieve these aims the DfT has allocated up to £200 million per annum through TIF, which will be available from 2008-09. This money is expected to be available to local authorities to tackle congestion in areas where congestion is a current or forecasted problem, with a view to establishing a major road pricing pilot by around 2012.

2.3.10 Early progress has already been made with £18 million having been already allocated as part of the "pump priming" work that will inform local authorities' bids for Road Pricing schemes. Seven areas have already benefited from this funding: Greater Bristol; Cambridge; Durham; Greater Manchester; Shropshire; Tyne & Wear; and West Midlands. DfT announced in November 2006 that a further £7.5 million has been allocated to local authorities. This includes additional funding to those areas that received funding under the first round of pump-priming but also includes three new areas: Nottingham, Derby and Leicester and the surrounding counties; Reading; and Norfolk (for Norwich).

2.3.11 To accompany these developments the Government is expected to announce a national framework which Road Pricing schemes can be designed within, incorporating costs and design principles. This will be supported by establishing a Road Pricing Local Liaison Group who will reflect national Government responsibilities and the need to share knowledge between national and local Government. It will be kept informed of progress on the Government's road pricing strategy and will be used as a sounding board to identify, discuss and where possible resolve issues that arise.

3. Worldwide Progress of Road Pricing

3.1 Introduction

3.1.1 This Chapter presents a review of the information gathered on emerging Road Pricing schemes across the world. An initial identification of Road Pricing schemes across the world revealed a large number of potential schemes, as shown in Table 3.1, including those researched as part of the Phase 1 review. Drawing upon information from the desktop research exercise each of the potential schemes tended to fall into one of the following categories according to its current status, i.e.:

(i) Schemes included as part of the Phase 1 Review;

(ii) Schemes that appear likely to be implemented in the near future by having some level of commitment or implementation plan;

(iii) Schemes that have no evidence of firm commitment formally or informally but had been a subject of some detailed technical study; and

(iv) Schemes that have no evidence of commitment but had been associated with the concept of Road Pricing at some stage.

3.1.2 It should be noted that other than Category (i), categorisation is necessarily subjective given the nature of information that is freely available about the status of individual schemes.

3.1.3 The locations with emerging Road Pricing proposals outlined in bold in Table 3.1 have been selected as case study locations. Case study locations were selected to provide a suitably broad range of stages of development, contexts and geographical areas. The selection of case study locations was also partially influenced by the availability of information, with the impact that emerging proposals in Category (iv) are less well represented in the short-list. It should be noted that certain established (i.e. Category (i) schemes) continue to evolve, including London and Stockholm, and these have been included in the case studies.

3.1.4 Table 3.2 provides headline statistics on the characteristics of each case study location.

Table 3.1 – Classifications of Locations Associated with Road Pricing

Continent	Category (i) Included in Phase 1	Category (ii) Implementation Likely	Category (iii) Some Development	Category (iv) Little or no Development
Europe	Austria Bergen Durham **London** France Germany Hungary Japan M6 Toll Oslo **Rome** **Stockholm** Switzerland Trondheim	**Prague** **Genoa** Venice Milan	**Helsinki** Gothenburg **Copenhagen** **Netherlands** **Barcelona** Bologna **Cardiff** Bristol (Gtr) Tyne & Wear Shropshire Durham Cambridge West Midlands East Midlands Reading Norfolk	Nantes Lyon Grenoble Berlin Munich Frankfurt Reggio Emilia Forlì Padua Riga Vilnius Arnhem- Nijmegen Amsterdam Utrecht The Hague Warsaw **Madrid** Plymouth Belfast Edinburgh Dublin Graz
USA and Canada	Orange County **New York** – Port Authority San Diego Toronto		**San Francisco** **Seattle**	Calgary Montreal Vancouver
South America	Santiago			Sao Paulo Santiago
Asia	Singapore	**Shanghai**	Wuhan Port Louis **Hong Kong**	Beijing Tokyo Seoul Kuala Lumpur
Africa				Cape Town
Australasia	Melbourne		**Auckland** Wellington	Sydney

Table 3.2 – Characteristics of Case Study Locations

City	Population (City administrative area)	Population (Wider urban area)	Area – km2 (City administrative area)	Area – km2 (Wider urban area)	Mean population density (population per km2)	Car ownership (cars per 1000 population)
Local Areas						
London	7,500,000 (GLA area)	8,500,000	1,579 (GLA area)	-	4,761	365
Cardiff	319,700	-	140	-	2,263	355
Rome	2,550,000	3,830,000	1,285	5,352	1,983	645
Genoa	620,000	890,000	243	-	2,553	665
Barcelona	1,590,000	4,230,000	100	3,240	15,869 (city area)	410
Madrid	3,230,000	5,180,000	607	8,000	4,886	322
Copenhagen	501,000	1,210,000	88	456	2,659	275
Prague	1,180,000	-	496	-	2,357	500
Helsinki	563,000	891,000	184 (excl. water)	743	3,050	322
Stockholm	777,000	1,210,000	375	-	3,230	386
New York City	8,100,000	18,500,000	786 (excl. water)	8,683	10,316	n/a
San Francisco	739,000	3,390,000	121 (excl. water)	8,869	6,115	n/a
Seattle	574,000	3,810,000	369 (excl. water)	21,202	2,665	n/a
Auckland	1,240,000	-	1,086	-	989	500
Shanghai	9,840,000	17,400,000	6,341	-	2,750	50
Hong Kong	7,040,000	-	1,103	-	6,295	48
National Areas						
England	50,400,000	N/A	130,395	N/A	377	460
Netherlands	16,300,000	N/A	41,526	N/A	395	376

Note: Various Sources

3.2 Current Status of the Case Study Road Pricing Schemes

3.2.1 All the case study schemes are different in some way. The schemes are at different stages of development, incorporate different characteristics, have subtly different objectives, different histories and appear to have different levels of support. This makes generalising across case studies difficult and for details of individual emerging Road Pricing schemes the case study proformas provided in Appendix a should be referred to for detail. Nevertheless, it is possible to pick out a number of key conclusions on scheme status.

National and Local Road Pricing schemes

3.2.2 First, from the identification of emerging schemes worldwide there is a critical distinction between local and national Road Pricing schemes. Only two emerging Road Pricing schemes can be considered as national in their proposed coverage – those for the UK (as set out in various policy statements and as addressed in the

DfT's Feasibility Study of Road Pricing in the UK) and the Netherlands (as documented in the case study included in this report). Neither of these two national schemes can be considered committed. As discussed in Chapter 2, there is no definite proposal for a national scheme in England and the UK – though a study of the feasibility of such a scheme has been undertaken. In the Netherlands, while plans are more developed, there is also as yet no firm commitment to implementation. It is noted that partial national schemes already exist in Germany, Austria and Switzerland in the form of lorry road user charging schemes, with the Czech Republic and Slovakia also expected to implement lorry charging schemes.

3.2.3 The distinction between national and local schemes is important in considering the attributes of and driving forces behind emerging Road Pricing proposals and is used in subsequent sections of this chapter.

Progression towards Implementation

3.2.4 The categorisation of emerging Road Pricing schemes presented in Table 3.1 attempts to identify how far away from implementation each of the schemes are. Across the case studies there are two main distinctions: proposals for the extension or modification of implemented schemes (that were identified in the Phase 1 review); and proposals for emerging schemes that are some way off implementation.

Modifications to Existing Schemes

3.2.5 London is obviously the most advanced in implementing a full Road Pricing scheme out of all the case studies, but for the most of the report the progress of London in developing Road Pricing will be considered in terms of future developments, beyond that of the planned western extension.

3.2.6 Stockholm could then be said to be the most advanced as the permanent implementation of the initial pilot scheme has been agreed by the government since the referendum, but aspects of the scheme such as the level of charge may well change. The Stockholm pilot scheme is planned to be restarted on a permanent basis from 2007.

Emerging Schemes

3.2.7 Despite the profile of Road Pricing across the world, and an increasing amount of 'noise' generated through various media about the progression of Road Pricing schemes, none of the case study locations other than London and Stockholm have developed schemes to into firm Road Pricing propositions.

3.2.8 Expectations formed in the first stage of the research that the level of noise surrounding schemes could be a fair approximation of their development and progression of implementation was often found to be misleading.

3.2.9 Generally Road Pricing propositions are not far developed in any of the cases examined. Nevertheless, in most case study locations there is a positive expectation that Road Pricing will be implemented and in many instances aspirational time horizons are quoted.

3.2.10 Cases considered to have fairly well developed plans that appear to be moving towards a firm Road Pricing proposition are listed below, including when each scheme might realistically be implemented - though no formal commitment has been made:

- Prague (2010);
- Shanghai (2008-2010);
- Auckland (2015-2020);
- Cardiff (2010);
- Copenhagen (2009);
- Genoa ; and
- The Netherlands (2012 national scheme).

3.2.11 It is noted that during the research, Milan appears to have emerged as a scheme likely to be implemented in the near future. It is reported that a trial scheme focused on the city centre area is due to commence in early 2007. Milan has not been included in the case studies as it was not possible to obtain more detailed information on the scheme.

3.2.12 Amongst the other case study locations the degree of progression to a firm Road Pricing proposition and to implementation is vague and difficult to assess.

- While San Francisco, Seattle and Helsinki have not developed plans to any level of detail they are currently developing and scoping proposals for future consideration.

- New York, Rome, Barcelona and Madrid are considering Road Pricing but currently do not appear to be moving towards developing a firm Road Pricing proposition.

3.2.13 New York and Rome have in the past considered how charging could be introduced and have received support from many areas. However, in recent years there has been no political movement to take this further largely because of an apparent lack of support and subsequently its proposal being seen as ‘political suicide’. In New York this may yet change as in order to bridge an emerging funding gap the Mayor may be forced to seriously consider how Road Pricing could be introduced.

3.2.14 Rome, Madrid and Barcelona are, though, actively implementing a series of measures to manage traffic and congestion in varying degrees across the city. The main measure in Rome is a restricted zone where access is with an annual licence only. This is different to other Road Pricing schemes which tend to allow journeys, including irregular and infrequent journeys, if the driver is willing to pay the charge. Barcelona is also restricting parking to residents and local business in order to dissuade other car travel. Consequently, neither of these schemes is considered to be a Road Pricing scheme within our definition. Madrid is only at the stage of developing a range of Travel Demand Management measures largely to increase modal share of sustainable transport modes.

