The feasibility of implementing a congestion charge on the Halifax Peninsula: filling the 'Missing Link' of implementation

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The Feasibility of Implementing a Congestion Charge on the Halifax Peninsula:

Filling the "Missing Link" of Implementation

Keywords: traffic congestion, congestion charge, user fees, policy implementation, Halifax

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Abstract

Congestion charges pose a policy dilemma due to the balance that must be made between the management of a quasi public good along with the correction of negative externalities against the needs of economic, demographic, and urban growth along with citizen acceptance. The literature provides detailed rationales for congestion charges but minimal consideration on how to implement such charges once the decision to proceed has been made. The purpose of this article is to expose some of the technical and administrative issues that come with enacting and implementing congestion charges. The Halifax Peninsula is used as a case study to illuminate the topic. Drawing on this case, we spell out eleven *ex ante* implementation criteria that can be used to assess implementation considerations in any given congestion charge context. In so doing, we argue that context-specific factors must also be recognized and accommodated by policy and decision makers if congestion charge policy is to present a feasible, and palatable, choice.

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Introduction

Congestion charging, a user fee charged to motorists for travelling on certain roadways in peak periods, has been advocated by economists for nearly a century (Knight, 1924; Pigou, 1920) as an economically efficient solution to the traffic congestion problem facing many cities. London, Singapore, Stockholm, Milan are some jurisdictions to have implemented such charges and provide helpful success stories that have attracted the attention of scholars and practitioners intent on discovering a positive implementation path. New York, Edinburgh, Hong Kong, and Manchester, on the other hand, provide examples of cities that have rejected implementing congestion charging after public consultations including referendums. These failed cases demonstrate that far from being a mundane policy arena, congestion charges represent a controversial issue relevant to the pressures of modern urban planning: the demands of the modern city are forcing many governments to consider the issue and decide whether or not to move ahead with congestion charges and, if so, how.

Congestion charges pose a policy dilemma due to the balance that must be made between the management of a quasi public good (i.e. transport corridors) along with the correction of negative externalities (i.e. travel delays and lost productivity; greenhouse gas emissions from idling; accidents; and wear and tear on road infrastructure) against the needs of economic, demographic and urban growth along with citizen acceptance. The literature (e.g. Banister, 2003; Blythe, 2005; Glaister & Graham, 2006; Lindsey, 2007; Maddison et al., 1996; Newbery, 1988; Safirova, Houde, Lipman, Harrington, & Bagliano, 2006; Sandholm, 2002; Stopher, 2004; Vickrey, 1963; Yin & Lawphongpanich, 2006) provides a detailed rationale for congestion charges but consideration as to how to implement such charge once the political decision to proceed has been made has only recently begun to be discussed in the literature. The purpose of this article is to explore key technical and administrative issues that present implementation challenges. In doing so, we bring together economic,

policy, legal, and public administration considerations that have traditionally been separated in the literature.

The Halifax Peninsula is used as a case study, detailing the context and specific elements of its congestion problem, to illuminate the topic. We have focused on the depth of detail that is achievable through a single case study analysis (Yin, 2008) to extract implementation lessons that can be investigated further and more widely applied. Why Halifax? Halifax Regional Municipality (HRM) faces serious traffic congestion[1] on the roads leading onto, on, and away from the Peninsula, the economic hub of HRM, during peak commuting times. As a result, HRM officials have been examining policies and actions designed to ease traffic congestion in this area, including a congestion charge. This case provides a classic congestion charge scenario that lends itself to scrutiny for two reasons. First, HRM is constrained by addressing the problem through new road infrastructure. Second, projected urban growth and development in HRM will only serve to exacerbate congestion.

Drawing on the HRM case, we expound eleven implementation criteria, with particular regard to technical and administrative feasibility, that can be used to assess implementation considerations in any given congestion charge context. In so doing, we argue that context-specific factors must also be recognized and accommodated by policy and decision makers if congestion charge policy is to present a feasible, and palatable, choice. Halifax provides a helpful example that offers *ex ante* implementation lessons applicable not just to other jurisdictions contemplating congestion charge regimes but also to jurisdictions that have already implemented congestion charges and may be willing to undergo learning assessments of the successes and challenges associated with implementation of their regime. The unique contribution of our analysis is that we have simultaneously developed and applied a 'smart practice' (Bardach, 1998, 2005) guide on ex ante implementation issues associated with congestion

charging by melding public administration, public policy, law, and economic issues and literature. The approach and process outlined in this paper parallels the emphasis in recent contributions addressing the technical and administrative issues involved in implementing tax reforms (e.g. Bahl & Bird, 2008; Bird, 2009; Rao & Bird, 2010), including the fact that fiscal policy is "path-dependent and context-specific…[and] politics…deserves close attention by those interested in improving tax policy" (Bird, 2009, 12).

Literature Review

Some existing congestion charge implementation literature must be acknowledged. Albalate and Bel (2009) use experience from cities[2] that have implemented the congestion charge to explore lessons of success and failure but they focus only on: (i) fee structure and operational technology; (ii) revenue uses and investments; and (iii) political impacts. This work provides important factors that define congestion charge policy implementation, but fails to detail other administrative components of the implementation challenge.

Some of these issues are addressed in Gaunt, Rye, and Ison (2006) and Rye, Gaunt, and Ison (2008) who outline reasons behind the 2005 Edinburgh "no" referendum vote against congestion charging. They argue that negative press coverage directly influenced community perceptions, highlighting the important distinction between *consultation* and *promotion* of the policy unaccounted for by policymakers. Implementers focused on consulting with the community at the expense of communicating policy rationale. As a result, policymakers failed to capitalize on the positive economic rationales for the charge. In fact, community and political sentiment for congestion charging is said to be "inversely proportional" to the consensus of support among economists regarding its desirability (De Palma, Marcucci, Nisanen, & Wieland, 2005); but how the issue is framed can turn this

proportionality on its head (Albalate & Bel, 2009). Albalate and Bel (2009, 964) suggest if the revenue from congestion charging can be framed as being invested back into the majority's welfare, it helps make the project politically feasible and increases community acceptance. The lack of clear communication regarding congestion charge functionality contributed to the public's disillusion in Edinburgh. If congestion charging implementation is explained clearly to the public, Rye et al. (2008) suggest it can contribute to positive implementation.

Rye et al. (2008) also suggest agreement on objectives and the presence of a political champion were lacking in the Edinburgh case and that this led directly to the choice of a referendum; a political tool that more often than not spells doom for a policy option before it progresses to the vote. Leape (2006), who examines the success of London congestion charging policy, explains that Mayor Ken Livingstone's champion status for congestion charging was a critical force behind London's successful uptake and implementation. The lack of a centralized administrative agency for implementation, on the other hand, created disaster in the Edinburgh case, a point Gaunt et al. (2006) argue is generalizable across other congestion charging contexts.

While much of the existing literature focuses on *ex post* implementation regimes, literature applying these lessons to cities that are, or should, consider congestion charges is limited. Lindsey (2007, 2008) has elaborated on various elements of the implementation dimension to congestion charging using three cases (Toronto, Montreal, and Vancouver) that could implement a congestion charge but have not yet. He addresses a few of the elements of implementation that we identify, but notes his work "does not identify an optimal implementation path for any city, let alone for Canada; its focus is limited to determining how road pricing might be introduced in the next few years using established technologies" (Lindsey, 2008, 245).

