

## CAN KUWAIT ADOPT FISCAL POLICY INSTRUMENTS IMPLEMENTED BY OTHER COUNTRIES TO REDUCE TRAFFIC CONGESTION?

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### ABSTRACT

Unlike other equally important social problems the Kuwaiti people face, such as political corruption, rapidly deteriorating health and education services, unemployment, inflation, fluctuating oil prices and high costs of living – the problem of traffic congestion in particular affects the whole population of nationals and expatriates equally regardless of what level of income they fall under. The Kuwaiti people are increasingly enraged by the massive amounts of time and money being wasted in tedious traffic congestions every day, not to mention the fatal car accidents and environmental issues associated with rapidly growing traffic. Calls for serious government interference are no longer a mere consideration but a crucial necessity. The government's inadequate response to growing traffic – on the other hand – has consisted of small road expansions in limited areas of the state. In practice this has proven to be an insufficient solution for two reasons; the first, is that new road capacity will divert some travel off congested roads in the short term, only to have the new roads quickly fill up with traffic almost immediately, not to mention the very slow process of infrastructure expansion. The second reason why increasing roads does not relieve traffic is a purely economic one, rising traffic means there is a higher demand for roads than there is a supply of roads, thus, increasing the supply of roads will only increase the demand and cause more traffic unless a higher price is implemented on usage of those new roads, i.e. congestion charges which this paper will discuss as an effective solution to traffic congestion. Rising traffic congestion is a multidimensional social problem and thus requires multidimensional social solutions, therefore, the state has to consider effective short term solutions in addition to the long term ones, implementing a single legal or fiscal policy and expecting traffic relief is not only highly ineffective but can also be a waste of large sums of public funds. This paper attempts to look at various fiscal policies such as congestion charges, employee parking cash-out, gas tax, HOT lanes, and carpooling, implemented and tested by other traffic ridden cities around the world to find whether or not such policies can be as effective in the small state of Kuwait.

**Keywords:** Traffic congestion, road expansion, congestion charges, HOT lanes, carpooling, employee parking cash-out, gas tax.

### INTRODUCTION

Cities and traffic have developed hand-in-hand since the earliest large human settlements. The same forces that draw inhabitants to congregate in large urban areas also lead to sometimes intolerable levels of traffic congestion on urban streets and thoroughfares. Today Kuwait also suffers immensely from traffic congestion with massive amounts of time and money wasted in tedious traffic congestions, in addition to fatal car accidents and environmental issues associated with rapidly growing traffic. The problem of congestion is far worse in Kuwait due to the absence of trains and very poor public buses, in addition to the extremely hot weather all year long which prohibits commuters from cycling or walking. Although the issue of traffic congestion is a relatively modern one, much attention was dedicated to solving this issue in literature; in his book *Still Stuck in Traffic: Coping with*

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*Peak-hour Traffic Congestion* (Downs, 2004) examines the advantages and disadvantages of various strategies and considers the causes of worsening traffic problems, however, this book focuses only on the United States. The same can be said about (Arnott, 2005) in his book *Alleviating Urban Traffic Congestion* where the author concentrates on neglected methods such as downtown parking policy, the encouragement of bicycling, the staggering of work hours by dominant employers, and the use by medium-sized cities of a "multimode" ticket that charges cars entering the city center a toll equal to the transit fare, but focusing only on the American experience. (Gulberg, 2009) in his book *Congestion Taxes in City Traffic: Lessons Learnt from Stockholm Trial* focuses on the Swedish capital of Stockholm a seven-month long trial period with congestion taxes was carried out in 2006. It has since been made a permanent system. And (Manwarren, 2012) in his book *Traffic Congestion and Road Pricing: Issues, Impacts and Project Reviews* examines current issues, impacts and project reviews relating to traffic congestion and road pricing, however, the book is focuses only on America.

The reason why this paper can be useful for scholars researching in the problem of traffic congestion in Kuwait is that it specifically focuses on the Kuwaiti experience and policies that can be effective in the Kuwaiti environment and other that may not be effective. The limitation of this paper is the shortage of data in regards to the problem of traffic congestion in Kuwait.