3.2.15 Other cities have also implemented a number of non-Road Pricing Travel Demand Management measures. Seattle and Washington State have a series of High Occupancy Vehicle (HOV) lanes which originally were intended to benefit cars

carrying passengers and encourage car-sharing. It is expected that these, like others across America, will be altered to allow single occupancy vehicles, i.e. non-passenger carrying vehicles, to use these less congested lanes in return for a distance based charge. This is intended to reduce congestion on other lanes of the highway and to raise revenue. Because it does not directly charge for a route or network, it is not considered as a Road Pricing scheme in this study's context. Also in a large number of cases, toll-roads operate mainly to raise revenues, such as the New York bridges; USA highways; Prague (for foreign drivers and shortly freight); the Italian motorways; and Hong Kong.

3.2.16 One of the case studies investigated, Hong Kong had undertaken a feasibility study but did not subsequently go on to implement the scheme. There were a raft of reasons for Road Pricing not being progressed, but the strongest seems to relate to public and political support against the background of a changing political framework. There is presently no evidence that a Road Pricing scheme is re-emerging as an option. Hong Kong has implemented a number of changes in their road tax structure to discourage increasing car ownership, which it did successfully, although there was little impact on congestion levels. There is also debate over the current tolling arrangements where charges on those operated by private companies are higher than those operated by the Government.

Technology Trials

3.2.17 To further understand the operation of Road Pricing schemes some locations have undertaken trials of different Road Pricing operating systems rather than purely technologies. Genoa trialled a cordon charge using Automatic Number Plate Recognition (ANPR) cameras. This informed subsequent proposals for progressing with Road Pricing. Seattle has also completed a trial with over 400 participants to see how drivers behave under a kilometre charge that might be used to replace fixed taxes. A similar trial was undertaken in Copenhagen although with the focus on assessing pricing structures. Stockholm is, of course, the most substantial trial undertaken which, unlike Genoa and Seattle, operated at full scale.

Road Pricing Studies

3.2.18 To refine initial proposals some locations have undertaken scoping studies. These review various scenarios and consider details of a scheme's characteristics. Locations that have undertaken such studies in the past include: New York (2005); Prague (2004); Shanghai (2004); Hong Kong (2001); and the Netherlands (1999). Of these only Shanghai has built upon the scoping study and progressed to a more detailed assessment. The other locations have either changed their scheme (e.g. Netherlands moving from local schemes to a national scheme) or dropped Road Pricing altogether.

3.2.19 The majority of locations are currently undertaking or reviewing results of more detailed studies into Road Pricing. These include: San Francisco; Seattle; Shanghai (2nd Round); Auckland; Cardiff; Genoa; Helsinki; Copenhagen and the Netherlands. The direction and shape of any Road Pricing scheme is expected to be dependant on the outcome of these deliberations.

Describing the Emerging Schemes

3.2.20 Against this backdrop of different contexts and different levels of scheme progression four main themes have been used to describe the emerging Road Pricing schemes examined by the case studies, as follows:

- the aims and objectives of a scheme;
- background to the transport policy and political considerations;
- the form of any proposed scheme; and
- the current position regarding the public, media and stakeholders

3.2.21 These themes are common to all schemes across the world. It is possible in some cases to further break these down into more detailed sub-themes. But in many cases the schemes are not far enough developed to provide sufficient detail for this.

3.2.22 Considering the available level of detail, each of the 17 case studies was researched around these key elements and then analysed along a thematic approach. This has enabled comparisons between locations to be made.

3.2.23 It should be noted that often locations had not developed or considered aspects of schemes sufficiently to comment and therefore occasionally only a limited number of cases are referred to.

3.3 Aims and Objectives of Scheme Proposals

Primary Objectives

3.3.1 The primary objectives identified for each of the emerging schemes is shown in Table 3.3. In order to enable some form of benchmarking with the status of Road Pricing in the UK, the table also shows an assessment of the stated objectives of Road Pricing in the context of the UK. A distinction has been made between the objectives of a national scheme (as per the DfT's Feasibility Study of Road Pricing in the UK study) and local schemes (as per Congestion TIF).

3.3.2 It is noted that the means by which objectives are identified and expressed across the case study areas does vary. Additionally, certain objectives are linked to one another.

3.3.3 However, the above analysis does clearly indicate that the most clearly focused objective of Road Pricing is that of targeting congestion. Overall, though, Road Pricing is seen as having multiple objectives.

Table 3.3 – Objectives of Road Pricing as Stated by Case Studies

	Reduce Congestion	Improve Air Quality	Prevent Climate Change	Sustain Economy	Improve Urban Environment	Raise Funds for Transport	Modify/ Replace Taxation Regime
Local Schemes							
England (Congestion TIF)	✓						
London	✓	(✓) (also LEZ)	(✓) (also LEZ)	✓			
Cardiff	✓		✓	✓	✓	(✓)	
Rome		✓			✓		
Genoa	✓						
Barcelona	✓				✓		
Madrid	✓	✓	✓	✓	✓		
Copenhagen	✓						
Prague	✓	✓	✓			✓	
Helsinki	✓					(✓)	
Stockholm	✓	✓	✓	✓		✓	
New York	✓	✓	✓	✓	✓	✓ (potentially)	
San Francisco	✓	(✓)	(✓)	(✓)	(✓)	(✓)	
Seattle	✓					✓	✓
Auckland	✓					(✓)	
Shanghai	✓	✓					
Hong Kong	✓						
National Schemes							
England	✓	✓	✓	✓			
Netherlands	✓	✓	✓	✓			✓

Note: ✓ - Primary Aim
(✓) – Secondary Aim

3.3.4 Only Genoa, Copenhagen and Hong Kong have a single key aim of reducing congestion without specifically stating other objectives. In the context of local Road Pricing schemes in the UK, the primary stated objective is considered to be that of targeting congestion, even though other sub-objectives could be viewed as linked to this.

3.3.5 A number of locations have the primary aim of reducing congestion with one or more secondary objectives. These locations include San Francisco, Auckland and Helsinki. The UK – as a national scheme - although having similar broad objectives to the Netherlands, does not appear to have an explicit objective to modify the existing tax system.

3.3.6 In London there are a number of key aims, related to air quality and pollution, which have benefited from the traffic changes. These objectives are also being tackled through complementary schemes such as Low Emissions Zone (LEZ).

3.3.7 New York has two primary objectives: reducing congestion and improving air quality. It further recognises the importance of a number of additional factors including redirecting freight traffic from the city centre, providing economic sustainability and improving the public realm. Currently the opportunity to raise additional revenue to fund transport is a secondary issue, although this may become more important if the Mayor does decide to propose Road Pricing.

3.3.8 The Stockholm trial was originally implemented in the face of increasing congestion, but with equal intentions of improving accessibility and improving the environment alongside understanding how a scheme might enhance the transport system. Stockholm may yet be adding another aim to the list as the Alliance government state that Road Pricing will be introduced and the revenues reinvested in building a ring road around the city. To reinforce the importance of this there is already suggestion that the scheme will be operational only as long as revenues are required to build roads. This arrangement is along the same lines as those in Norway, particularly Trondheim, where revenues were ring-fenced for a transport infrastructure project until a certain point in time, which has now passed and so the charge has been duly terminated.

3.3.9 Other cases have more than one objective for Road Pricing, but report them to be of equal significance including Shanghai, Seattle, Prague, Cardiff and Madrid.

3.3.10 Only Rome does not target congestion as an issue in itself, but rather is treated as a by-product through improving mobility, increasing public transport mode share, protecting health and preserving their historical and architectural heritage.

3.3.11 It is noted that many of the case studies examined do explicitly have an objective to raise revenues to provide funds for reinvestment in the transport system. This is not a stated objective for the UK.

3.3.12 Additionally, despite the increasing focus on tackling climate change due to emissions from transport sources, not all the emerging schemes have explicit objectives for this – including the UK in relation to local schemes.

Use of Revenues

3.3.13 The use of revenues derived from Road Pricing has been considered key to the acceptability of Road Pricing schemes. This has been an important factor in London where around £90million of net revenues each year have been used to fund public transport improvements in and around the charging zone as well as transport projects around the Capital that encourage more sustainable transport and travel away from the most congested areas. Other Road Pricing cases around the world link revenues to funding transport infrastructure of one sort or another.

3.3.14 However, unlike London, many cases are intending to use net revenues to support transport projects that are not necessarily related to the introduction of Road Pricing and a package of wider Travel Demand Management measures. These include; Seattle; New York; Prague; Auckland; Cardiff; the Netherlands; and now Stockholm.

3.3.15 It is worth noting that although London does currently have an obligation to invest revenues in transport, this was originally only to be the case for 10 years, after which the Treasury would have responsibility for investing net revenues. The Mayor has

negotiated an extension to this so that the 10 year period starts again after the implementation of the extension such that transport in London will continue to benefit from Road Pricing revenues until at least 2017.

Table 3.4 – Expected Use of Revenues from Schemes

	For Local Transport	To Bridge Funding Gap	To Replace/Modify Existing Tax Regime
Local Schemes			
England (Congestion TIF)	✓		
London	✓		
Cardiff	✓	✓	
Rome	✓		
Genoa	✓		
Barcelona	✓		
Madrid	✓ (Through City's Budget)		
Copenhagen	✓		
Prague		✓	
Helsinki	✓	✓	
Stockholm	✓ (For Trial)	✓ (Proposed for Scheme)	
New York	✓	✓ (Potentially)	
San Francisco	✓	✓	
Seattle	✓		✓
Auckland	✓	✓	
Shanghai	✓		
Hong Kong	✓		
National Schemes			
England			✓
Netherlands			✓

3.3.16 Evidence for Seattle and the Netherlands indicates that they do intend to use Road Pricing revenues to modify the current road tax systems with a system that is deemed to be more closely related to the level of road use. In the UK under the national scheme the possibility of replacing the current fixed tax system has been identified though there is no commitment to such a measure.