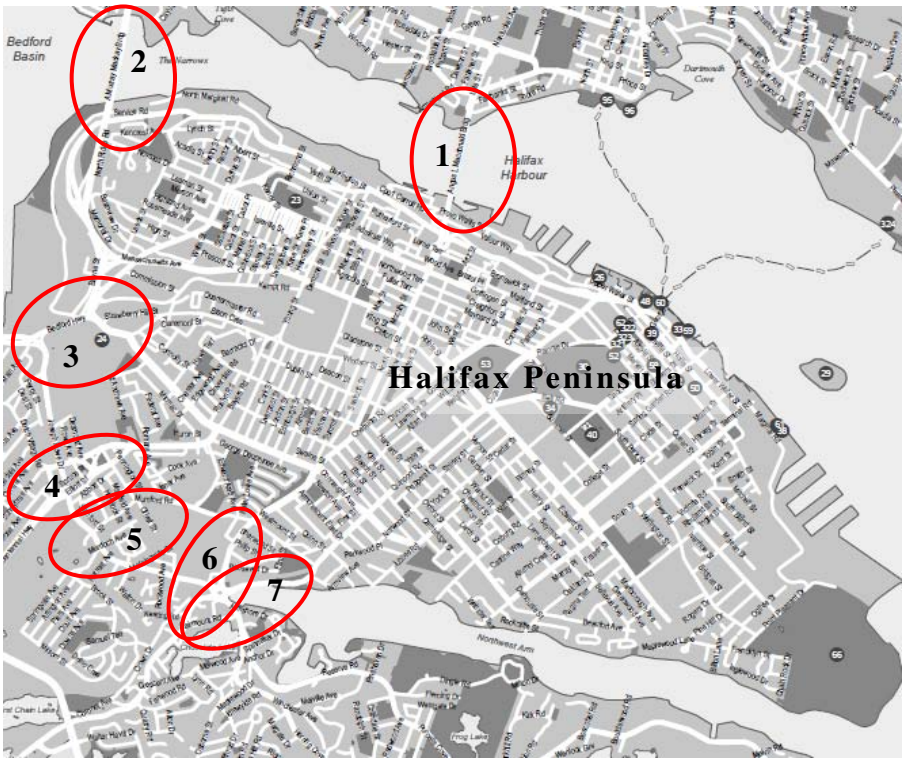
This survey suggests that while congestion charge implementation has begun to be explored, much is still missing from the current analysis of implementation factors relevant to policy development. The significance of implementation for any policy, let alone congestion charges, must not be underrated. Authors across public policy disciplines continue to be united in their conclusion that implementation remains "the missing link" since the tagline was coined by Hargrove in 1975 (Robichau & Lynn, 2009; Hill & Hupe, 2009): Pressman and Wildavsky (1973) bemoaned the lack of an implementation focus; Gunn's (1978) seminal—if criticized—'top-down' approach to 'perfect' implementation endures as a dominant model highlighting the challenges of achieving successful policy implementation; and, Pal (2009), suggests "policy is initially nothing more than ideas or conceptualizations, while implementation is the specific needs of execution and elaboration in practice" (241). The missing link dilemma associated with implementation has also begun to be mirrored in the tax policy literature, with Bird (2009) stating that good fiscal policy planning and formulation "pays close attention to detail and implementation" (31).

Halifax Regional Municipality & the Halifax Peninsula

HRM is the urban centre of the maritime province of Nova Scotia. It has approximately 150 km of shoreline comprised of numerous inlets and the Halifax Peninsula is formed by one such inlet. The Peninsula is 3.3 km wide, 7.5 km in length, and has a population of approximately 72,000 (19 per cent of HRM's population) (Government of Nova Scotia, n.d.). The Peninsula, while small geographically and demographically, is considered to be the region's cultural, historical, educational, political, and economic centre, thereby making efficient access to the area a necessity. However, the geography combined with commuting patterns has resulted in the Peninsula becoming heavily congested during weekday morning and evening commutes.

Vehicle access to the Peninsula is constrained due to limited road options. As shown in Figure 1, the Macdonald Bridge (1), the MacKay Bridge (2), Bedford Highway / Kempt Road (3), Bayers Road (4), Mumford Road (5), Chebucto Road (6), and Quinpool Road (7), are the only road access points. Most of these seven roads are one or two lanes so when a traffic incident happens there are long queues, slower speeds, and increased travel times. The building of new—or the expansion of existing—road infrastructure is constrained by land costs, space, and public opposition yielding limited opportunity to address congestion through additional road infrastructure.

Figure 1: Seven Access Points to Halifax Peninsula



Source: Halifax Regional Municipality (2009)

Several factors shape HRM commuting patterns. First, nearly 40 per cent (80,000) of the jobs in HRM are located on the Peninsula (McCormick Rankin Corporation, 2008, 4), yet less than 20 per cent of the

population lives there, resulting in many people commuting to the Peninsula daily for work. Haligonians are highly reliant on their cars for commuting purposes with "65 per cent of the working population in HRM commut[ing] to work using their car on a daily basis" (Statistics Canada, 2008, 27). Settlement patterns suggest the congestion problem will only worsen as most of the region's population growth is expected to occur off the Peninsula and into the suburbs, commuter shed and rural areas (McCormick Rankin Corporation, 2008). Further, employment growth on the Peninsula, as well as Central Dartmouth and Dartmouth North, is expected to increase more than in any other area in HRM (McCormick Rankin Corporation, 2008, 12).

Second, the Port of Halifax and the reliance of the Peninsula as a strategic transportation centre compound the Peninsula's traffic congestion. The Port of Halifax, one of the largest deepwater ice-free ports in the world and one of the top three ports in Canada in terms of traffic, has two container terminals that generate "686 truck movements in and out of the south end container terminal each day" (MariNova Consulting Ltd., 2006, ii). These vehicles, which travel along the congested routes, serve to strain transportation infrastructure. The Atlantic Gateway initiative, which is expected to increase cargo container shipment and attract business investment into the Port, will further exacerbate traffic.

Third, public transit faces the same traffic congestion as private vehicles. The traffic congestion on access roads onto the Peninsula can "delay buses for up to 15 minutes in the peak hour" (HRM, 2008, 4), lowering the incentive to take public transit. In addition, while there are over 30 transit routes, most of those routes serve the urban region, leaving the suburban or rural areas underserved and contributing to high reliance on vehicle use. Halifax, therefore, faces a "chicken and egg" problem: public transit cannot be improved unless people stop using their cars as their main source of transport but people will not stop using their cars until public transit is improved.

The Peninsula's strategic importance, forecasted population growth and settlement pattern, places pressure on traffic planners to find viable policy solutions to address the traffic congestion problem. HRM has made congestion reduction a priority, acknowledging that "the current system is not sustainable . . . and the municipality must look at ways to improve public transit and encourage people to leave their cars at home" ("Better Transit," 2008, para. 8). HRM's (2006) approved 25-year Planning Strategy articulated a number of policies to encourage drivers to travel other than by vehicle to improve traffic congestion, including congestion charges designed "to provide a pricing signal to commuters that will trigger a market response…." (77-78).

The Eleven Implementation Criteria applied to Halifax Peninsula

We now turn to the implementation criteria that we propose should factor into the execution of congestion charging. These interconnected criteria need to be addressed simultaneously by governments should they wish to have a chance of success with the scheme. Because consideration of these implementation criteria may force policymakers to review and potentially reevaluate policy design, these criteria also possess characteristics worthy of design elements. We leave the specifics of classification to policymakers themselves; suffice to say these issues demand attention prior to taking any final decision to implement a congestion charging scheme.

Two outstanding issues must be mentioned upfront before the criteria are outlined. First, congestion charging policy should take place within a broader framework of city and urban planning including consideration of the type and style of city living that is desired for any particular jurisdiction where congestion charging poses a policy possibility. The forces surrounding inner city renewal can vary considerably from trying to service overpopulation demands, to trying to kick-start growth in the face of city decline. Without knowing the specifics of each case, we do not attempt to cover this issue in

this article but instead suggest the implementation criteria we detail furnish generalizable factors specific to congestion charging policy once the political decision has been made to press ahead with a congestion charging regime. Second, for efficiency and equity reasons congestion charges need to be embedded in a suite of accompanying policy measures, such as earmarking revenues for public transit service, reforming parking charges, and so on. The significance of implementing congestion charges as part of a suite of initiatives is stressed in Stockholm where it became clear that people are more positively inclined to congestion charging if such an approach takes place (Winslott-Hiselius, Brundell-Frej, Vagland, & Byström, 2009).

i) Jurisdictional Authority

Since traffic congestion is a local phenomenon, congestion charges are likely to be pursued by municipal governments, like HRM, rather than at the provincial/state or national level. As "creatures of the provinces," municipalities cannot legally do anything that has not been authorized through their enabling provincial legislation. For HRM, the relevant legislation is the *Halifax Regional Municipality Charter* (S.N.S 2008, c. 39). Section 102 provides the authority to establish user charges: "the Council may, by by-law, prescribe charges for the provision of services for persons who use or benefit from the service, on a basis to be set out in the by-law." Section 188(1)(e) also grants HRM the power to make by-laws related to transport and transport systems and as a consequence most roads within the boundaries of a municipality are owned by the municipality, with the exception of private roads, provincial highways and federal highways.