### **Kuwait struggles with immobility**

Kuwait currently has no laws restricting the number of vehicles an individual can own, nor does it implement a car tax or a progressive tax that individuals are liable to pay in the event of owning more than a specific limit allows e.g. two or three vehicles. Another issue is the absence of a legislation that holds individuals accountable to include parking space in their house building plan which only contributes to the growing problem of road congestion, as each house hold owns more cars than its actual need and often parks the vehicles on the road causing congestion in the suburbs as inner roads grow narrower. These previous facts coupled with the tremendous paste in which the Kuwaiti population is growing increases the problem, as statistics show that in 2008 the Kuwaiti population was 3.441.813<sup>2</sup> (1.087.552 of which are nationals and 2.354.261 are immigrants)<sup>3</sup>, in 2014 the Kuwaiti population grew to a staggering 3.996.899<sup>4</sup>.

While the number of cars recorded on Kuwaiti roads were 1.745.251 in 2008, this is in addition to the 16392 new driver license issued by The General Department of Traffic in Kuwait during the first 6 months of 2009; this shows the number of cars on the roads of Kuwait is quite extreme if we Keep in mind that children under the age of 18<sup>5</sup> and elderly people do not drive<sup>6</sup>.

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<sup>2</sup> Statistics published in "AlQabas" a Kuwaiti Daily News Paper, by The Public Authority of Civil Information in Kuwait, in March 29th 2009.

<sup>3</sup> *ibid.*

<sup>4</sup> Kuwait's Demographic Profile 2014, [http://www.indexmundi.com/kuwait/demographics\\_profile.html](http://www.indexmundi.com/kuwait/demographics_profile.html).

<sup>5</sup> The legal age to obtain a driver license in Kuwait is 18.

<sup>6</sup> Online published research on the problems of traffic congestion by Kuwait's National Assembly <http://www.kna.kw/clt/run.asp?id=1547#sthash.OcseffDu.dpbs>

### Other systematic factors increasing traffic congestion in Kuwait

1. The poor infrastructure of roads in terms of not complying with the correct measurement specifications necessary for dimensions, entrances, exists and bridges, in addition to not expanding existing highways since the 80s.
2. The cramming and overcrowding of all vital public services in one area of the country, with working hours in both government and private sectors beginning and ending at the same time, in addition to the fact that all schools and colleges have the same hours which causes more and more traffic and in many cases serves as an invitation to violate traffic laws.
3. Most commercial and administrative institutions are concentrated inside the city causing extreme traffic congestions at peak hours, with very little to no traffic at non-peak hours, this means that during peak hours the shortest routes leading to the city are congested while other routes are empty.
4. The absence of government smart planning in terms of building highly demanded institutions; popular hospitals, schools and busy shopping malls in one area with not efficient parking space, causing more traffic problems.
5. Leniency in issuing license for road users, as statistics show that a number of 16392 driver licenses were issued between January and June of 2009.<sup>7</sup>

From the factors above, it is obvious that relieving traffic congestion in Kuwait can only be achieved through a multiple of methods and policies. Below are different policies implemented and tested in traffic congested, overpopulated cities around the world, can such policies be as effective in Kuwait?

### FISCAL POLICIES OTHER COUNTRIES ARE USING TO COMBAT CONGESTION

#### 1. Congestion Charges: The Case of Singapore and London.

Economists such as Pigou<sup>8</sup>, Walters<sup>9</sup>, and Vickrey<sup>10</sup>, have long advocated congestion charges. This policy offers the most cost-effective means of reducing congestion, under this scheme surcharges are imposed upon drivers during peak periods with the key purpose of reducing congestion. Congestion charges also induces people to efficiently exploit alternatives to peak-hour driving, such as using mass transit, driving on other (non-congested) routes, re-scheduling trips at less busy times, carpooling, and so on<sup>11</sup>. It should be noted here that congestion pricing is different from Road Pricing which seeks only to generate revenues for the purpose of financing the road infrastructure. There are numerous key factors that make congestion charging so successful. The underlying principle is that road users should be forced to pay for their road usage in proportion to the negative effects that this usage creates. In calculating such cost, it is not easy to be exact, but congestion charging provides a platform for greater accuracy, since it can be tailored to target specific places at specific

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<sup>7</sup> *ibid* (see footnote 2).

<sup>8</sup> Pigou, Arthur C., (1912). *Wealth and Welfare*. Macmillan, London.