3.3.17 Overall, the majority of the case study locations with local schemes intend to use revenues on improvements to the local transport system. Specifically, Shanghai, San Francisco; Genoa, Copenhagen and Helsinki all have proposals for reinvestment in measures that will support the impacts of Road Pricing. Although Copenhagen intends to implement Travel Demand Management measures and improve public transport without additional funding from Road Pricing, they do recognise the importance of this hypothecation towards gaining acceptability of a scheme. Barcelona, Madrid and Rome are locations that are really focussing on Travel Demand Management rather than Road Pricing. Barcelona and Rome expect revenues to be reinvested in improving transport, although in Madrid revenues would be expected to be part of the larger 'pot' of the City's budget.

3.4 Policy Rationale for Proposals

3.4.1 The status and progress of Road Pricing in a given city or country is dependant on many factors. Some of the key drivers and inhibitors relate to the current political climate and policies, the level of commitment, existing legislation and available funding.

Policy Responsibilities

3.4.2 Table 3.5 below identifies whether the progression of emerging Road Pricing schemes is driven by policy set at local, regional or national levels, and the extent to which policy makes a solid commitment to developing a scheme.

Table 3.5 – Position of Responsibility for Road Pricing Policy and Current Commitments

	Local	Regional	National	Commitment to Road Pricing
Local Schemes				
England	✓	✓	✓	Local schemes driven by a national framework
London		✓		Mayor's Transport Strategy
Cardiff	✓			None – expected soon by Assembly
Rome	✓			None other than to Travel Demand Management
Genoa	✓			None – expected in UMP 2007
Barcelona	✓			None
Madrid	✓			None
Copenhagen	✓			None – expected in 2007
Prague	✓			None other than to Travel Demand Management
Helsinki		✓		None – Other than Travel Demand Management and revision planned 2007
Stockholm			✓	Verbal from Prime Minister
New York	✓	✓		None
San Francisco	✓			None
Seattle	✓	✓		None
Auckland	✓	✓		None – but planned Auckland Transport Plan
Shanghai	✓	✓		None
Hong Kong		✓		None
National Schemes				
England		✓	✓	White Paper
Netherlands			✓	In Mobility Policy Document

3.4.3 Overall, the responsibility for Road Pricing lies with the transport authority, although in some cases this is divided as is responsibility for different aspects of the transport network. In London this position was clarified when the power to implement Road Pricing was given to TfL under the 1999 GLA Act.

3.4.4 In Shanghai, Seattle and New York responsibility lies across local and also provincial (or regional) government. In the case of New York this is seen to have potential pitfalls. The City of New York has very different characteristics to the State of New York. The City is highly dependent on the public transport network and has to support a vast economy. It is not considered that the State is 'representative' of the City. Responsibility for New York City's transport research lies locally although policy is set by both the City and the State government. The Mayor is an additional factor who, although having no political power in this area is seen to be the 'voice' of New Yorkers and can be very influential in gaining acceptance and support. The outcome of this could be that policy does not reflect the needs of New York as a World City.

3.4.5 In the case of Seattle a scheme could be implemented in the Puget Sound Region (containing Seattle and its suburbs) by the Regional Council. However, if the scheme were to be focused on replacing the existing tax system this would become the responsibility of, and have to apply across, the wider State of Washington.

3.4.6 In the majority of cases the development of Road Pricing schemes has benefited from local positioning of power. Rome, Genoa, Barcelona, Madrid, Copenhagen, Prague, Cardiff and San Francisco are effectively governed by their City Councils meaning power lies at the heart of the area. The benefit of this is apparent in some of the cases where there is a short implementation time scale such as in Copenhagen, Prague and Cardiff. It should be noted that these cities would have to rely on legislation being implemented nationally.

3.4.7 Helsinki is slightly different in that responsibility lies within the region, the Metropolitan Area Council, which also includes three other cities. Partly as a result of this only a scheme for the whole region is being considered. In Hong Kong there is also regional responsibility for transport policy, although Road Pricing has largely only been considered within the Central and Kowloon areas.

3.4.8 Auckland and Stockholm are different in that any Road Pricing proposal must be passed by national Government despite being driven locally. In Stockholm the City Council applied to the government for permission to conduct a trial. This was agreed and the trial undertaken in two parts with an initial improvement in public transport in 2005 and then a six month trial in 2006.

3.4.9 The national scheme in the Netherlands is the responsibility of the Government, although accelerated Travel Demand Management schemes in local areas to target congestion prior to a national scheme will be implemented with the cooperation of the local governments. This is not expected to be problematic as areas such as Rotterdam and The Hague have traditionally been keen to implement Road Pricing.

Commitment to Road Pricing

3.4.10 There is little evidence of clear commitments to implementing Road Pricing in the local or national transport strategies and plans relating to the case study locations.

3.4.11 The Netherlands is the clearest where the government's Mobility Policy Document to 2020, published in September 2005, states that;

3.4.12 "The cabinet considers the introduction of a kilometre fee in combination with a reduction in road taxes to be a workable alternative."

3.4.13 The Implementation Memorandum for the Policy Document goes further towards making a decision on Road Pricing;

> *"The state will take all steps needed to introduce a system for levying a 'fast-track fee'. The proceeds will be used to expedite the resolution of existing bottlenecks. To enable a future cabinet to reach a decision regarding the introduction of a road pricing system, the current cabinet will make all necessary preparations. The introduction of such a system will coincide with a lowering of road and/or vehicle taxes."*

3.4.14 England has a similar level of commitment as described in section 2.3. However, a national scheme in the UK is not considered to be as well developed as in the Netherlands in terms of reaching an implementation plan.

3.4.15 In London there has obviously been a clear commitment to Road Pricing, although at present there is no formal commitment to long term plans beyond the western extension.

3.4.16 Also on a local level the closest written commitment is in the San Francisco 30 year 2004 Countrywide Transportation Plan which commits to developing schemes to tackle congestion, one option of which is Road Pricing.

3.4.17 Prague, Copenhagen, Barcelona, Rome, Shanghai and Helsinki do commit to developing Travel Demand Management measures in their transport plans, although not specifically Road Pricing. Copenhagen intends to have a clear commitment within the City Council to Road Pricing by early 2007. Auckland and Genoa are developing plans which are intended to shape commitment within transport plans.

3.4.18 Hong Kong, Seattle and New York are the exceptions. Based upon reviewed evidence, there is no current commitment to Road Pricing. However, in Hong Kong there have in the past been measures taken to reduce car ownership levels. In Seattle and Washington there is a wider programme of Travel Demand Management measures and past discussions continue to support the further study of Road Pricing.

Legislative Requirements

3.4.19 Table 3.6 shows the current position regarding legislation required to implement a Road Pricing scheme. In the majority of cases there is existing legislation which allows for the tolling or collecting of revenues for funding transport infrastructure. In these situations, rather than introducing completely new legislation, it may be possible to revise that already in place to cover a particular Road Pricing scheme.

Table 3.6 – Legislation Requirements for Road Pricing

	Legislation In Place	Revisions required to existing legislation / Legislative Precedent Set	Full Legislation Required
Local Schemes			
England	✓		
London	✓		
Cardiff			✓
Rome		✓	
Genoa		✓	
Barcelona			✓
Madrid		✓	
Copenhagen			✓
Prague		✓	
Helsinki			✓
Stockholm		✓	
New York		✓	
San Francisco		✓	
Seattle		✓	
Auckland		✓	
Shanghai			✓ (local)
Hong Kong			✓
National Schemes			
England			✓
Netherlands			✓

3.4.20 London is the only case where there is legislation fully in place for building upon the current scheme. Although, similar to London, there is legislation in place to implement schemes across the UK, there is none in place for a national scheme. This is also true of the Netherlands, although there is legislation being developed to allow the first stage of a scheme in tolling areas of severe congestion.

3.4.21 Cases that require completely new legislation are: Shanghai, who need local legislation and intend to set up an agency responsible to deal with all Road Pricing aspects; Hong Kong, despite current operating tolls; Cardiff, who have made some ground by already decriminalising parking offences for improved management and need the Welsh Assembly Government also to introduce legislation; Copenhagen; Barcelona; and Helsinki. Copenhagen considers legislation from Government to be the biggest risk in delaying the implementation date of 2009.

3.4.22 In Stockholm the Swedish Parliament adopted the Common Congestion Charges Law which contained an annex relating to the Stockholm trial and should cover future Road Pricing schemes. This would need to be revised for the scheme to be introduced permanently.

3.4.23 Some cases have existing legislation that provides a precedent or basis for developing more specific requirements. San Francisco has a 'Prop K' half cent tax on sales in the State that is administered by the San Francisco County Transportation Authority (SFCTA) and dedicated towards transport improvements. Although legislation for tolls exists in many locations this would not apply to area charges as is the case in Genoa, nor would it allow the reallocation of revenues to replace road tax, as is the case in Seattle and the Netherlands.

3.4.24 In the case of Prague there is already legislation for restricted zones that charge non residents or business users for entering. This would have to be revised to allow expansion of the zone and application to different vehicles.

Funding of Road Pricing Scheme Development and Implementation

3.4.25 In many of the case study locations, funding has been provided from various sources for the development of Road Pricing schemes (e.g. studies and pilots) and, in some cases, potential funding for subsequent scheme implementation. Funding availability was identified in a number of case studies as a major driver for scheme development. Table 3.7 summarises whether Road Pricing schemes are being encouraged at planning and implementation stages through the availability of funding for scheme progression.

3.4.26 The Congestion TIF is a prime example of this. In London, it is expected to be funding a substantial programme of technology trials and could encourage Local Authorities to participate in any extension of the current scheme. In terms of a national scheme, the UK is funding the development of local schemes that, as well as targeting local congestion, will inform the progress of a national scheme and potentially reduce costs in the longer term.

3.4.27 In San Francisco, grants from the United States Federal Highway Administration (FHA) have supported studies undertaken.

3.4.28 Rome, Genoa, Barcelona, Copenhagen and Helsinki all have received funding from the European Commission (EC) who set up international projects researching and progressing Road Pricing and sustainable transport. However, Copenhagen comments that although this research was useful in terms of developing pricing structures it was not pivotal in driving their current plans for Road Pricing. Rome is being funded to develop its Road Pricing related Travel Demand Management measures jointly by the City Council and the Italian Environmental Ministry.