Examination of the enabling legislation indicates HRM is likely to have the jurisdictional authority to pursue a congestion charge without approval from or additional authorities granted by the province, provided the charge could be considered a user fee and the fee will only apply to municipal roads. We

consider the status of a congestion charge as a user fee and under what conditions in section (iii). Implicated roads are considered in the charging strategy discussed in section (vi). Regardless, it would be prudent for policymakers to carry out a detailed legal analysis prior to proceeding. It would also be wise for HRM consult with the province throughout implementation, particularly organizations such as: Service Nova Scotia and Municipal Relations; Transportation and Infrastructure Renewal; and the Strategic Joint Regional Transportation Planning Committee, which committee takes an integrated approach to transportation issues between the province and the municipality. This point is detailed in section (xi).

ii) Clear and agreed objectives

Decision makers need to be clear about why they have selected a congestion charge policy and to reflect this clarity into agreed, transparent objectives behind the decision. These objectives should then be used to structure policy design, as well as be communicated to the public to provide coherence to the entire scheme. As a general rule, the objectives behind congestion charging are often unstated, conflated, or misunderstood. In particular, opponents to congestion charges often levy accusations against implementers that the charge constitutes nothing more than a "tax grab".

In the case of HRM, the primary objective would not be to raise revenues but rather to reduce congestion by incentivizing individuals to use public and other alternative transit rather than their vehicles. Unlike road tolls, which are aimed at recouping road infrastructure costs (including maintenance and future investment in the road network), congestion charges are aimed at reducing vehicle use in heavily congested areas at heavily congested times. Traffic congestion is defined as a condition of traffic delay where the volume of vehicles attempting to access a road network exceeds road capacity.[3] In order to reduce the shortage, the price for using the road needs to be raised from zero

to some positive amount in order to reduce demand for road space back to the efficient level. Though some revenue will be generated, the main rationale for a congestion charge is to promote greater efficiency through the correction of a market failure created by the overconsumption of an underpriced good. The distinction between a road toll and a congestion charge needs to be made clear to decision makers, policy teams, and the public.

Transparency in, and understanding of, the objectives is important for policy design and implementation. Road pricing can be implemented for at least three purposes: congestion relief, reduction of other traffic-related externalities (e.g. the environment), and revenue generation. While all three purposes hold merit and may tempt governments to design a road pricing scheme that pursues all three, there is a danger the public will become confused by multiple objectives and trust in the scheme will be lost. For example, the added environmental goals in the case of the London congestion charge (when a 25£ charge was proposed for high-emission vehicles and exemptions for low-emission vehicles) became a problem. Similar problems emerged in Stockholm, when high-occupancy toll lanes allowed hybrids to use toll lanes for free. The benefits from considering environmental pricing into a congestion charge depend directly on the severity of the pollution. In HRM, an environmental goal is questionable since air quality in the area is generally good, even with the traffic congestion. As such, HRM should focus its policy on the main goal which is to reduce congestion. Whether reduced congestion should be measured in terms of traffic volume or travel speeds, however, remains debated. While reduced traffic volumes are easy to communicate and measure, travel speeds are a better indication of the efficiency gains from a congestion charge (Eliasson, 2008, 397).

iii) Is a congestion charge a user fee or a tax?

The objective of the congestion charge is also important for classifying the charge as a road toll, tax, or a user fee. Since economists call a congestion charge a Pigouvian tax[4], many assume it is a tax. This assumption may be misguided, as congestion charges can be considered as a form of user fee, depending on design. Determining whether or not a congestion charge is a tax or a user fee is important from an implementation standpoint since municipalities have the authority to impose user charges but cannot implement taxes beyond those granted to them within enabling legislation. Interestingly, detailed consideration of this issue has been overlooked in the congestion charge literature with the exception of Powell (2009).

HRM is limited to imposing property and deed taxes. This is unfortunate since the status quo has transportation infrastructure funded through property taxes, the level of which has no link to the consumption of the funded services. To expand its fiscal authorities to include the collection of a congestion tax, HRM would need to lobby the provincial government to have its enabling legislation modified which would not only set a potentially undesirable precedent in Nova Scotia and get lukewarm reception since provincial governments have traditionally been unenthusiastic in granting additional tax authorities to municipalities but may also result in decreased payments to Nova Scotia under the existing equalization program. Hence, there may be little political appetite in the province to allow HRM to implement a tax making the question of how to design the charge so that it is classified a user fee of paramount importance. If congestion charges can be considered user fees then pursuing the tax authority route may be an unnecessary complication.

As Bird and Tsiopoulos (1997) note "taxes are mandatory levies that are not related to any specific benefit or government services …[whereas user fees are] payments levied to recover the cost of a particular government service…" (38-39). Thus, a tax is a compulsory payment while a fee is paid only

when one seeks to consume the associated good or service on which the fee is levied. Since congestion charges are only imposed on individuals who seek to consume road space at peak times, they would appear to satisfy this basic criteria of a user fee. Unfortunately, other than this descriptive distinction, there are no hard and fast rules regarding what constitutes a valid user fee versus a tax but case law does provide some additional determining guidance.

As outlined in *Lawson* v. *Interior Tree Fruit and Vegetable Committee of Direction*, [1931] S.C.R. 357 (Supreme Court of Canada) at paragraph 10, a tax is: enforceable by law; levied by a public body; imposed under the authority of the legislature; and, intended for a public purpose. The final criterion is the most important that arises in case law. Saying that something is "intended for a public purpose" means the charge is a revenue-generating device. For example, in *Eurig Estate (Re)*., [1998] 2 S.C.R. 565 (Supreme Court of Canada) the court determined that a probate levy was a tax and not a user fee because the levy was used for the public purpose of defraying court administration costs in general and not simply to offset the costs of granting probate. This means for a charge to be considered a user fee, the purpose of the charge must be to defray or recover the costs of providing a service from those who benefit.

That is, the monies collected from a user fee cannot be deposited into general revenues to offset general expenditures, but instead must be earmarked and spent purposefully. This is important not only from an implementation perspective but also politically and economically. Politically, while governments may seek flexibility in the allocation of revenues generated from user charges, the palatability of such flexibility needs to be weighed against public perceptions and legal ramifications. Economically, public finance theory suggests that tax revenue should not be locked into any particular expenditure patterns because priorities change over time in unpredictable ways and earmarking

hampers effective budget control. That being said, earmarking user fees can be justified using the benefit-received principle and arguments of accountability (Bird & Tsiopoulos, 1997; Bird, 2009).

Another criterion that the courts have used in the past to distinguish a user fee from a tax is the size of the fee. As indicated by the court in *Eurig Estate (Re)*, [1998] 2 S.C.R. 565 (Supreme Court of Canada) at paragraph 3 "another factor that generally distinguishes a fee from a tax is that a nexus must exist between the quantum charged and the cost of the service provided in order for the levy to be constitutionally valid." That is, the fee charged cannot exceed the cost to government of providing the service. This criterion places a substantial burden on a government to establish a defensible charge. Fortunately, the court in *Eurig Estate (Re),* [1998] 2 S.C.R. 565 at paragraph 3 provided a caveat: "courts will not insist that fees correspond precisely to the cost of the relevant service. As long as a reasonable connection is shown [between the cost of the service provided and the amount charged], that will suffice."