<sup>9</sup> Walters, Alan A., (1961). *The Theory and Measurement of Private and Social Cost of Highway Congestion*. *Econometrica* 29: 676-699.

<sup>10</sup> Vickrey, William S., (1963). *Pricing in Urban and Suburban Transport*. *American Economic Review Papers and Proceedings* 53: 452-465.

<sup>11</sup> Giuliano, Genieve., (1992). *An Assessment of the Political Acceptability of Congestion Pricing*. *Transportation* 19: 335-358.

times. This makes it a far more direct strategy than, for example, fuel taxing, which penalizes road users evenly, regardless of their true negative impact<sup>12</sup>.

The main principle of congestion pricing is to impose higher charges on travelers at times and places when road systems are congested. This reduces both social and environmental costs imposed by congestion through enhancing traffic flow and decreasing travel demands and emissions resulting from the idling and slowing of vehicles. Thus, congestion charges internalize the additional travel cost imposed by motorists on fellow travelers by altering their travel behavior<sup>13</sup>. This charge also encourages people to travel during off-peak hours, through non-congested routes or through other modes of transportation. However, the willingness of motorists to pay congestion charges depends upon their level of income and their availability of alternative means of transportation<sup>14</sup>. Congestion pricing is theoretically well-established and implemented in practice throughout many urban centers, particularly in developed countries. Charging in this way has a number of important knock-on effects. Crucially, it makes drivers more aware of their impact and thus reduces unnecessary driving. The result is that demand is regulated and redistributed such that congestion is reduced without having to increase supply (build more roads). In economic terms, this approach is desirable since it corrects the shortage by charging the equilibrium price rather than just increasing supply. Increasing supply only serves to lower the 'price' and hence re-increase demand (so generally only offers a short-term solution). This effect is often summed up by the phrase "building more roads increases traffic"<sup>15</sup>.

### **How to calculate the optimal congestion charge?**

The theory of congestion pricing states that the charges imposed should equal the difference between the social marginal cost and the private cost for the flow<sup>16</sup>. With the increased congestion, average speed decreases and average travel time increases for the driver. Thus, an increased travel time causes the average and the marginal travel costs to increase<sup>17</sup>. This means that an optimal charge is the one that falls between how much time, money and emotional stress the slow journey to work has cost the driver plus the urgency to reach his destination faster, and all cost of time, money and pollution the slow journey is costing the state and the environment.

### **Congestion charges in practice Singapore**

In order to reduce both the social and environmental costs associated with congestion, congestion charging systems have been adopted in various parts of the world with varying

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<sup>12</sup> Commin. H., (2009), The Congestion Charging Schemes of London and Singapore: Why Did London Choose Different Technology, and Was this a Mistake?, <http://skynet.ee.ic.ac.uk/~hcommin/ComminDissertation.pdf>

<sup>13</sup> Sikow-Magny, C., (2003). Efficient pricing in transport—overview of European commission's transport research program. Acceptability of Transport Pricing Strategies eds. J. Schade and B. Schlag, pp. 13–26. Elsevier, Amsterdam.

<sup>14</sup> Sharp, C., (1966). Congestion and Welfare—An Examination of the Case for a Congestion Tax. *The Economic Journal*, 76: 304, 806-817.

<sup>15</sup> Santos, G., (2000), "Congestion Pricing: An Idea that Makes Sense",  
Web link: [vox.cepr.org/index.php?q=node/410](http://vox.cepr.org/index.php?q=node/410).

<sup>16</sup> Jansson, J. O., (1969). Optimal Congestion Tolls for Car Commuters. A Note on Current Theory. *Journal of Transport Economics and Policy*, 3: 3, 300.

<sup>17</sup> Innes, J., (1995). Planning Theory's Emerging Paradigm: Communicative Action and Interactive Practice. *Journal of Planning Education and Research*, 14:183-189.

degree of success. Congestion charges that increase the cost of travel may convince motorists to alter their travel behavior, although some diversions of traffic may take place. The area licensing scheme (ALS), introduced by Singapore in 1975 is probably the first example of congestion pricing created to alter travel behavior. In this system, only those cars with three or fewer people were charged. The charge ranged between \$1.50 to \$2.50 per day<sup>18</sup>. At that time, technology was not available to implement the ALS electronically. Instead, drivers were required to display daily or monthly windshield licenses if they wished to enter the 2.0 square-mile central Restricted Zone (RZ) during morning peak hours. A workforce of about 150 was required in order to staff the ticket booths and the 34 gantries that surrounded the RZ<sup>19</sup>. Heavy fines were imposed to discourage violators.