Table 3.7 – Funding Influences for Scheme Development and Implementation

	Funding for Development	Funding for Implementation
Local Schemes		
England (Congestion TIF)	✓	✓
London	✓ (Technology Trials)	
Cardiff		✓ (Concern over availability)
Rome	✓	
Genoa	✓	
Barcelona	✓	
Madrid		
Copenhagen	✓	✓ (Available locally)
Prague		
Helsinki	✓	
Stockholm		✓ (Value Proven)
New York		
San Francisco	✓	
Seattle	✓	✓ (Expected through FHA)
Auckland		
Shanghai		
Hong Kong		
National Schemes		
England		
Netherlands		✓ (Cost Monitor)

3.4.29 Funding scheme implementation has not, as yet, been considered in the majority of cases, reflecting the very embryonic status of many of the emerging schemes.

3.4.30 As well as the costs of the Road Pricing scheme's infrastructure there is potentially also the cost of the associated package of complementary measures.

3.4.31 The issue of funding and the relationship between funding implementation and the revenues that Road Pricing could deliver is raised in a number of the case study locations.

3.4.32 San Francisco, for example, makes this point in their 2030 Transportation Plan that for a Road Pricing scheme to be worthwhile it would be expected to cover its costs in revenues within a reasonable timescale and not prohibit its introduction:

> *"Fortunately, many of these "intelligent transportation" strategies come at relatively low cost — especially when compared to major road or transit expansion projects. So, while new funding is needed, it is not the major obstacle to full-scale implementation."*

3.4.33 Cardiff has particular concerns over funding. They estimate that to implement a scheme with associated infrastructure changes it would cost £300million-£500million. How this would be provided is of concern to Cardiff given that it amounts to at least three times the Welsh national annual transport budget of £100million.

3.4.34 Seattle is a case where funding is expected to come from grants made available nationally by the United States FHA.

3.4.35 The Netherlands is an example where funding is not seen as a significant concern. More attention is being paid to value-for-money and benefit maximisation. Emerging costs are also being competitively reviewed and will have to provide a strong case for value and relative benefits compared to revenues. A 2006 review found that costs for a national scheme would now be less than they were in 2005. If this continues it could advance the implementation date. Further reviews are planned for 2008.

3.4.36 In Stockholm, although there where significant outlay costs and the trial did not operate long enough to recoup these; in the long term it is felt that the scheme will produce a positive value. Subsequently funding is not a key issue in its future operation.

3.4.37 Copenhagen studies indicate that potential costs for the City are not of concern and are generally 'affordable'.

Key Influences

3.4.38 Not only is the progression of Road Pricing schemes complicated by factors relating to policy, commitments, legislation and funding there are numerous other issues that appear to be driving the progression of Road Pricing schemes.

3.4.39 Table 3.8 provides a summary of key influences, noting that this is a necessarily subjective view drawing upon the evidence from the case studies.

3.4.40 Hong Kong was seen to be pioneering the early development of Road Pricing, led strongly by the Government's desire to cut rising car ownership levels and avoid increasing congestion levels. However, there has been little progression over the last 5 years with no obvious drivers other than a belief amongst academics and transport professionals that Hong Kong is a 'natural candidate' for Road Pricing.

3.4.41 In more recent years the success of schemes already operating around the world has been a significant factor in progressing cases in other locations. To Shanghai and Helsinki in particular, the development and referendum of the Stockholm trial was of particular importance. The outcome of Stockholm is not considered to have caused an impediment or delay in developing schemes, but rather as providing a gauge to

acceptability and greater understanding of impacts. On a more general basis there is considered to be increasing attention to Road Pricing as a Travel Demand Management measure from within local and national Government in places such as Seattle, San Francisco and the Netherlands.

Table 3.8 – Key Influences Described in Progressing with Potential Schemes

	Research Funding / Partnerships	Results of Studies / Trials	Opinion of Stakeholders	Success of other Schemes	Potential Revenue as a Source of Funding Transport
Local Schemes					
England	✓	✓	✓	✓	✓
London	✓	✓			✓
Cardiff		✓	✓	✓	✓
Rome	✓				
Genoa	✓	✓	✓	✓	
Barcelona	✓				
Madrid			✓		
Copenhagen		✓			
Prague	✓	✓	✓	✓	✓
Helsinki	✓	✓		✓	
Stockholm		✓			✓
New York		✓	✓		✓ (potentially)
San Francisco	✓	✓			✓
Seattle	✓	✓			✓
Auckland		✓	✓	✓	✓
Shanghai		✓	✓	✓	
Hong Kong		✓	✓		
National Schemes					
England		✓			
Netherlands			✓		✓

3.4.42 In Cardiff, the UK national policy to progress Road Pricing has supported the case and has led to hopes that the scheme could be utilised as a 'Pilot'. Conversely, in America national policy is not seen to be a particular motivator in setting local policy. The Department for Transportation in May 2006 released its National Strategy to Reduce Congestion on America's Transportation Network which is intended to provide a guide for officials to tackle the problem of congestion. It states that;

> *"We must not be afraid to make meaningful progress in reducing congestion."*

3.4.43 Despite this none of the American cities studied considered this to be a motivating factor in furthering Road Pricing other than the associated provision of funding from the FHA.

3.4.44 In London the national policy to further the development of Road Pricing could be a significant factor in how the current scheme develops further. Although an equally important factor is the upcoming need to re-tender the operation of the scheme providing an opportunity to more easily implement any changes.

3.4.45 The Netherlands appear to need few influences and are developing implementation plans for their national scheme. The "Opinion of Stakeholders" is only included in this case in Table 3.8 because the Netherlands has itself established a 'Joint Fact Finding' committee involving a wide range of stakeholders to generate information that will allow a political decision to be based on. The committee's members represent a large proportion of the country's residents. Copenhagen too has few influences other than the results from studies indicating a worthwhile reduction in traffic levels.

3.4.46 The involvement of interest and stakeholder organisations has proved to be a strong force in maintaining the profile of Road Pricing within locations. This has been the case in New York, where the Regional Plan Association (RPA), an independent not-for-profit research organisation, is striving to understand how Road Pricing could best benefit New York. In Auckland the Joint Official Group (JOG) comprising local authorities and national government has been instrumental in initiating and driving forward Road Pricing issues.

Political Influences

3.4.47 The political framework of a location can have a strong influence on the direction Road Pricing may take.

3.4.48 It is generally agreed that in London the Mayor, Ken Livingstone, had a key role in driving forward and implementing Road Pricing. This would appear to be the case for the remainder of his term in office, after which the future developments could be affected by a change in leadership. This has not been the case in the majority of other locations studied. Although in Auckland the independent Mayor is seen to be following in Mayor Livingstone's footsteps by actively supporting development of Road Pricing despite occasional vociferous opposition.

3.4.49 The influence of an individual can also be used to resist Road Pricing as was the case in New York. Here, Mayor Bloomberg recently held back from supporting Road Pricing as it is not widely supported and was felt could lead to his 'political suicide'. This situation may still change as demands for bridging funding gaps grow.

3.4.50 Hong Kong is a key example where the political framework is partly to blame for the lack of progress on Road Pricing. There was a new political structure implemented in the 1980's which provided a powerful blocking force to such schemes. The Government generally were not proactive in lobbying support and providing effective communications on Road Pricing to allow debate, and the key progress occurred around the time of the hand-over to China sparking concerns over invasive technology.

3.4.51 Even if a political framework is effective, transport policy can change depending on who is in power. For example in Auckland there is general support for Road Pricing partly as a result of power shifting after the last election, which may again change in the 2007 election. The current administration more closely reflects the national picture of largely Labour candidates who are generally not in favour of building new roads to manage congestion. Current schemes which could potentially be vulnerable to forthcoming elections are Cardiff and the Netherlands. Cardiff City Council will not commit to a Road Pricing scheme before pending elections in May 2008. And in the past have been affected when the last local elections saw Labour lose overall control

and Road Pricing policy only maintained with the support of one Liberal Democrat transport member.

3.4.52 The Netherlands national scheme too could be susceptible to a change in the political administration in the November 2006 elections. However, they are confident that any result will not significantly affect progress of the scheme which all parties have supported in their manifestos, assuming there is no significant change to the proposals. Stockholm is a current example of how government policy is standing behind Road Pricing. It had been expected that the new centre-right administration would not be in favour of the scheme but it has come out in support of it.

3.4.53 A further example of how political support can affect progress is seen by comparing Prague, which is expecting to implement a scheme by 2010 and has political support for this, to Helsinki, which cannot envisage an implementation date partly because of the lack of political support, other than perhaps of the Green party who hold little or no influence. Copenhagen falls in the middle of these two situations where the City Council is largely supportive of a scheme and is driving forward an ambitious implementation programme, whereas the national Government who are responsible for providing the legislation are generally opposed to Road Pricing. Although in this case there could be other conflicting reasons including a freeze on new taxes, and the opinion by some members that a national scheme could replace current road tax of 180% on newly purchased cars - which could be exacerbating levels of car use.

3.4.54 The EC has shown itself also to be a successful political motivator on Road Pricing and has been involved in projects promoting sustainable transport solutions. As well as funding, the EC provides a role in motivating locations and fulfilling a central role through which information can be shared.

3.4.55 Forecasts of large growth in population, employment and associated travel are also reasons for developing Road Pricing schemes. This has been highlighted as an issue in Cardiff and Helsinki. In Shanghai the predicted rate of increase is vast, reflecting growth in the economy. Here Road Pricing is almost seen as a possible prevention to a foreseeable problem rather than a cure, as in most other cases.

Table 3.9 – Evidence of Political Leadership Driving Support for Road Pricing

	Individual	Local / Regional Bodies	National Bodies
Local Schemes			
England			✓
London	✓	✓	
Cardiff		✓	
Rome		✓	
Genoa		✓	
Barcelona		✓	
Madrid		✓	
Copenhagen		✓	
Prague		✓	
Helsinki		✓	
Stockholm		✓	✓
New York	✓		✓ (Transport Strategy)

	Individual	Local / Regional Bodies	National Bodies
San Francisco		✓	✓ (Transport Strategy)
Seattle		✓	✓ (Transport Strategy)
Auckland	✓	✓	✓
Shanghai		✓	
Hong Kong	✓ (Held responsible)	✓	
National Schemes			
England			✓
Netherlands		✓ (The Hague, Amsterdam, etc)	✓

3.5 Types of Schemes being considered

3.5.1 None of the schemes have progressed to a stage where a definite set of characteristics are proposed or have been agreed for a specific Road Pricing scheme, although many are at the stage of considering and agreeing options.