These legal criteria suggest that in order for a congestion charge to be considered a user fee as opposed to a tax, the fee charged must be carefully developed and rationalized according to costs of congestion and that the monies collected be earmarked and dedicated to expenditures related to reducing congestion. Ironically, a well designed congestion charge tightly adheres to these principles leading to the conclusion that congestion charges are user fees.[5]

iv) Revenue uses

While the primary objective of congestion charging is not to produce revenue, the literature demonstrates that congestion charges can generate substantial revenues. There may be some desire in having the charge be revenue neutral, possibly by implementing a corresponding decrease in property

taxes or, perhaps more appropriately, a reduction in public transit fares. The ability to achieve this outcome is hampered by two features: (1) the constraints of designing a user fee noted in section (iii); and (2) expected revenue declines from the charge over the medium and long term as behaviour is modified. Pursuing a revenue neutrality objective in designing a user fee may be palatable politically and may ease the distributional effects; however, implementers will have to weigh this against the need for additional revenues in the short term to ensure the success of the congestion charge.

While a portion of the revenues generated from a charge will be required to administer and operate the charging system (see section (vii)), remaining revenues must be directed to specific expenditures related to the purpose of the congestion charge, as noted in section (iii). Congestion reduction expenditures aimed at increasing the supply of transit options through the construction of additional roads, bridges, and tunnels as well as improving road quality and infrastructure. These points are particularly relevant to Halifax given a recent report that suggested that due to traffic congestion and predicted population growth "there is still a need for a third crossing by 2026" (McCormick Rankin Corporation, 2008, 22). However, road construction is expensive and contentious and land costs and space constrain opportunities to address congestion on the Peninsula.[6] If the real objective of congestion charging is to get people out of their cars (i.e. reduce demand on existing infrastructure), it is essential there be viable alternatives.

v) Availability of alternative transport

As noted by Lindsey (2008), the case for a congestion charge rests on two factors: severe traffic that regularly imposes costs on motorists and the scope for commuters to modify their travel decisions. As such, a jurisdiction should not invoke a congestion charge without first giving serious consideration towards how it will develop comprehensive, integrated, and quality transport options. This includes

consideration given to buses, bikes, ferries, among other modes. The issues of access, scheduling and pricing, quality, coordination, and a comprehensive transit plan are all important.

As discussed in section (iv), congestion charges can provide revenues to fund public transit infrastructure. Such investments make it easier for commuters to see the value of the congestion charge, which assists in the public accepting the charge, and are consistent with the charge being considered a user fee. Indeed, as noted by Farrell and Saleh (2005), voters in Edinburgh were more accepting of a possible congestion charge when it was indicated that the revenues were going to be spent on bus service improvements. In Halifax, a deserving recipient of potential congestion charge revenues could be Metro Transit, HRM's public transportation agency. Unlike many municipal public transit bodies, Metro Transit does not receive provincial funding. Rather Metro Transit "has operated in a constrained fiscal environment" with needs "just barely been met with nothing going toward future expansion" (Wells, 2008, para. 16). A 2008 survey by Bristol Omnifacts Research found that 40 per cent of Halifax transit users believed the transit system was "inconvenient" and that HRM needed to provide more than a few buses if the transit system was to be a viable way to commute to and from work (Jones, 2008). These views are supported by evidence which shows that HRMs transit system is operating at or above capacity, with the incidence of standing loads and passenger pass-ups increasing, and that additional capacity must be provided to increase ridership (IBI Group, 2009, 19 and 37). Even HRM acknowledged the problem: "to be an attractive alternative to the automobile, Metro Transit must not only consider new higher order services such as fast ferries and bus rapid transit . . . but also enhance its regular routes that feed these services and serve a wider population base" (HRM, 2006, 72).

The low quantity of public transportation is compounded by the lack of transit alternatives on the Peninsula itself. People commuting to the Peninsula often need to travel within the Peninsula or to Dartmouth for employment activities. If there are no suitable transit alternatives to make these journeys during the day, this limits the possibility of leaving vehicles at home. Peninsula specific transit alternatives, such as the availability of taxis, passenger ferries, hop-on/hop-off buses, among other options need to be considered.

A final element associated with transit alternatives concerns the timing of investments.[7] Consideration needs to be given to whether investments in transit options should be made before implementing a congestion charge. It is noteworthy that the success of the London and Singapore congestion charges was due to pre-existing excellent, area-wide public transport systems which provided a viable alternative to commuters upon implementation of the congestion charge. In Stockholm, a seven-month trial period of congestion charges took place during 2006 before referendum approval and implementation in August 2007. The trial took place only after a coinciding public transit funding injection and upgrades which saw a small increase in public transport use during the trial and a positive reduction in crowding from the minor influx of commuter-switching. Both these factors helped ensure citizens' post-trial acceptance of congestion charging was higher than the pre-trial acceptability levels (Eliasson, 2008; Schuitema, Steg, & Forward, 2010).

HRM has already committed to investing in public transit. In 2008, a $115 million five-year Transit Plan was approved. The plan includes the addition of new buses being added to the existing fleet of 265 buses starting with 15 buses in 2008-2009 and 10 buses in each of the financial years 2010-2013 (HRM, 2008, 13). In addition, new routes and rapid transit alternatives are being created throughout HRM's suburban and rural areas, which have been under-serviced for many years. This expansion

demands evaluation to determine whether or not HRM will need additional improvements in advance of a congestion charge.

vi) Pricing technology and strategy

Collection of congestion charges is another piece of the implementation puzzle. The advent of a number of electronic tolling devices and technologies have made it possible to collect the congestion charge from drivers more efficiently and effectively than traditional methods and without imposing delays on drivers. Pricing technology and pricing strategy selection should occur by weighing the relative costs and benefits, along with the objectives of the congestion charge itself, to determine the best scheme for each case.

With respect to technologies, several electronic systems are currently available and use one of the following three technologies: (1) Global Positioning System (GPS); (2) Global System for Mobile (GSM); and, (3) Automatic Vehicle Identification (AVI) systems. In the long-run, GPS and GSM systems may come to dominate the congestion charge landscape when the technology is projected to be ubiquitous; but basing a congestion charge on GPS or GSM would mean the installation of such devices would need to be mandated in vehicles which would require either provincial or federal legislation. Implementers would then have to wait until all vehicles can feasibly be equipped with such technology which may take more than two decades. In addition, GPS and GSM systems raise numerous privacy concerns. AVI systems, on the other hand, are simple, feasible and currently in place in many locations, including HRM.

Three of the most successful congestion charge systems, London, Singapore, and Stockholm, are based on AVI technology. London and Stockholm based their AVI system on cameras. One of the primary

reasons why London chose the camera option is related to existing infrastructure and experience through the closed-circuit television (CCTV) system upon which the congestion charge system was built in that jurisdiction. Singapore, on the other hand, pursued the gantry system which provides for the congestion charge being paid when a driver passes under a gantry, an overhead assembly on which debiting technology is mounted. Singapore vehicles are outfitted with smart cards so as vehicles pass under gantries the charge is automatically deducted from a cash card.

Much like the London case, an AVI system is already being used in HRM that could potentially be extended for use in a congestion charge scheme, thereby minimizing the technological investment for both commuters and the municipality. A toll already exists on the Macdonald and MacKay bridges, which provides a useful precedent for charging in the area as well as experience with charge collection. The MACPASS is an electronic device that works in conjunction with an electronic tolling system used on these two bridges. MACPASS enables toll collection by using an AVI system based on transponders attached to windshields containing information identifying a driver's account, which automatically deducts the charge from the account associated with the vehicle allowing vehicles to pass without stopping. The fact that these two bridges comprise two of the seven entry points onto the Peninsula begs the question why a new separate system should be developed for the congestion charge when the existing system appears to work and be accepted.