The impacts of the ALS were substantial and immediate. The flow of cars into the RZ fell suddenly by 73% (from 42,800 to 11,400 per day). By the early 1980s, more than half the cars entering the RZ carried four or more passengers. People flocked onto the improved and expanded bus and rail systems, with 69% of morning peak-time travellers choosing public transport (compared to 33% in 1976).

In September 1998, after 23 years in operation, the ALS was replaced by an electronic version called the Electronic Road Pricing System (ERP)<sup>20</sup>. Since the ERP scheme was merely a replacement of the ALS, its impacts may be expected to be small. Furthermore, since the adaptive pricing scheme led to almost all charges being reduced, the expectation might be that traffic volumes may even have increased. Incredibly, though, the number of vehicles entering the RZ during the charging period dropped by a remarkable 15% within the first year. The reason for this reduction is believed to be a result of the per-entry charging. In contrast to the era of the ALS, drivers now had to plan their journeys better and avoid unnecessarily re-entering the RZ. Indeed, the number of multiple trips into the RZ had fallen by 34%<sup>21</sup>.

## London

In order to better understand the overall issue of implementing a congestion charging scheme in London compared with Singapore, it is necessary to discuss some of the important differences between these two cities. A highly relevant factor is that Singapore is an island city-state. It is almost entirely self-enclosed (with its only land links being two bridges to neighboring Malaysia). Despite being the second most densely-populated country in the world, its population is only 4.6 million. Furthermore, its enormous immigrant workforce (the largest, by proportion, in Asia) means that the true number of permanent residents is just 3.6 million. By comparison, the London metropolitan area is home to around 13 million people. However, in direct contrast to Singapore, it is also freely accessed by a nation totaling 61 million people. Also, the cost of vehicle ownership (relative to general living expenses) in Singapore is astronomically high. The myriad of extra fees and taxes include the “Additional

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<sup>18</sup> Daniel, J. I. and Bekka, K., (1999). The Environmental Impact of Highway Congestion Pricing. *Journal of Urban Economics*, 47:2, 180-215.

<sup>19</sup> Menon, A., Keong, C., (2004), “The Making of Singapore’s Road Pricing System”, *Traffic Engineering & Control (tec)*, Vol 45 No. 2.

<sup>20</sup> Keong, C. (2002). Road Pricing: Singapore’s Experience. Prepared for the third seminar of the IMPRINT-EUROPE Thematic Network: “Implementing Reform on Transport Pricing: Constraints and solutions: learning from best practice”, Brussels, 23rd – 24th October, 2002.

<sup>21</sup> Menon, A., (1998), ERP in Singapore - a perspective one year on. Available at: [http://www.lta.gov.sg/motoring\\_matters/index\\_motoring\\_erp.htm](http://www.lta.gov.sg/motoring_matters/index_motoring_erp.htm).

Registration Fee” (ARF), set at a mind-boggling 100% of the vehicle’s open market value. Excise duty is also high (20% compared to 0% - 10% in the UK) and, every 10 years, drivers must bid for a “Certificate of Entitlement” (COE). In May 2009, a COE cost around \$10,000 (£4,400), but fluctuating figures over the previous 12 months, at their peak, reached almost double that<sup>22</sup>. Singaporean drivers are also offered financial incentives to own new cars. “Preferential Additional Registration Fees” (PARF) are paid back to drivers who scrap or export their cars before they reach the age of 10 years. After this age, road tax surcharges of up to 50% are imposed. Thus, very few people are willing to commit to the purchase of a 10-year non-transferrable COE for an older car and the cheap secondhand car industry simply doesn’t exist in Singapore. The point being made is that it is hugely more difficult to afford a car in Singapore<sup>23</sup>.

In 2003, the city of London introduced a congestion charging scheme in which vehicles entering inside a 22-square km zone comprising core shopping, government, entertainment and business districts were required to pay a congestion charge of £5 between 7 AM and 18.30 PM on weekdays. The charge has been increased to £8 since July of 2005<sup>24</sup>. Today the congestion charges have gone up to £11.50 daily when driving between 07:00 and 18:00, Monday to Friday in the Congestion Charge zone.