3.5.2 Table 3.10 sets out a summary of the types of schemes that are being considered in each of the case study areas.

Table 3.10 – Elements of Road Pricing Schemes Considered

	Area	Cordon	Distance	Hours of Operation	Possible Charge Level
Local Schemes					
England (Congestion TIF)	✓	✓	✓		Undecided
London	✓	✓	✓	7am – 6am (With Extension)	£8 (Current)
Cardiff	✓	✓ (Double)		AM Peak (In Study)	£4 - £12 (In Study - By Vehicle Type)
Rome					
Genoa		✓		7am – 8pm	1 – 5 Euros (70p - £3.50)
Barcelona					
Madrid					
Copenhagen		✓		Peak and Off Peak	DK10 - DK25 (£1 – £2.50)
Prague	✓	✓ (Single or Double)			1 – 5 Euros (70p - £3.50)
Helsinki			✓ (Regional)		Undecided
Stockholm		✓		6.30am – 6.30pm (In Trial)	10 – 20 SEK (70p - £1.40) (In Trial)
New York				6am – 7pm and	$4 - $10

	Area	Cordon	Distance	Hours of Operation	Possible Charge Level
				24 Hours (In Study)	(In Study)
San Francisco					Undecided
Seattle			✓	6am – 10pm (In Trial)	0 – 50 cents/mile (0 – 25p/mile) (In Trial)
Auckland	✓	✓ (Double)		AM Peak (In Study)	$3 - $6 (£1 - £2) (In Study)
Shanghai		✓		AM and PM Peaks	5 – 7 RMB (30p – 50p)
Hong Kong		✓ (2001 Study)		✓ (2001 Study)	HK$8 – HK$31 (60p – £2.10) (2001 Study)
National Schemes					
England			✓		Undecided
Netherlands			✓		Undecided

Charge Basis

3.5.3 The Netherlands and the UK national schemes are primarily considering a distance based charge most likely varying by area and time of day. Seattle is also progressing in this direction, although does stands out as being the only local scheme currently considering this arrangement. This would entail the scheme covering the whole of the Washington State region. To inform this eventuality Seattle has completed a trial based on a smaller region with volunteers and provides valuable information on how drivers might react to such a scheme.

3.5.4 Shanghai, Genoa and Copenhagen are only considering a cordon scheme where drivers would be charged for entering a defined area, as was Hong Kong. These are expected to cover just the city centre. Although the Stockholm trial operated on a cordon basis it charged drivers for entering and leaving the area. Copenhagen did study a number of options including a city centre cordon, a larger cordon and distance based charging, but in order to implement a scheme as soon as possible and achieve uniform impacts the larger cordon is the most likely proposition.

3.5.5 Other locations have identified a number of scenarios that have been considered suitable for further development. Cardiff, Prague and Auckland are all considering an area or a double cordon charge where a higher charge would be paid for entering the central area and a lower charge for the outer area. Prague is also looking at the option of just a single cordon at the centre as is New York. Although not currently progressing scenarios the most recent feasibility study focused on a cordon charge in Manhattan. London could alter its current scheme in a number of ways but if it is to do so by 2010 would involve an area or cordon charge rather than distance based scheme.

3.5.6 An additional option investigated in Auckland was to install a parking levy on top of parking costs inside the defined zone. Although this is not directly a Road Pricing scheme it is expected to have an impact on reducing traffic.

3.5.7 Some cities are currently scoping suitable proposals. In Helsinki this would cover the wider Metropolitan region and in San Francisco it would focus on the 'Downtown' area. Seattle and the Netherlands also say they do not have a current plan although a distance-based charge that would replace the fixed tax system is preferred.

Charging Periods and Charge Levels

3.5.8 Few of the locations examined have developed their scheme sufficiently to decide what Road Pricing charges would be. Some locations are expecting to have a variable charge in order to target congestion including the national schemes in the UK and the Netherlands, local schemes in Cardiff, Helsinki, Genoa, Seattle, and this was also the case in the Hong Kong study. In the case of Cardiff this is also intended to vary by vehicle in line with their focus on air quality.

3.5.9 Genoa, Copenhagen and Seattle are considering charging for the full working day. In Hong Kong the original trial only charged in peak periods, although the second round of proposals did recommend charging across the working day.

3.5.10 Cardiff and Auckland are considering charging for the AM peak period only. Part of the reason for this is to impact upon the worst congestion but it can also help achieve acceptability by minimising who would be affected. Cardiff specifically comments that operating a charge in the morning peak only is a condition of gaining business community support as shoppers will be largely unaffected.

3.5.11 Shanghai is focusing their charge during both peak periods. In the Netherlands it is expected that by having a higher charge in the peaks and in the cities this will provide the majority of the push that is needed to reduce the most serious congestion.

3.5.12 In many cases the charge is expected to vary depending largely on the time of day travelling.

3.5.13 Current charges in London as well as those proposed in Cardiff and modelled for the English national scheme appear considerably higher than those proposed around the rest of the world. In Singapore, where the cordon based charge was recently adjusted, the maximum charge for a heavy goods vehicle on a weekday morning peak is $7, approximately £2.40. In the US it has been estimated that for a distance based charge to be fiscally neutral with current tax arrangements the required charge is around 1.2 cents per mile, although such a scheme would be unlikely to impact on congestion levels.

3.5.14 It is noted, however, that comparing charge levels between locations is difficult because of differences in costs of motoring, income levels etc. and due to exchange rates.

Technology

3.5.15 Technology clearly has an influence on when a scheme could become operational. However, it does appear that if the characteristics of the scheme are developed primarily, then the suitable technology is a secondary consideration.

3.5.16 In cases where variable distance-based charges are being considered Global Positioning Systems (GPS) are largely seen to be the most feasible option. This

tends to mean that a scheme would not be operational until around 2012 at the earliest. The Netherlands as a national scheme and Seattle and Helsinki as local schemes are investigating this option. Hong Kong also recommended GPS in their 2001 study to maximise interoperability and give longer term technical benefits. The issues associated with GPS were shown in the Seattle trial where the 'Downtown' area could not be included in the chargeable network as GPS is not yet at a stage where it can give sufficiently detailed coverage in dense areas to ensure a fair system of charging drivers within those areas.

3.5.17 Technology considered suitable for area and cordon-based charges is already available and has undergone testing in existing schemes and can therefore mean implementation could be completed in a shorter timescale. Tag and Beacon technology, or Dedicated Short Range Communications (DSRC), as used in the Stockholm trial is also being considered for Auckland, Prague and Shanghai. Genoa and Copenhagen are considering both Tag and Beacon and Automatic Number Plate Recognition (ANPR) cameras for their cordon charge - the choice of which will be closely scrutinised on the basis of cost and value. Although Stockholm is expected to be continuing with Road Pricing there is some debate over continuing to use DSRC. Although this is often considered to be the cheaper and more flexible option Stockholm considers that ANPR may provide a more efficient and accurate system and could be preferable for the scale of the permanent Stockholm scheme. Copenhagen too predicts this may be the situation in their case.

3.5.18 Questions concerning the cost, reliability and interoperability of technologies are closely linked to the development of the English national scheme through the TIF programme. In the Netherlands the focus is more on monitoring the cost of implementing a scheme, which is expected to decrease as the technology itself becomes more reliable and therefore more readily available.

3.5.19 The technology trials undertaken by TfL will inform any plan for altering the current scheme when it is retendered in around 2010. The main focus has been Tag and Beacon and there is currently a trial underway of this technology. GPS-based technology has also been tested, although it is considered to be out of scope for any medium term proposals.

Table 3.11 – Technology Being Considered for Scheme

	ANPR	Tag and Beacon	GPS type	Likely Date of Implementation
Local Schemes				
England (Congestion TIF)				
London	✓	✓		2010+
Cardiff	✓	✓	✓	2010
Rome				
Genoa	✓	✓		Not Known
Barcelona				
Madrid				
Copenhagen	✓	✓		2009
Prague	✓	✓	✓	2010
Helsinki			✓	Not Known
Stockholm	✓	✓		2007+

	ANPR	Tag and Beacon	GPS type	Likely Date of Implementation
New York				
San Francisco	✓	✓	✓	Not Known
Seattle	✓	✓	✓	2015 - 2020
Auckland	✓	✓	✓	2015 - 2020
Shanghai	✓	✓		2008 - 2010
Hong Kong			✓ (2001 Study)	
National Schemes				
England			✓	2015+
Netherlands			✓	2012

3.5.20 Cardiff has not favoured any particular technology so far, although their options may be limited by their planned start date of 2010. However, they do have the benefit of being able to use experience gained around the UK in projects funded by the UK Government TIF, which although not extending to Wales, will be partly used to report on different technologies.

3.5.21 In addition to technology for the charging system there would be a need for effective enforcement technology to encourage compliance. In London, Stockholm and Singapore schemes are enforced with ANPR cameras. The Netherlands are expecting to use GPS based technology with ANPR for enforcement.

Other Aspects

3.5.22 Discounts and exemptions to the charge can affect the level of impact achieved by a scheme. In the majority of cases these had not been considered in detail and the experience of other locations such as London and Stockholm were felt to be instrumental in shaping this. In New York, discounts would be considered for certain groups, such as low income households in areas reliant on the river bridges, to avoid social exclusion. Shanghai debated whether official government cars not paid for by the owner would be excluded from the charge in order for a scheme to be equitable, this was eventually discarded.

3.5.23 The use of Road Pricing as part of a wider scheme has varied in importance. In most cases there is some element attached to introducing the scheme focussing on highway infrastructure, public transport or other Travel Demand Management measures. These were pivotal to the London scheme and are likely to continue to be with any alteration to the current scheme.

3.5.24 The Netherlands does not expect to implement local Travel Demand Management measures or public transport improvements but is concentrating on wider infrastructure. This is the opposite of a national scheme in the UK where the focus is on Road Pricing as part of a wider package of measures incorporating Travel Demand Management and public transport improvements. The Netherlands is also considering a different approach to implementing its Road Pricing scheme. In order to raise funds to support the network prior to the main scheme an incremental approach is being taken where Travel Demand Management measures in the form of tolls will be accelerated in certain areas prior to a nationwide scheme. This has the

benefit of targeting congestion and raising awareness whilst technology improves sufficiently to allow a nationwide GPS scheme.