Consideration has to be given as to whether it would be mandatory for vehicles entering the congested area to be fitted with the MACPASS system or whether payment will be accepted in other ways. Eliasson (2008, 398) notes Stockholm initially used a transponder system, much like the MACPASS, but abandoned the transponder in favour of camera identification because it worked so well. However, unlike in London where they system merely checks for payment, in Stockholm the camera system is

used to decide and register a charge for payment (similar to Highway 407 in the Greater Toronto Area), thus facilitating a variable charge regime. Alternatively, accepting cash payments at the access points is a possibility but doing so requires additional infrastructure and can disturb traffic flows. Allowing payment by post, via a call centre or website, or at various retail sites is also possible but there would need to be a way to record a license plate and link it to the payment, though Stockholm and London provide examples for how this can be implemented. It needs to be acknowledged that such flexible payment arrangements add to the collection costs of the charge as experienced in London. Moreover, cameras will be essential to any congestion charge system in order to record those vehicles not paying the charge. These cameras allow officials to ticket violators and impose penalties. Enforcement for nonpayment will need to be strict and the penalty high to ensure compliance, particularly in the early days of the charge.

Related to the pricing *system* is the pricing *strategy,* which relates to where the charge will be imposed and collected. Currently, there are four types of pricing strategies: area, cordon, facility, and network. Facility pricing is ideal on individual highways (e.g. Highway 407 in the Greater Toronto Area) and network pricing on highway systems (e.g. the highway systems around Bergen, Oslo, and Trondheim in Norway) whereas area and cordon pricing are suited for well-defined areas with multiple access points. This implies the role of road geography is crucial to selecting a pricing strategy.

In the context of HRM and the Halifax Peninsula, the aim is to limit vehicle entry onto and exit from the Peninsula during peak hours at the seven access points. The cordon or area-based systems appear better suited to the Peninsula than the facility or network systems given the Peninsula's geography and road infrastructure. While existing literature discusses area and cordon-based systems in detail, the literature provides little guidance in selecting between the two, simply noting that "the choice between

a cordon and an area charge has not been systematically examined in the literature" (Lindsey, 2007, 13). However, Santos and Newbery (2001) and Safirova et al. (2006) argue cordon-based systems are more cost-effective as they are relatively simple to implement, administer, and enforce. Lindsey (2007) further notes that a cordon-based system is preferred if traffic within the designated area is of less of a concern than traffic accessing the designated area. With respect to Halifax, a cordon-based system would mean vehicles located on the Peninsula would not be charged if they do not leave the Peninsula but nonetheless drive within the downtown core, which could decrease (though by no means eliminate) public opposition to a congestion charge.

While a detailed assessment of the costs and benefits of a cordon versus an area charge, along with the selection of the technology, would have to be completed before choosing between the two strategies, in HRM's case it would appear that combining AVI technology with a cordon-based strategy seems to be ideal given the nature of the problem and existing technology in HRM. In addition, the gantry system used in Singapore seems ideal to the HRM situation given the limited number of access points and how easily it can be combined with the MACPASS system. Using pre-existing infrastructure and familiar collection methods (for which the latter applied in Stockholm where "…the cordon had been termed the 'toll cordon' for several hundred years since this was where the ancient trade tolls were located…" (Eliasson, 2008, 397) may aid with public acceptance of the charge. Whatever the choice for Halifax, the issue of technology and existing investments must be taken into account by implementation teams when considering congestion charging.

There are two complexities that arise. First, two tolled bridges comprise two of seven access points onto the Peninsula and due consideration must be given to how the bridge tolls and the congestion charge will function together, if at all. Second, not all of the roads forming the suggested charge points

are municipal roads. For example, the two toll bridges fall under provincial jurisdiction. HRM will need to determine whether it is able to impose a congestion charge on these roads and/or whether it can partner with the province to implement a congestion charge on these toll bridges. The Strategic Joint Regional Transportation Planning Committee, noted in section (i) and further discussed in section (xi), could help address these issues.

vii) Fee structure, size and tailoring

In establishing a congestion charge, three questions arise. When is the charge going to be levied? How much is the charge going to be? Who pays (and does not pay) the charge? There exist multiple charging schemes based on static, variable, or dynamic pricing models, each of which can have varying complexities. A dynamic pricing model means prices can be updated in real time according to the level of congestion, variable pricing means prices vary with time according to a predictable schedule, and static means that the price is preset, usually according to usual traffic conditions.

Dynamic pricing approaches require extensive technology to monitor traffic flow and to communicate this information to commuters so that appropriate incentives can be structured to change commuting behaviour from the congested road to the uncongested roads and as congestion varies. While these dynamic schemes are desirable in theory, as they adjust according to the effective marginal cost of driving at that point in time, there are shortcomings. In particular, as drivers will not know the exact cost of their decision to drive or the route they wish to select when they begin their trip, the charge will not effectively dissuade marginal drivers from entering the road. Given that congestion in Halifax is predictable in terms of times (i.e. 7.30 am to 9.30 am and 3.30 pm to 5.30 pm) and days it occurs (i.e. Monday to Friday) it is not clear this added complexity derives any discernible benefit. Perhaps either a uniform fee or predictable schedule during the normal commuting times is an appropriate policy

given the specific case study circumstances. The static or variable pricing model based on this set-time-of-day approach, then, would be based on usual traffic patterns and would not demand the same levels of technology, monitoring, or commuter communication. The decision taken in London was to follow a static pricing model whereas Stockholm opted for a variable pricing model.

Once it is determined when the charge will be levied, the amount of the charge needs to be determined. Again, this appears simple in theory but is quite difficult in practice.[8] There are three elements to consider when setting the fee size. First, the theoretically ideal charge would set the charge equal to the marginal costs. These costs, however, are not only difficult to define properly, but also nearly impossible to estimate quantitatively.[9] Taking a cue from London, which instead relied on extensive modeling of household behaviour and traffic patterns to determine the charge, the undertaking required to determine a sustainable and economically efficient charge for the long term and not just for the short term should not be underestimated.[10] Second, once a charge is set, it may be politically and administratively difficult to modify the charge, particularly to revise the charge upwards (Bird & Tsiopoulos, 1997, 54) unless the charge is calculated according to well-defined and verifiable rules as was done in Singapore and on Route 91 in Orange Country, California. Third, the charge should cover the operating costs of the congestion charging system. Last, the charge has to be high enough to elicit the desired behavioural change.

Obtaining the desired behaviour change is dependent on three things. First, the price elasticity of demand (PED), which indicates the resulting percentage change in quantity demanded given a percentage change in price. If a price change elicits no or limited change in quantity demanded then the desired behavioural change will not be forthcoming. Second, the desired traffic reduction (measured either in terms of volume or flow (see section (ii))) during peak periods. Third, consideration must be

given to the cost of transit alternatives (which influences the PED), particularly public transit. An individual's choice between various modes of transportation is not simple and is based on more than just monetary costs, including transit times, waiting times, reliability, comfort, privacy, security, and so forth. While on the surface it may seem transit fares would need to be less than that of the imposed congestion charge in order to incent commuters to substitute their car for public transit, there is no rule that suggests transit fares have to be less than the congestion charge component of the monetary cost of driving.

The final consideration in setting the congestion charge concerns distributional effects along with discounts and/or exemptions. As noted by Ecola and Light (2009), who provide a comprehensive discussion of equity effects of congestion charges, "many proposals for a congestion charge have been rejected based on worries that congestion pricing is inequitable" (iii). Further, Bird (2009) stipulates that not only do "distributional issues matter in tax policy…[but] they often dominate in the minds of those who shape policy" (19). Congestion charges are often argued to be regressive (e.g. Flowerdew, 1993), where the payment forms a larger proportion of total income as income decreases, but in reality the regressive impacts are dependent on the "socio-economic and geographical considerations of the town where the scheme is under consideration" (Santos & Rojey, 2004, 23) as well as the current system for funding of, fees for, and taxation to support transportation infrastructure (Ecola & Light, ix). For these reasons, assessing equity implications is not a simple task and will depend on "how we measure equity and define groups, the specifics of the location, and to what we compare congestion pricing" (Ecola & Light, x).