**Figure 1 London Congestion Charge Zone**

<sup>22</sup> CarBuyer. May 2009 COE Tender. Web link: [carbuyer.com.sg/coe/](http://carbuyer.com.sg/coe/)

<sup>23</sup> Automobile Association of Singapore. AA New Car Price Reference. Web link: [aas.com.sg/?show=content&showview=12&val=176#](http://aas.com.sg/?show=content&showview=12&val=176#)

<sup>24</sup> Schmöcker, J.D., Fonzone, A., Quddus, M., and Bell, M.G.H. (2006). Changes in the frequency of shopping trips in response to a congestion charge. *Transport Policy*, 13,3, 217-228.

Despite high rates charges in the London congestion zone, there is no charge on weekends, public holidays, between Christmas Day and New Year's Day inclusive, or between 18:00 and 07:00 on weekdays.

### The impact of congestion charges

By definition, the primary objective of a congestion charge is to reduce traffic congestion, however, revenues from congestion charges are also beneficial; studies conducted as early as the 1960s have showed that congestion charges can increase welfare<sup>25</sup>. This is because a congestion charge ensures a more efficient use of existing infrastructure while generating revenues, which then can be invested in the road and public transport system surplus<sup>26</sup>.

In terms of Singapore, Since the ERP scheme was merely a replacement of the ALS, since the adaptive pricing scheme led to almost all charges being reduced, the expectation might be that traffic volumes may even have increased. Incredibly, though, the number of vehicles entering the Restricted Zone RZ during the charging period dropped by a remarkable 15% within the first year. The reason for this reduction is believed to be a result of the per-entry charging. In contrast to the era of the ALS, drivers now had to plan their journeys better and avoid unnecessarily re-entering the RZ. Indeed, the number of multiple trips into the RZ had fallen by 34%<sup>27</sup>. In terms of London, the congestion charge led to the reduction in city-center traffic by 12%; of which 50-60% shifted to public transport (Transport for London, 2004)<sup>28</sup>.

## 2. Employee Parking Cash-Out

In a cash-out program, a company pays employees to not drive. One rationale for such a program is that because car parking is an expensive commodity, those that use it less than others deserve additional compensation. However, Cash-Outs also mean that employees will not be driving to work and thus alleviate congestion. Companies can use various ways to discourage their employees from driving to work; such as providing bike parking and showers for cyclists, or company purchased commute services, such as bus passes or shuttle services, or just paying employees a compensation which equals what employees naturally pay for car parking in order to encourage them to commute to work through public transport. 10 studies carried out by Siegman<sup>29</sup> show that the cash-out method reduced parking demands by 25%.<sup>30</sup>

In the case of Kuwait, harsh weather conditions, where it is hot, humid, and dusty almost seven months a year, it would be quite unreasonable to expect people to cycle to work, not to mention the traditional formal attire of Kuwaiti men and women<sup>31</sup> is not suitable for such

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<sup>25</sup> *ibid* (see footnote 6).

<sup>26</sup> Eliasson, J. and Mattsson, L., (2006). Equity effects of congestion pricing: quantitative methodology and a case study for Stockholm. *Transportation Research A*, 40: 7, 602–620.

<sup>27</sup> *Ibid* (see footnote 9)

<sup>28</sup> Rich, J. and Nielsen, O. A., (2007). A socio-economic assessment of proposed road user charging schemes in Copenhagen. *Transport Policy*, 14, 4, 330-345.

<sup>29</sup> Siegman, P., "A Step-by-Step Guide to Reforming Parking Requirements" and "Rethinking Parking Policy", 1997, <https://www.cnu.org/sites/www.cnu.org/files/Seigman-RethinkingParking.pdf>, [http://sdapa.org/download/PatrickSiegman\\_SDParkingSym\\_7-14-06.pdf](http://sdapa.org/download/PatrickSiegman_SDParkingSym_7-14-06.pdf).

<sup>30</sup> Bullock, M., "Solutions for Traffic Congestion", 1997, <http://moderntransit.org/solution.html>.