3.5.25 Many locations report that they expect to introduce traffic and public transport improvements but have not yet considered this in detail including: Helsinki; Genoa; Copenhagen; Cardiff; Auckland; Prague; New York; San Francisco; Seattle; and Shanghai. Copenhagen and Helsinki both intend to introduce Travel Demand Management measures but do not necessarily see them to be integral to the scheme, but as a wider requirement. Other cities have already started introducing other Travel Demand Management measures. Cardiff is introducing park-and-ride schemes and measures to meet walking and cycling strategies. Rome and Barcelona are mainly focussing on Travel Demand Management measures rather than Road Pricing per se. Prague has restricted zones in the city centre and is building the City's ring road to allow alternative routes when Road Pricing is introduced. Stockholm has already improved their public transport in advance of the completed trial.

Table 3.12 – Elements expected as part of Road Pricing Package

	General Transport Infrastructure	Local Travel Demand Management	Local Public Transport
Local Schemes			
England (Congestion TIF)		✓	✓
London		✓	✓
Cardiff		✓	✓
Rome		✓	
Genoa		✓	✓
Barcelona		✓	
Madrid		✓ (Not as part of Scheme)	
Copenhagen		✓ (Not as part of Scheme)	✓ (Not as part of Scheme)
Prague	✓		
Helsinki		✓	✓ (Not as part of Scheme)
Stockholm	✓	✓ (Completed for Trial)	✓ (Completed for Trial)
New York			✓
San Francisco		✓	✓
Seattle		✓	✓
Auckland		✓	✓
Shanghai		✓	✓
Hong Kong		✓	
National Schemes			
England		✓	✓
Netherlands	✓		

3.5.26 Some locations have investigated costs for implementing a scheme. These vary quite significantly and are likely to depend on the size of the scheme, technology used and whether costs for implementing the wider package are included. Cardiff estimate

costs of between £300million and £500million including associated Travel Demand Management measures. Auckland estimates costs at between NZ$730million and $930million (£260million - £330million). Hong Kong estimated costs at HK$1billion (£69million) and Shanghai estimate costs will be around RMB130million (£9million). These are relatively low compared to other schemes although is likely to be linked to the differences in the economy and a more recent awareness of costs.

3.5.27 To implement the Stockholm trial contractors were paid SEK3.8billion (£266million) which is comparable to the existing scheme in London where implementation costs were around £200million.

3.5.28 There are no estimates for costs of setting up a national scheme in the UK, and it is acknowledged that costs are likely to change considerably before the likely implementation date. However, the DfT's 2004 Road Pricing Feasibility Study has estimated that for 30 million vehicles the in-vehicle units alone could cost around £3 billion – noting that there would also be other significant implementation costs. In contrast, evidence from the planning of the Netherlands National Scheme gives an estimated total implementation cost of between 2 and 4 billion Euros (£1.2 - £2.4 billion) for a fleet of around 7 million vehicles.

3.6 Level of Awareness and Acceptance

3.6.1 With any large, new, innovative transport project comes a level of media coverage, awareness and support. In the case of Road Pricing views and opinions can vary, often depending on an individual or organisation's position and experience.

3.6.2 In the case study locations the amount of attention from different stakeholders and media sources and how that has reflected on the scheme has varied. In many cases there has been no formal consultation on opinions, although there is often a general awareness of how different sectors currently view Road Pricing schemes in their areas.

Table 3.13 – Level of Awareness and Acceptance

	Public Surveys	Public Support for Road Pricing	Consultation
Local Schemes			
London	✓	48% (Oct 2003 TfL Attitudinal Survey)	✓
Cardiff	(Intended by Council)	6% (Newspaper Poll)	
Rome			(Limited consultation on Restricted Zones)
Genoa	✓ (Not Recently)		
Barcelona	✓ (As part of PRIMA)		
Madrid			
Copenhagen	✓	68%	✓
Prague	✓ (Referendum	+30% (net support for 1 Euro	

	Public Surveys	Public Support for Road Pricing	Consultation
	Planned)	charge) -2.5% (net support for 5 Euro charge)	
Helsinki	✓	40% (2002 survey if road pricing should be implemented)	✓
Stockholm	✓	53% (2006 referendum)	
New York	✓ (Underway)		✓ (Underway)
San Francisco			
Seattle	✓ (As part of Trial)	+7% (Increase in agreement with Road Pricing)	✓
Auckland	✓ (Open Consultation results not available yet)		
Shanghai	✓	6% (2006 opinion poll)	
Hong Kong			
National Schemes			
England	✓	66% (DfT Road Pricing Survey 2004)	✓
Netherlands	✓	>50% (Reported by Ministry of Transport)	(Currently Only Through Committee)

Awareness

3.6.3 Outside of the current London scheme Stockholm has received by far the most media and public attention which has provided an ongoing commentary to those with an interest in how the scheme progressed. In comparison, there has been limited attention or public awareness of any potential development to the London scheme.

3.6.4 Judging the level of public awareness of emerging schemes is difficult to assess. Evidence gathered in this study would suggest that public awareness of local Road Pricing development is considered to be high in San Francisco, Prague, Copenhagen, Cardiff, Netherlands, New York and also Helsinki. In San Francisco and New York, although awareness is considered to be quite high, knowledge levels surrounding the scheme are not. If people are not aware of how the scheme will operate and consequently how they will be affected it is most likely that public opinion will be more negative.

3.6.5 This was the case in Hong Kong where although Road Pricing was known about there was very little information provided or support canvassed resulting in opposition to the scheme.

3.6.6 In Seattle, Rome, Barcelona, Auckland and Genoa it is felt that public awareness of Road Pricing is generally low, although in Seattle and Rome it is felt there is already an awareness and acceptance of tolling, which could improve support for Road Pricing.

3.6.7 What is seen to be the level of awareness does not always tally with the amount of development or research that has been undertaken. For example Genoa and Rome have both been active partners in EC funded projects on sustainable travel closely related to Road Pricing. It might have been expected that such close alignment with a project would spark debate over possible implementation yet in these locations that is not considered to be the case.

3.6.8 The type of media coverage received can have an effect on the progress of schemes. In New York media coverage has proved to be very influential where in the past negative media coverage has seen schemes having been dismissed by politicians not wishing to be associated with them. Press coverage reviewed on schemes in Auckland, Prague, Seattle, Cardiff, Netherlands as well as Stockholm in the main has provided an apparently balanced picture reporting the facts of what has been undertaken and the background to Road Pricing as well as a mixture of views from politicians, public and other stakeholders, rather than highlighting one angle or particular sides.

3.6.9 Copenhagen co-ordinated their own press around media attention related to the Stockholm trial and referendum. A conference was produced to increase awareness locally and around the world at a time when Stockholm was generally a positive influence for Road Pricing.

Public Acceptability

3.6.10 Positive public opinion can be instrumental in implementing new schemes, such as is the case in Stockholm where a referendum led the way in influencing the political decision to continue with the Road Pricing trial on a permanent basis. Despite this in most of the cases researched there had been little formal soliciting of public opinion.

3.6.11 Gauging public acceptability from available market research information is also difficult, since it critically depends on how the questions are framed.

3.6.12 Experience in cities that have been operating schemes has showed that public opinion has improved over time. For example in Stockholm those in favour grew from 40% to 52%, whilst in London support rose from 40% to 57% after the implementation of the scheme. The general principle that support increases after a scheme is implemented was mentioned in some cases as the reason for not researching this before any plans were more clearly developed. This is reflected in Genoa and Auckland where public opinion has not been canvassed although it is felt to be improving and is expected to reflect the situation in London where, after implementation, there was more support than opposition.

3.6.13 In addition, public acceptability varies by area within towns/cities. As discussed above in relation to Stockholm, while the results of the recent referendum showed support for continuing with the Road Pricing scheme, this varied according to area - with Stockholm City supporting the scheme and the suburbs not supporting the scheme.

3.6.14 In Seattle and the Netherlands there is public support to introduce a way of paying for road use that is fairer than the current system. Although a similar arrangement is being considered for a national English scheme, the benefit of this has not been clearly communicated, and therefore receives little support.

3.6.15 In Shanghai the 'fairness' of the scheme has focused on whether official cars, paid for by the Government, were to be charged. Despite a call for them to be exempt it is now considered unlikely that will be the case.

3.6.16 Where public opinion has already been canvassed on Road Pricing in Shanghai it is reflective of the expected negative opinion where 91% of respondents said they did not want it. In Helsinki 60% of respondents opposed Road Pricing and most believed public transport should be funded through general taxes. In Cardiff opinion was also against Road Pricing, although in this case the question did not fully reflect the emerging scheme. Cardiff is therefore trying to raise the profile of Road Pricing and encourage public debate. In New York, where there is generally considered to be opposition to schemes, research is underway to gauge public opinion and understand how acceptance could be improved.

3.6.17 The public is largely supportive of Road Pricing in Netherlands (50%+) and Seattle where the schemes are considered to improve fairness. The trial in Seattle was largely reported as being for fact finding purposes and not a precursor of any imminent scheme. In Prague there is support for a scheme focused on the historic city core, but only on the basis of a very low level of charge.

3.6.18 In Copenhagen support has been measured to be very high at 68%, which is considered to be reflective of the rest of the country. It is not clear why there is so much support for a scheme here compared to other areas, but it could be related to their proximity to Stockholm and/or the way in which the question was worded. However Copenhagen do acknowledge that support is unlikely to be high amongst certain populations, such as car drivers.

3.7 Consultation

3.7.1 Consultation can be a difficult but necessary process in developing Road Pricing. Different sectors can have different views, for example environmental groups can be supportive whilst business groups may be concerned about loss of business due to change in travel behaviour. Again, because of the lack of development in Road Pricing schemes there has not been extensive formal consultation and in many cases more is expected to be undertaken later in the process.

3.7.2 London has undertaken consultation at key stages of the schemes variation, and would be obliged to continue to do if the scheme were to be changed in relation to retendering. As a result of ongoing consultation various aspects of the charge have been altered to the request of stakeholders. For example the charging hours are being changed to end at 6pm as of February 2007 to minimise any effect on the tourist and leisure industry.

3.7.3 The ultimate form of consultation could be said to be a referendum as was the case in Stockholm and is proposed in Prague. However these will tend to be on fully developed schemes and there is a strong case for involving stakeholders from early

development to help shape the scheme. This can help gain acceptability and progress implementation of schemes. This has been the case in the Netherlands where stakeholder groups are involved in developing the scheme's characteristics.