As an illustration, if higher proportions of low-income households do not own a car or use their cars less frequently for commuting or employment purposes, do not commute to and from the congestion

charge area, have more flexible work arrangements, or have better access to public transit, the charge will not disproportionately affect low income individuals. Instead, it may be more likely that the burden of a congestion charge peaks among middle-income earners (Blow, Leicester, & Smith, 2003, 16). In reality, any regressive or disproportionate effects can be minimized or even reversed (made progressive) with careful design, revenue uses, and compensation mechanisms, particularly discounts and exemptions for readily identifiable groups (e.g. the disabled) or vehicles (e.g. bicycles, motorcycles, taxis, public transport vehicles, emergency response vehicles, tow-trucks, armed forces vehicles). Equally, consideration should also be given to compensation mechanisms that can be put in place to ensure these select targeted groups are out of their cars without burdening them with prohibitive cost. For example, offsetting the congestion cost by subsidizing the cost of using alternative transport (e.g. subsidizing bus passes and tickets for low-income individuals). Governments need to determine their own social policy on these matters. However, it should be noted that "accounting and enforcement of tolls are easier if vehicles and individuals are treated equally; moreover, opinions can differ regarding who should be favored on grounds of efficiency or fairness" (Lindsey, 2008, 250).

Other distributional aspects relates to the economic effects of a congestion charge on businesses located in the congestion charge area. In the short term, the concern is that fewer people will enter the congestion charge area for shopping, eating, and other entertainment related activities. These concerns are partially addressed if the charge is limited to peak commuting times. In fact, some activities may increase as people remain on the Peninsula after work and have dinner or do shopping in order to avoid the charge on the way home. Equally, the implementation of a congestion charge may improve public transport and reduce congestion, allowing for better access to the Peninsula thereby improving the attraction to travel to the area for pleasure purposes. The literature examining congestion charging effects on retail business is unable to reach a conclusion. Quddus, Bell, Schmocker, and Fonzone

(2007) found retail sales decreased by about 8.2 per cent after the implementation of the London congestion charge; whereas Clark (2004) surveyed 500 firms and only 26 per cent reported that they felt the effect on the London economy was negative. Eliasson, Hulkrantz, Nerhagen, and Rosqvist (2009) and Daunfelt, Rudholm, and Ramne (2009) found no effects on retail markets following the Stockholm trial.

In the long term, some businesses may relocate from the Peninsula to the suburbs so that their employees can avoid paying the congestion charge. While some business flight from the Peninsula might actually be optimal, particularly given projected settlement patterns, incentives to keep businesses in the Peninsula may have to be considered. For example, Metro Transit could offer discounted transit passes to Peninsula employees, similar to what is in place for university students and naval forces personnel. Discounts and exemptions may also be desired for economic reasons. For example, in the case of Halifax, port traffic might classify for special compensation. Certainly, the ability for congestion charges to influence such economic traffic is complicated by business constraints. With respect to port traffic, changes in the timing regarding the loading and unloading of freight are necessary to redirect traffic. Evidence from the Ports of Los Angeles and Long Beach suggest a peak hour congestion charge may incent cargo owners to change pickup and delivery times from peak hours to nights and weekends ("Industry Stakeholders," 2010).

That being said, if there are business and economic constraints that limit the ability to shift this traffic, discounts or exemptions could be considered. Local delivery trucks must access the Peninsula and their delivery schedules may be inflexible and they may have limited ability to pass along the congestion charge through higher prices to their customers. Hicks (1977) suggested that in these cases the congestion charge should be levied on the business requiring the delivery during peak hours and

Holguin-Veras (2008) suggested tax incentives to incent businesses to change their delivery schedules. There may also be interest in providing an exemption or discount to some or all of HRM vehicles (e.g. snowplows, refuse collection trucks, emergency vehicles).

Another group that may be considered for discounts or exemptions is through traffic commuters: commuters that are using the roads subject to congestion charges not through choice but necessity. For Halifax, through traffic commuters would comprise commuters using the bridges to drive to and from Dartmouth. Their usage of the bridges occurs because there are no other access points to Dartmouth without going all the way around the inlet. It could be argued that these commuters should not be charged for congestion because they do not have any realistic alternatives. In London, drivers are not charged on a few designated through-fare routes so as to reduce the impact of displaced traffic to other parts of the congestion charge zone and on roads approaching the congestion charging zone. In Stockholm, there is no charge levied on Essinge bypass, despite the bypass being heavily congested (Eliasson, 2008, 396). In Halifax, the same might be accomplished by designating the route from Joseph Howe Drive to Bedford Highway and onto the MacKay Bridge as a charge-free route. Alternatively, HRM could consider building or modifying road connections that exempt such drivers from these charges.

Computing an optimal congestion charge scheme is just one aspect. Conveying the scheme is an intelligible way to commuters is another matter altogether. Whatever the selection of pricing structure, size, and discounts, the implementing jurisdiction needs to ensure that commuters understand and appreciate the rationale for any variability and are clear about its application so they can make informed choices.

viii) Parking and Park and Ride lots

Parking access, location, and charges are also important components of a congestion charge scheme. Commuters will be tempted to drive just to the congestion charge boundary, park their car, and walk or take public transit into the zone. This can impose an extreme negative spillover on residents and businesses in these boundary areas. On the other hand, it provides an opportunity for additional economic activity as residents and businesses could rent out parking space on their privately owned property to interested commuters. HRM will have to give consideration to parking rules, charges, and enforcement in a set perimeter around the congestion charge boundary.

Park and ride lots can reduce illegal or unwanted parking in residential areas and make public transit a more palatable option, particularly for commuters living in areas ill served by public transit. Park and ride lots provide transit customers with parking. In some instances, parking is free whereas in other jurisdictions there is a parking charge. Metro Transit currently runs 12 such lots, most of which are free. The number of available parking spots at these sites varies from 15 to 315 spots (Metro Transit, 2009) and there may be need to expand not only their number of parking spots but also the number of sites.

There might be pressure to consider parking charges on the Peninsula, perhaps even in lieu of a congestion charge scheme. This includes raising the fee on publically provided parking spots as well as a levy on parking spots provided by businesses to their employees. Albert and Mahalel (2006) caution against using parking fees to address traffic congestion because commuters are much more sensitive to a congestion charge; they are willing to change their travel behaviour to avoid the charges yet more willing to pay parking fees. Thus congestion tolls are more effective in curbing congestion during the times the congestion charge applies. Bonsall and Young (2010) further note that parking charges have

no direct effect on through traffic, which in the case of Halifax contributes to the congestion problem. In addition, parking charges can influence the parking space search process and can influence idling time and the volume of circulating traffic. It is also the case that parking fees have no effect on reducing delivery or freight traffic.

Parking fees, therefore, can be a poor substitute for well-designed congestion charges, depending on the congestion charge design and the vehicles targeted. Increasing parking fees in tandem with a congestion charge also seems odd since a properly designed congestion charge should effectively address the congestion problem. An alternative strategy is to reduce or abolish parking charges at public parking sites in the congestion charge zone as a way to reduce "peak period congestion while preserving, perhaps enhancing, the role of the city centre as a location for retail activity and increasing equity." (Bonsall & Young, 2010, 333) Such a scheme would increase the acceptance of the congestion charge and could be financially viable if there are far more people paying the congestion charge than parking in the public spaces.

ix) Timing, communication, consultation

It is clear that decision makers cannot just decide in favour of a congestion charge, announce its implementation, and think reduced congestion will automatically follow. On the contrary, a jurisdiction needs to provide alternative transit options (noted in section (v)) and time will be needed to install appropriate collection technology to facilitate collection of the charge on a streamlined basis. Additionally, political decisions need to be made as to the timing of congestion charge announcements to maximize political capital and minimize political risks (see section (x)). Overall, the development, announcement, and implementation of congestion charging must be packaged into a comprehensive and coherent timeframe if implementation is to offer any chance of success.