<sup>31</sup> The traditional way for men to dress in Kuwait is a long white cotton garb with a light weight white cotton head cover, while most women wear long modest skirts and dresses, as modest dressing is an important part of the tradition and religion of the Kuwaiti people.

physical sport, therefore, what would really be effective in the case of dusty hot Kuwait is for companies to provide private shuttles, allowing for one vehicle to transport a large number of employees rather than each employee traveling alone, and improving public transportation (buses) in order to encourage employees to commute via public buses whilst compensating them annually for the cost of public transportation. At the moment, Kuwait's public buses are rated as extremely poor, the vehicles are old, unclean and are not time efficient, leaving them only to be used by the lower wage immigrants who cannot afford to drive cars or hire taxis.

### 3. Fuel Tax

A fuel tax is a levy on the consumption of fuel in proportion to its pre-tax price. Traditionally it is introduced for several purposes, such as to raise government revenue with low administrative costs; to conserve foreign exchange, and to generate revenue to finance road maintenance, etc.<sup>32</sup> Fuel tax can, however, act as a pricing instrument to correct transport sector externalities, such as congestion and environmental pollution. In the short-run, a fuel tax results in an increase in fuel price, which in turn, discourages utilization of vehicles and thus over-consumption of fuel and release of emissions. In the long-run, fuel taxes also alter consumers' purchasing behavior, thereby causing them to switch to more fuel-efficient methods<sup>33</sup>. Unlike other taxes, the fuel tax is administratively simple and well-established in principle. The fuel tax considers externalities that are not directly priced<sup>34</sup>.

#### Impact of Fuel Tax

Although the fuel tax is introduced mainly to generate government revenues, it could have significant impact toward the reduction of emissions and traffic congestion. A number of existing studies<sup>35</sup> demonstrate how the fuel tax reduces travel demand, fuel consumption, and emissions. Employing an econometric model for household gasoline demand in Canadian provinces for 1969-1988,<sup>36</sup> finds that a 10% increase in the fuel price would cause 75% of households to reduce their vehicle travel within one year after the fuel price increase. As a result, 15% of households shifted from large to small vehicles, and 10% of households switched from less fuel-efficient to more efficient vehicles. Using the data from 68 large cities worldwide, Hirota et al.<sup>37</sup> demonstrate that for every 1% increase in the fuel tax, vehicle miles traveled (VMT) could be reduced by 0.042%.

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<sup>32</sup> Gupta, S., and Mahler, W., (1994). "Taxation of Petroleum Products: Theory and Practice". International Monetary Fund Working Paper WP/94/32, Washington, D.C.

<sup>33</sup> Acutt, M. Z. and Dodgson, J. S., (1997). Controlling the environmental impacts of transport: Matching instruments to objectives. *Transportation Research Part D: Transport and Environment*, 2: 1, 17-33.

<sup>34</sup> Ubbels, B., (2002). The Economics of Transport Pricing, In: *Colloquium Vervoersplanologisch Speurwerk: De kunst van het verleiden?*, Delft, CVS, pp. 201-219.

<sup>35</sup> Eltony, M., (1993). Transport gasoline demand in Canada. *Journal of Transport Economics and Policy*, 27, 193-208. And, Sterner, T., (2007). Fuel taxes: An important instrument for climate policy. *Energy Policy*, 35, 6, 3194-3202.

<sup>36</sup> *ibid* (see Footnote 35).

<sup>37</sup> Hirota, K., Poot, J., Minato, K., (2003). Do policy incentives affect the environmental impact of private car use? Evidence from a sample of large cities. Paper prepared for the 43rd Congress of the European Regional Science Association, Jyväskylä, Finland 27-30 August 2003.



## Are fuel taxes applicable to Kuwait?

This paper was written in January 2015, when oil prices in Kuwait have slumped from \$110 per barrel to \$50 per barrel, to rise up again to \$77 per barrel, all in a matter of the past 4 months! The issue becomes even more serious when we consider that Kuwait is a country that depends solely on oil export for income. Introducing a tax (as Kuwait does not yield any taxes from its individuals or corporation) can be a very efficient way for Kuwait to create a second more reliable source of income, however, the tax falling on a commodity as volatile as oil can raise many concerns over its reliability. The other point of view is that taxing gasoline is a far less efficient scheme to relieve congestion than the congestion charge discussed in this paper (see pages 4-10) for the simple reason that taxing gasoline will affect all drivers and will raise the cost for all drivers without discrimination, unlike congestion charges that falls only on drivers who are using certain congested lanes and thus induces them to use other less congested ones<sup>38</sup>.