3.7.4 In Auckland an open consultation was undertaken by the Ministry of Transport. Only around 1,000 submissions were received which is considered reflective of the low level of awareness. In New York although there is no scheme proposed the views of some stakeholders are currently being sought and a number of stakeholder groups have been active in debating proposals. Helsinki is another location which has undertaken a lot of consultation with local and regional authorities, politicians and the Chamber of Commerce and road-user groups.

3.7.5 Seattle, San Francisco and Rome have only undertaken limited consultation, although along with Prague, Genoa and the Netherlands are expecting to do more when plans are further developed. This is with the exception of Rome where there are powers in place that can allow some Travel Demand Management measures to be implemented without additional formal consultation.

3.7.6 Businesses can be very powerful organisations in influencing how a scheme is progressed, and the sustainability of the economy is an important aim of the many schemes. In New York and the Netherlands businesses are generally supportive of Road Pricing proposals.

3.7.7 Businesses are less supportive in Auckland because of the view that Aucklanders are wedded to their cars and fears that associated Travel Demand Management could impact on businesses. Similar fears were expressed in Copenhagen. Helsinki businesses have a generally negative of Road Pricing, although as with public support this is considered to be improving.

3.7.8 In Seattle and Cardiff views of the business community are felt to be mixed. This is often considered to be as a result of their location within the city and proposed charging area and their size and number of employees.

4. Benchmarking Road Pricing Progress in the UK to the Rest of the World

4.1 Why Compare the UK to the Rest of the World

4.1.1 The UK would appear to be at the forefront of the continuing evolution and development of Road Pricing. At the same time this review has demonstrated Road Pricing is evolving rapidly and is now being considered as a potential Travel Demand Management (TDM) tool in many other towns, cities and countries across the world.

4.1.2 The Department for Transport (DfT) has committed heavily in terms of developing and funding research into Road Pricing in the UK both on a local and national level through projects such as DIRECTS, the former Charging Development Partnership and most recently the Transport Innovation Fund (TIF). Research and development, albeit on a smaller scale in most cases, is being carried out in many other worldwide locations.

4.1.3 Whilst worldwide levels of research activity and policy development of Road Pricing have notably increased this does not necessarily mean we will see a similar growth pattern in operational schemes in the next 5 -10 years. Through this study CfIT is seeking to understand where the Government's thinking on Road Pricing stands in relation to these worldwide locations, specifically in the development and implementation of charging in the UK. By gaining a better understanding of the key drivers behind Road Pricing development CfIT can advise of changes necessary to increase the chances of successfully delivering live schemes.

4.1.4 The remainder of this report combines the findings from the Phase 1 and Phase 2 reviews to highlight where it would appear the UK stands in terms of key issues for developing and implementing Road Pricing.

4.2 Degree of Interest in Road Pricing

4.2.1 The identification of locations where some form of Road Pricing scheme has recently or is currently being considered is unsurprisingly large. Although it is difficult to gauge, it would appear that a very much larger range of towns and cities now have Road Pricing on the agenda as a tool for addressing transport issues than even a few years ago. Moreover, the range of locations includes towns and cities in nearly every continent and of different sizes of urban area.

4.2.2 In the context of the UK, this growth in interest in Road Pricing is also evident with a far wider range of locations and sizes of urban areas now considering the role that Road Pricing could play in addressing transport problems and issues.

4.3 Current Status of Emerging Schemes

4.3.1 On the basis of the evidence gathered for this review, there are no new emerging schemes which are expected to be implemented imminently anywhere in the world.

Firm implementation plans are limited to changes to those schemes already identified in the Phase 1 review as operational plus, potentially, a trial scheme, as follows:

- London, with the western extension to the current Central London Charging scheme due to become operational in February 2007;
- Stockholm – which at the time of the Phase 1 review was being trialled and the subject of a referendum – and now at the time of writing a verbal commitment to the continued operation of the scheme has been made by the Swedish Prime Minister though this remains to be formally ratified. It is currently considered likely that the scheme will re-start in 2007; and
- Milan – where it has recently been announced that a trial scheme focused on the city centre is to be introduced in early 2007, though full details are limited.

4.3.2 Schemes identified in other locations would all appear to be some way off implementation with their status ranging from very outline concept – the vast majority of emerging schemes identified – through to a broadly defined implementation plan even though, in some instances, aspirational implementation timescales seem bold. Additionally, none of the emerging proposals appear to have the necessary legislative frameworks in place to enable them to be implemented imminently.

4.3.3 There is therefore a substantial gap between the status of existing operational Road Pricing schemes and the sizeable pack of emerging schemes.

4.3.4 This gap is evident in the development of Road Pricing schemes in the UK . As discussed further below, the UK is more advanced in having developed legislative and policy frameworks than other locations, but local schemes being developed under TIF are currently only at an outline planning stage.

4.3.5 As noted in the Phase 1 review, the presence of existing schemes is important in demonstrating the case for and improving acceptance of Road Pricing and thereby improves the prospects of other schemes being implemented. However, while the UK has clear advantages over many other locations in developing Road Pricing schemes because of the experience of schemes operating in London and Durham and the emergence of TIF, there is no evidence to suggest that the UK is forging ahead in delivering new Road Pricing schemes compared with the rest of the world. Equally, there is no evidence to suggest that other countries and locations are themselves forging ahead with Road Pricing at a pace faster than that in the UK.

4.3.6 The only possible exception to this is the Netherlands which is at a much more advanced level in progressing national Road Pricing than the UK. An Implementation Plan has been published which outlines a two stage plan, with a national scheme that could possibly be in place around 2012. There is, though, no firm commitment to implement the scheme. It is also noted that the scale of a national scheme in the Netherlands is very much smaller than that for a national scheme covering the UK. Additionally, it would appear that the planning of the national Road Pricing scheme in the Netherlands has suppressed the development of local schemes – such as those that at one stage were being considered in Rotterdam and The Hague.

4.3.7 Of the remaining case studies there are only five cities with emerging schemes that have been identified as having declared planned implementation timescales, as follows:

- Prague - 2010;
- Shanghai – 2008-2010;
- Auckland 2015-2020;
- Cardiff - 2010; and
- Copenhagen – 2009.

4.3.8 However, as the more detailed case study descriptions show none of these locations actually have firm commitments to introducing Road Pricing.

4.3.9 Currently, with the exception of the western extension of the London scheme, no emerging schemes in England have committed to an expected implementation date, though it is anticipated that schemes delivered through the Congestion TIF process would be in place by 2012.

4.4 Policy Framework

4.4.1 The research has shown that the policies that frame the development and implementation of Road Pricing schemes in different countries are structured in very different ways. Clearly this is influenced by the institutional and policy frameworks that exist in different locations, with different balances of national, regional and local powers and responsibilities. Comparing the policy frameworks in detail reflects the institutional arrangements in the countries concerned.

4.4.2 However, the evidence from the case studies does show that the majority of the emerging Road Pricing schemes are framed by a local policy rather than a national policy. There are cases where more than one location within a country is considering Road Pricing, for example as in the USA and Italy, although there is no current national policy framework for Road Pricing.

4.4.3 Within the UK, a national policy framework does exist to promote the development and eventual implementation of local Road Pricing schemes. Moreover, the national framework is, to an extent, then embedded within regional and local policies and plans to explore and develop Road Pricing schemes. This can be contrasted with the majority of the emerging world Road Pricing schemes that are framed by local and/or regional policy but not national policy.

4.4.4 Again, the exception to this broad conclusion is the Netherlands, where the policy framework for a national scheme is set at a national level. In the UK, it is noted that there is no clear policy commitment to implement a national scheme.

4.4.5 Across the case studies it is reasonable to conclude that the English national policy framework to develop and implement Road Pricing schemes at a local level in a way that addresses issues of interoperability between locations is unique.

4.4.6 However, the policy frameworks identified in the case studies do not appear to imply a commitment to proceed with Road Pricing schemes, merely an intention to consider schemes. The exception to this is the two schemes identified in Phase 1, London and Stockholm. London is committed to the western extension. As noted

above, subsequent to the referendum on the Stockholm scheme, a commitment in principle to the continued operation of the scheme has been made. In the context of local and national Road Pricing schemes in the UK there is also no expressed commitment to proceed. Overall, this position appears to reflect the need for Road Pricing schemes to demonstrate that they can meet key criteria and deliver on objectives before any firm commitment is given. Since all bar the London and Stockholm schemes are still at the planning stage this lack of firm commitment is not, therefore, surprising.

4.4.7 It is, however, apparent from all the case studies for locations that are advancing local Road Pricing schemes that, in general, responsibility for planning and – subject in most cases to suitable enabling legislation - delivery of the scheme lies with a single authority. Contrasting this with emerging schemes in England suggests that many of the schemes that may emerge from authorities granted TIF pump-priming funding will need to cover multiple planning authorities. Schemes that require collaboration from a number of adjacent local authorities would seem – not surprisingly – harder to deliver. This is the case in locations like Seattle and Helsinki and could also prove to be a barrier in some parts of England, such as the West Midlands or Greater Manchester.

4.4.8 There is also a wider issue in terms of control and deliverability of complementary public transport measures that may be critical to the acceptability and implementation of Road Pricing. Most of the other authorities in locations worldwide that are considering Road Pricing schemes have more direct control and influence over their public transport systems than do the authorities currently progressing local Road Pricing schemes in England – excluding London.

4.4.9 In terms of interoperability the UK is in a strong position by developing a framework for local schemes in England to operate under. This is intended to enhance usability and interoperability and act as precursors to a national scheme. Norway is the only other location that has operated a number of local schemes in a similar way.

4.4.10 Funding for developing and planning schemes is important in many of the locations examined. The DfT is providing substantial funding towards developing local schemes in England through TIF and this must be seen as a major positive in moving towards scheme implementation.

4.5 Legislative Framework

4.5.1 In all the emerging schemes examined, new legislative powers are still required in order to implement Road Pricing schemes. The extent and nature of legislation varies and, within the context of the research exercise, it has not been possible to examine the nature of the powers that would be required in any detail.

4.5.2 Even the Netherlands national scheme – which in planning terms appears one of the more advanced of the schemes considered - still requires legislation to enable it to be implemented.