Public awareness is also critical. As Bird and Tsiopoulos (1997) comment:

> nowhere, it seems, is government doing a very good job of explaining either to citizens in general or to the users (and managers) of particular services why [user] charges, and why these particular charges, should be imposed … [t]he potential of good user-charge policy is all too likely to be swamped by its perceived and actual bad implementation…A critical question in user charge policy… is how to sell user charges both to the public at large and to those who stand to be directly affected by them. (31)

Care and attention must be paid to incorporating the right communication and consultation strategy for each jurisdiction, circumstance, political will, and community mood.[11] This includes educating drivers on the costs and causes of congestion *before* embarking on implementation and enforcement of the congestion charge regime. Attention also needs to be paid to communicating the desirability for commuters to consider alternative public transit options. Through this process, it is important to consider the messaging of how to sell the idea particularly since "[t]here is a potential conflict between making congestion charging [economically] 'efficient' in the theoretical sense and making it easily understood" (Eliasson, 2008, 397). The communication process also needs to continue after implementation. Stockholm demonstrates the value of visible proof of congestion relief and providing extensive, professional, and independent scientific data showing hard data on actual reductions in traffic volumes and congestion.

Whatever the marketing approach taken, it is worth noting the challenges in selling the concept of congestion charging to residents before the benefits of improved public transit have been realized. The

Stockholm trial powerfully exemplifies the need for the public to gain positive experiences (as opposed to just information) with congestion charging schemes if support is to be secured. The turnaround in public opinion pre-trial to post-introduction in Stockholm was somewhere in the order of 15 to 40 per cent (Eliasson, 2008, 402-403; Winslott-Hiselius et al., 2009, 280). Precise explanations and causality links regarding the change are difficult to obtain, but Winslott-Hiselius et al. (2009) conclude that citizens seem to "need personal experience before they know what they really think about such a complex issues as road charges" (281). In undertaking a trial approach to congestion charging governments need to ensure visible congestion reduction actually occurs and public expectations are not disenchanted by poor implementation during the trial period. In Stockholm "…people knew what to do…the information campaign… [and] the technical system…worked…. Anticipated problems with people who did not know that they should pay or did not know how to pay, did not materialize" (Eliasson, 2008, 403).

The status of Halifax as a regional municipality means that it should pay careful attention to the realities of the policy from the region's own perspective. HRM is a mix of urban, suburban, and rural communities that all need to be engaged and the diverse transit needs of individuals in each of these communities will need to be balanced to maximize the effectiveness of the congestion regime. HRM should also exercise care in selecting which media mediums and outlets best fit each of these community's communication needs. Data should be developed to show the exact implications of the policy for HRM and each of its diverse communities. In this way the personal dimension to municipal governance can be stressed; users and the general population can feel comforted that they are being treated seriously and with respect, that the policy is not some abstract, theoretical idea that has been imposed in a distant way without thoughtful application, and that the decision makers are fully behind

the policy and are not being coerced into implementing a decision made by another level of government.

HRM officials may be drawn to the idea of holding a referendum, but experience suggests such a strategy would not necessarily provide a positive message on which to request citizen preference expression, unless a positively experienced trial has taken place. Lindsey (2007, 19) indicates that while there is "scant evidence on which to propose a guideline… opposition to most road-pricing schemes tends to wane after they come into operation, the traditional explanation being that attitudes improve after people experience the benefits of the schemes." Schade and Baum (2007) further suggest that people become more favourable toward a congestion charge if the introduction of such a charge appears to be inevitable.

x) Political impacts

Experience shows that implementation of congestion charging is highly political. Congestion charging can draw sustained and, in some cases, misinformed opposition from businesses, citizens, and drivers which can adversely affect public perception resulting in sustained pressure to abandon congestion charging plans. This criterion is among the more vital as it requires political vision and stamina to shepherd the process from concept to implementation in the face of vocal opposition.

Althaus (2008) suggests six political risk barometers should be addressed if the political risk success or failure of any policy is to be managed. Three are situational: (1) confronting and reducing policy and political uncertainty; (2) concern for constituent and community impacts; and, (3) awareness of policy settings and control over policy levers. Three are personal: (4) presence of a champion politician; (5) potentiality of policies and use of experience; and, (6) reliance on politics over policy technicalities.

As an overarching rule, while various people contribute to the political risk decision making process the calculation fundamentally rests with politicians (Althaus, 2008) who rely particularly on their own personal experience to help guide them through their assessment of what to do in the face of uncertainty. Politicians who are able to manage the paradox of reading the community well and who take leadership action despite community sentiment are seen to be good at political risk management (Althaus, 2008). The political risk portfolio across the jurisdiction agenda will also need to be carefully considered and the place of congestion charging in this portfolio and within electoral and policy cycles needs to be contextualized and controlled accordingly (Althaus, 2008, 231-5).

London showed the benefits associated with having a champion politician, Ken Livingstone, whose personal commitment to the policy helped promote detailed analysis of the policy and positive marketing to ensure successful implementation. This champion status cannot be viewed, however, in isolation from other political forces. Livingstone, for example, benefited in many ways not just from being counter to Margaret Thatcher but also from being an independent pitted against the Blair New Labour candidate. Together, these factors arguably improved his status with the electorate as being London-focused and not beholden to any party (Richards, 2006) enabling him to champion congestion charging as a policy that would separate him as a genuine local candidate. Livingstone also benefited from the work of the Road Charging Options for London Working Group established in 2000 in advance of the mayoral elections to "inform Mayoral candidates on how they might use their road user charging powers" (Richards, 2006, 3). The resources, advice, and expertise of this group enabled Livingstone to explore options, be decisive and take speedy action upon taking office as well as within the timing demands of the electoral cycle—all salient political features in the successful uptake of the congestion scheme and his re-election in 2004 (Richards, 2006, 221-31).

A political champion is not a necessity for successful congestion charging implementation. Singapore and Stockholm provide cases where no such individual can be clearly identified. Instead, Singapore, for example, chose the tactic of political consensus through education and consultation to help achieve implementation success. Political consensus took the place of a champion. The size of the jurisdiction and the style of the political system are relevant in this regard but Singapore's dominance of the media suggest that authorities could have unilaterally "…implemented congestion pricing with little or no public involvement. Instead, authorities carried out a year-long intense assessment and education program. They responded to public reaction by making adjustments to the pricing program before implementation" (K.T. Analytics, 2008, 2.9). At this point in time, it would not appear that there is an identifiable political champion in HRM; however, there may be scope for this to change as a few HRM politicians have suggested that a congestion charge is a great idea worth pursuing. Attention to political factors such as a champion politician or political consensus might provide a much-needed checklist to ensure Halifax maximises its chances of putting in place appropriate political struts to support the congestion charge case.

The position of HRM as a regional municipality must be recognized. The capacity to deliver policy 'on the ground' is, according to the principle of subsidiarity, best met when decision making occurs at the level of implementation responsibility. A regional municipality faces political forces that are different from sub-national and national governments and must weigh its own political portfolio in its own way. Being closer to the people being affected by the charge is an important dimension. Politicians at this level of government are often known 'in person' to the voters on the street and their proximity to the people suggest it is wise on the part of the government to walk alongside the populous throughout implementation rather than impose a heavy-handed, top-down implementation regime that is insensitive to the demands for personal service that otherwise characterize regional municipal

government. This is especially the case in HRM where use of the Ward system for electoral representation means a direct point of citizen access to Councilors is a feature of HRM political life.

Moreover, the close proximity between politicians and officials at the municipal level and the embellished ability of officials and third parties (usually delivery agents) to play a significant feedback and leadership role at the local level suggests the need for continual briefing and for local politicians to gather and exploit street-level intelligence from these parties so that the inevitable unintended consequences can be managed quickly and effectively (Barber, 2008; Elmore, 1979-80; Wanna, Butcher, & Freyens, 2010). Meanwhile, implementation issues associated with 'place management' include paying due attention to the cultural and physical aspects of the Halifax region (Wanna et al., 2010, 227-8), including legacy issues associated with municipal amalgamation that occurred in 1996 (Vojnovic, 1998). Congestion charging should be explained in local terms and coordination with other local issues, such as HRM's recent tax reform review process, needs to be undertaken.

xi) Governance issues given the various communities and a centralized administrator

In Halifax, a number of players are relevant at the local and provincial levels including internal government agencies as well as the Halifax Dartmouth Bridge Commission[12] and the Strategic Joint Regional Transportation Planning Committee. HRM would be well advised to create a comprehensive congestion charge team involving the above mentioned players and tasked with coordinating efforts related to congestion charging and related policies and investments. The London experience is worth noting here, even if the contextual forces for specific cases will demand different governance needs. In London, a team of up to 70 hand-picked government and consultant members joined across a comprehensive sub-grouping of six implementation taskforces (including specifically communications and public relations) to comprise a formidable implementation team with a significant resourcing

budget (Richards, 2006). This level of commitment may not be appropriate for every jurisdiction but the level of attention paid to governance in such an implementation team approach is certainly worth emulating.

HRM also needs to consider the viability and desirability of including non-government stakeholders in the design and implementation process, including confronting the question of whether to feature private sector operators. This is a separate and complex analysis that demands context-specific attention and will not be dealt with in this paper, except to note its significance for implementation. Once a congestion charge scheme is implemented, it will be important for HRM officials and their collaborating partners to consistently review and, if required, revise the system. This entails monitoring performance, identifying issues and remaining flexible to make changes to improve the system on a dynamic basis. Issues of horizontal governance will emerge for consideration and enactment as part of this process (Bakvis & Juillet, 2004; Bourgault & Lapierre, 2000; Hopkins, Couture, & Moore, 2001). Vertical integration with other jurisdictions and relevant policies will also be needed. For the purposes of this paper, it is suffice to say that governance mechanisms will need to be established once jurisdictional authority has been settled.

Several governance options exist in Halifax. HRM could be granted jurisdictional authority to undertake alternative transit policymaking roles or the province could work collaboratively with HRM to give effect to the united intent behind the congestion charge and alternative transit strategy. The transportation coordination component could come through the creation of a transportation authority, an option currently being urged by the Mayor of Halifax (Kelly, 2010). This would enable HRM and/or the provincial government to coordinate all transportation issues. In addition to such a body,

changes would also need to be made to the Halifax Dartmouth Bridge Commission's (HDBC) mandate to reflect the role that that entity could play in reducing traffic congestion and improving public transit. Using some of the funding HDBC charges Metro Transit toward public transportation may help HRM invest in public transportation while avoiding any need for a third bridge across the Halifax Harbour. HDBC is situated to play a vital role with congestion charging given its experience with electronic tolling systems. In fact, HDBC has experience with implementing, maintaining and integrating electronic tag and beacon systems. The congestion charge must be part of a coordinated approach to increase the capacity, reliability, efficiency, quality and integration of the entire transport system.

Conclusion

Without changes, congestion on the Halifax Peninsula will worsen: population growth will lead to residential developments in areas off the Peninsula; transit improvements take time to implement and will not service all areas; and, vehicle use among Halifax commuters will remain high.

This article proposes eleven implementation criteria that should be considered to harness positive aspects associated with congestion charging and to address potential drawbacks prior to any enactment of a congestion charge scheme should it be considered politically feasible. Paying attention to implementation should reap positive benefits for policy and decision makers who must attempt to generate optimal community welfare in a manner conducive to public sentiment. These criteria represent a mixture of top-down and bottom-up approaches towards the study of implementation as provided for in the policy implementation literature (Ison and Rye, 2003, 224).

It is not suggested that the criteria will provide for 'perfect implementation' but they can at least begin to allow policy and decision makers to explore the viability, desirability and potential pitfalls and

promises that congestion charge schemes might offer. In addition, it is vital that a detailed cost-benefit analysis be performed of congestion pricing, properly weighing both current and future benefits from congestion relief against the costs of implementing and operating a congestion scheme, before proceeding.

Many variables are at play in implementation, not least of which is sequencing, timing, and imperfect information, and no amount of theoretical guidance will substitute for practical nous and context-specific application. However, awareness of potential implementation indicators promotes the assimilation of lessons to be learned from smart practices (Bardach, 1998, 2005). While Halifax poses ex ante case-specific issues for policy implementation, the eleven criteria outlined in this paper represent generalizable implementation factors that merit the attention of policymakers regardless of jurisdiction and circumstantial details. In presenting these criteria, it is our hope the "missing link" will begin to be filled and implementation of congestion charge schemes will prove a more successful exercise to benefit the public interest.

Endnotes

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[1] According to transportation measurements taken by HRM transportation officials, the total vehicle capacity on the six roads leading to the Peninsula is 14,200 vehicles per day. The baseline number of all vehicles using the seven roads is 16,123 and all of the roads exceed their daily capacity. For example, HRM traffic studies have indicated that inbound traffic volumes on Chebucto Road during the morning rush hour period exceed its capacity. Queues extend back from the Chebucto/Mumford intersection and cause traffic to back up into the Armdale rotary, located 0.7 km southwest of the intersection, and beyond which further affects traffic flow on neighbouring streets. In addition, a report by GPI Atlantic suggests that congestion costs Haligonians $7million a year and more than 90% of this cost consists of time delays to motorists (as reported in a March 2008 GPI press release whose URL on September 2010 was http://www.gpiatlantic.org/releases/pr_transportation2.htm).

[2] They apply their framework to London, Singapore, Stockholm, Norway, and Edinburgh.

[3] Transport Canada (2006) goes further suggesting that traffic congestion is "the inconvenience and increased costs that travelers impose on each other while using their vehicles, attempting to use the road network at the same time, because of the relationship that exists between traffic density and speed (with due consideration of capacity)" (5).

[4] A Pigouvian tax is a tax levied on activities that generate negative externalities. Negative externalities occur when the social costs of the activity exceed the private costs of the activity thereby resulting in market inefficiencies. The tax operates as an incentive to reduce the activities to the efficient level.

[5] It is important to note that it is by no means simple to design a user fee with the legally stipulated criteria that will stand the test of a court challenge; it is essential implementers carry out a detailed legal analysis at the design and implementation stages.

[6] Halifax's inability to address congestion through new road construction or expansion is a blessing in disguise since Duranton and Turner (2009) find confirmation for Downs' (1962, 1992) 'fundamental law of highway congestion' that increased provision of "major urban roads is unlikely to relieve congestion of these roads" (Duranton & Turner, 2009, 1).

[7] It should be noted that transit improvement programs in and of themselves are not likely to have any discernable effect on traffic congestion making them, independent of a congestion charge, a poor policy lever for tackling traffic congestion (Duranton &Turner, 2009).

[8] While by no means seen as a replacement for the extensive modeling that would need to be undertaken to determine the size of the optimal charge, it is nonetheless possible to perform "back of the envelope" calculations to obtain on the potential estimates of the congestion charge size for use on the Halifax Peninsula. Using a simple model used by O'Doherty (2005) following work derived by Foster et al. (2003) and using price elasticity of demand estimates, the size of the charge needed to reduce the number of vehicles to road capacity levels ranges from approximately 1.50CDN a trip to approximately 5.00CDN a trip. For comparison, Singapore charges between 0.50SGD and 5.00SGD (or between $0.39CDN and $3.89CDN) depending on vehicle type and time of day for entering and exiting its congestion charge district, London charges £8 (or $12.93CDN) for entry into its congestion charging zone, and Stockholm charges between 10SEK and 20SEK (or between $1.52CDN and $3.04CDN) for each time a vehicle enters or exits the congestions charge area and depending on the time of day, up to a maximum of 60SEK a day ($9.11 CDN).

[9] As noted by Leape (2006, 158) while calculating optimal charges using marginal cost pricing for a single road is relatively straightforward, the same is not true for a network of roads. Since congestion varies, particularly at intersections, optimal marginal cost charges vary by road segment, intersection, day, and time of day, applying marginal cost pricing is often not realistic.

[10] Political aspects regarding the size of the charge need to be considered. In London, "considerations in favour of a 5.00£ charge were undoubtedly reinforced by political concerns regarding public reaction should the charge be set as high as 10.00£" (Leape, 2006, 160).

[11] The lack of a clear and detailed communication plan prior to announcement and implementation often spells disaster for fiscal policy changes, as recently demonstrated in the BC GST harmonization fiasco.

[12] The Halifax Dartmouth Bridge Commission(HBDC) is a commission of the provincial government that constructs, maintains, and operates bridges, including the MacKay and MacDonald bridges, and approaches across the Halifax Habour. The HDBC also operates the MACPASS system.

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