4.5.3 In the UK, implementation of a national scheme would still require new legislation. However, in the UK the Transport Act 2000 does provide local authorities with the necessary powers to implement Road Pricing schemes – though subject to Secretary of State approval and with limits of the time horizons that authorities have in retaining scheme revenues. In this respect the ability to implement emerging local Road Pricing schemes in England is substantially greater than in other locations worldwide.

4.6 Objectives of Road Pricing

4.6.1 The evidence from the case studies shows that most of the emerging Road Pricing schemes have multiple objectives.

4.6.2 Unsurprisingly tackling congestion is a primary objective in all but one of the cases (Rome). The majority of the emerging schemes also explicitly define objectives to tackle problems of poor local air quality and address climate change. A smaller set also state as an objective the need to sustain their economies and improve the urban environment.

4.6.3 Eight of the case study locations also explicitly identify using Road Pricing to raise funds to reinvest in transport. This includes Stockholm, for example, where the revenue raised by Road Pricing has been linked to the implementation of a highway scheme.

4.6.4 Only two of the case studies have evidence that one of their objectives is to use Road Pricing revenues to modify the current means of road use taxation, the Seattle local scheme and the Netherlands national scheme.

4.6.5 In contrast, Road Pricing in the UK has the very clear primary objective of tackling congestion. The DfT's January 2006 TIF guidance to local authorities, states that TIF is focused on directing resources towards the achievement of two very high priority key objectives: tackling congestion and improving productivity. The Congestion TIF schemes that are being pursued by a number of local authorities are clearly focused on achieving the demand management objectives to tackle congestion that were set out in the Government's 2004 Future of Transport White Paper.

4.6.6 While congestion clearly does impact on emissions and the economy this very exclusive focus on reducing congestion as the primary objective does make the approach to local Road Pricing schemes in the UK (outside London) stand out from the emerging schemes elsewhere in the world.

4.6.7 While there is recognition that Road Pricing schemes can raise revenue to reinvest in the transport system there is, in the UK, no explicit recognition of this as an objective of introducing Road Pricing. This differs from a number of locations – such as Cardiff, Prague, Stockholm and Auckland - which explicitly identify raising revenue as an objective. Trondheim in the Phase 1 review provides an example of a completely different objective linked to raising revenue to fund specific infrastructure projects. As work now progresses on full implementation of the Stockholm scheme it appears that a similar link may be made, perhaps to increase the support for the scheme in the areas surrounding the city.

4.6.8 However, one of the findings from Phase 1 was that the focus of schemes on a single, clear objective was important in gaining public acceptability – for example as in the case of the London scheme. Phase 2 of the review does raise the possibility that a more balanced approach may be to recognise that Road Pricing can serve a number of objectives, although this may risk confusing the public and hampering scheme acceptance.

4.7 Revenue from Charging

4.7.1 Given that most of the emerging schemes are at an early stage of development it is clear that details of how revenues derived from Road Pricing might be used are not firm at this stage.

4.7.2 However, it is clear that none of the emerging local Road Pricing schemes are expecting to be revenue or fiscally neutral. All schemes expect to generate net revenues from charging.

4.7.3 There is evidence that the Netherlands national scheme would seek to modify the taxation regime to shift the basis of charging for road use from car ownership to car use. In the UK, the DfT's 2004 Feasibility Study of Road Pricing in the UK does acknowledge that one option for a national scheme is to have a system with some form of revenue neutrality that does not gain additional revenue from drivers but return revenues in the form of reductions in fuel duty or vehicle excise duty. The evidence from the review is that this is not an option being considered other than in the Netherlands. However, the Netherlands scheme would still expect to raise revenues for reinvestment in transport so would not be revenue neutral.

4.7.4 Across the emerging Road Pricing schemes the vast majority of the case studies plan to use net revenues from charging to improve local transport in the urban area within which the Road Pricing scheme would operate. Again, the details of how such revenues would be used are not well developed in most instances. Certain locations do propose to utilise revenues to fund specific infrastructure projects.

4.7.5 The emerging Road Pricing schemes in England are considered to be very similar. Although the DfT's TIF guidance is not explicit on the use of net revenues there appears to be a working assumption that the Road Pricing schemes will raise net revenues to reinvest in the local transport systems which will include substantial infrastructure projects. However, it is clear that the emerging Road Pricing schemes in England are, too, at a very early stage of establishing details of how revenue will be used. Based on the evidence of London and various attitudinal surveys on the acceptability of Road Pricing, establishing the link between Road Pricing revenues and transport investment is key to gaining support for schemes.

4.8 Type of Scheme

4.8.1 Given that the vast majority of the emerging Road Pricing schemes are, as discussed above, at an early stage of planning, is not surprising that there are few firm commitments to scheme type in terms of charging area, charging period and technology. Nevertheless, the concepts being considered, and certain scheme

design parameters being discussed, do provide a useful benchmark against which to assess scheme development in the UK.

4.8.2 First, as already noted, only one of the emerging schemes – that in the Netherlands – is national. The remainder are all local schemes which are driven from a bottom-up local level outside any form of national Road Pricing framework. In the UK, it is reasonable to conclude that local schemes are focused on local transport issues but framed by national policy and funding.

4.8.3 There is no definitive scheme type yet established for the Netherlands national Road Pricing scheme though the expectation is that it will comprise a distance-based charge using a GPS-based system combined with ANPR. To an extent this mirrors the position in the UK where there is, too, no firm idea of charging type and system other than a broad recognition that some form of distance-based charge is required. However, the evidence shows that the Netherlands is actively researching and considering scheme specifications with a view to being able to take political decisions on scheme type in 2007. The Netherlands is also linking technology availability and cost to its decision-making process on when to implement Road Pricing by monitoring system costs.

4.8.4 At the local level, the emerging Road Pricing schemes identified do represent a broad spectrum of different locations and issues. However, all the locations identified are large cities – the smallest of the case study locations in population terms being Cardiff. It is noted that there are few smaller towns/cities actively considering Road Pricing in contrast to England where locations such as Cambridge and Shrewsbury are developing Road Pricing schemes through TIF, and other locations such as Norwich have now also received TIF pump-priming funding. This may reflect the UK as being ahead of the world in considering Road Pricing for smaller urban areas, or could equally reflect the rest of the world as only considering Road Pricing an option for major urban areas. The only parallel with the UK in this respect is Norway where, as identified in Phase 1, Road Pricing options have been applied in locations such as Trondheim and Bergen.

4.8.5 Considering scheme types, most of the local schemes are considering cordon or area-licence solutions. In all instances where area-licence solutions are being considered so also are cordon-based solutions. Only three of the case studies identify distance-based solutions, including London, as a long-term option. Broadly, this is consistent with the approach being adopted by the authorities in the UK developing schemes through TIF; looking at area-licence and cordon schemes but with distance-based charging as a longer term option.

4.8.6 It is noticeable from the case studies that the level of charge being considered in the majority of the locations is low relative to the levels charged in London and conceived in many of the studies on Road Pricing options in the UK. It is difficult to draw too many conclusions from this since charges need to be seen alongside the motoring costs prevalent in each case study area. It may also, though, represent that most locations are still at an early stage of scheme development and that the charge levels quoted in the public domain are low because of the sensitivity of this issue. It is also noted that Road Pricing schemes would be expected to be optimised after introduction – so comparing existing schemes with planned schemes may be misleading.

4.9 Road Pricing and Other Measures

4.9.1 The evidence from the case studies overwhelmingly indicates that Road Pricing is being considered alongside a package of other measures to improve the transport system. For the vast majority of case studies this explicitly includes public transport. However, in certain locations measures include other demand management and highway network schemes. Broadly the approach being followed on TIF in the UK is consistent with this, though with the DfT's guidance giving emphasis on improving public transport.

4.10 Awareness and Acceptability

4.10.1 The experience of London and now Stockholm clearly shows the importance of public and stakeholder acceptability in successfully implementing Road Pricing schemes. Measuring the extent of awareness and support of schemes examined by the case studies is difficult and the evidence inconclusive. Certainly there is no evidence to suggest that there is overwhelming support for Road Pricing in any of the locations examined or that any of these locations are more advanced than the UK. The possible exception to this is Stockholm, where the results of the recent referendum do indicate overall support for the Road Pricing scheme, albeit marginal.

4.10.2 At the national level there is some evidence to suggest that the continuous stakeholder engagement that has been used in developing the Netherlands scheme has increased awareness and possibly improved acceptability. The UK has a Liaison Group for local authorities developing road pricing proposals to share experience with one another and to maintain a dialogue with DfT.

4.11 Overall Conclusions

4.11.1 This review has identified the status of emerging Road Pricing schemes from around the world. It is clear that a wide range of locations worldwide are now considering implementing local Road Pricing schemes, but only the Netherlands and the UK are looking at national schemes. However, the evidence indicates that the majority are at very early planning stages with very few having clear specifications of schemes. Other than locations that are extending or modifying schemes already in existence or proposing trials – there are no committed implementation plans across the sites reviewed. The UK, with two operational schemes, has a clear advantage in demonstrating the benefits and feasibility of Road Pricing and gaining public acceptance.

4.11.2 The evidence also indicates that most locations are developing local schemes on a bottom-up basis, not framed by wider national policy or backed up by legislation that would enable Road Pricing to be implemented. The exception to this is the Netherlands which does have a national framework supporting the development of its national scheme.

4.11.3 In contrast, the UK does have a national policy framework that is guiding the development of interoperable local Road Pricing schemes and does have legislation that would enable Road Pricing schemes to be implemented. Importantly, the longer-term aspiration for a national scheme is not hindering the progression of local

schemes. The Department for Transport is also providing funding to enable the development of Road Pricing schemes in the UK.

4.11.4 In respect of scheme objectives it is clear that the primary focus of Road Pricing in the UK is addressing problems of congestion, while the majority of schemes worldwide explicitly seek to achieve a wider range of objectives. As Phase 1 concluded, this single-objective focus was important in gaining public acceptability for schemes that have been implemented but there may now be a case for expanding the stated range of objectives Road Pricing can address.

4.11.5 In most other respects local Road Pricing schemes in the UK outside London are at a similar stage of planning and development to those elsewhere in the world and thinking on scheme design and technology in the UK appears to be consistent with that of emerging Road Pricing schemes worldwide. However, the planning of a national scheme in the UK appears to be behind that in the Netherlands where, although the implementation envisaged in 2012 has significant caveats, progress is being made with the identification of options and engagement with stakeholders.