### 4. HOT lanes

Recently in the U.S. there have been some experiments with individual lane tolls that vary with the time of day<sup>39</sup>. There seems to be less opposition from the public to these schemes since they leave open the option of using other lanes on the freeway without having to pay any money<sup>40</sup>.

Create High Occupancy Toll (HOT) lanes. Peak-hour road pricing would not be politically feasible if policymakers put tolls on all major commuter lanes, but HOT lanes can increase traveler choices by adding new toll lanes to existing expressways, or converting underused high-occupancy vehicle (HOV) lanes to HOT lanes, and leaving present conventional lanes without tolls. True, HOT lanes do not eliminate congestion. But they allow anyone who needs to move fast on any given day to do so, without forcing all low-income drivers off those same roads during peak periods. In some regions, whole networks of HOT lanes could both add to overall capacity and make high-speed choices always available to thousands of people in a hurry<sup>41</sup>.

### How HOT lanes work

A small plastic case, called a "tag" (shown below) either attaches to the vehicle, or is placed on the dashboard. The tag contains information in an electronic memory that is transmitted to roadside "readers" using radio frequencies. There are two methods:

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<sup>38</sup> Parry, I., (2000), "Comparing the Efficiency of Alternative Policies for Reducing Traffic Congestion", Resources for the Future, p.2.

<sup>39</sup> On route 91 in Orange County, California, two new toll lanes were built in the median of an eight-lane freeway, and the tolls vary according to the time of day. Similar schemes now operate on I-15 in San Diego, and on I-10 in Houston. A variety of other proposals for single lane tolls are currently being studied in a number of different states (e.g., Poole and Orski, 1999, and Small and Gómez-Ibáñez, 1998). Some of these schemes are called high occupancy/tax (HOT) lanes, because single occupancy vehicles pay the toll, while multiple occupancy vehicles pay

lower rates or no toll at all.

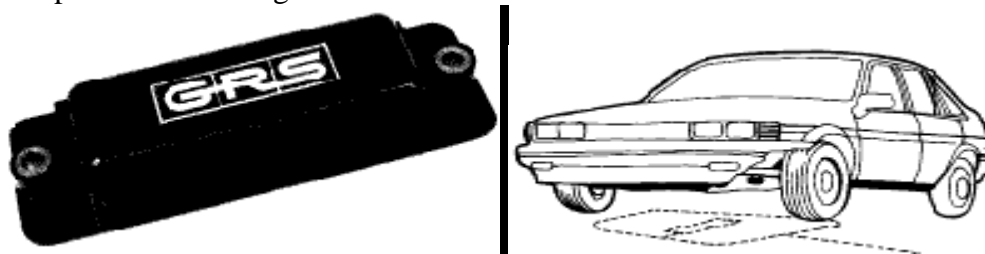
<sup>40</sup> *ibid* (see footnote 38).

<sup>41</sup> Downs, A., (2004), "Traffic: Why It's Getting Worse, What Government Can Do", Brookings Policy Brief Series, p. 7.

- the tags contain the license plate number, and the readers send this information to a computer for billing. The customer receives monthly billing as for other utility bills. These tags do not contain batteries, nor do they have any wires to attach. (The negligible power they use actually comes from the readers)
- or, the tags contain monetary value only. This is pre-pay ticketing, similar to BART-type ticketing or pre-pay phone cards. Tags are purchased in advance and then debited just by driving by.

Both methods should be used, to give people a choice. The readers do not have to charge the same rate to all vehicles. Trucks and buses should be charged more. If a new lane were constructed, users of that lane should be charged for the lane construction.

Most important, the fare per mile can frequently change to keep traffic flowing at an optimum speed, thus eliminating congestion. The current rate would always be displayed by variable signs (as is now done on bus destination signs). In fact, computers will have all the information to control traffic flow by using congestion pricing, also called demand pricing. Computers can also signal a stall or an accident<sup>42</sup>.



**Figure 2 Tag (left) Sensors underneath the roadway read the tag (right).**

Many believe that HOT lanes do not address the problem of congestion they only serve an option for a driver who wants to reach his destination faster without having to implement a charge on all drivers. In fact many believe that HOT lanes exacerbate the problem of congestion further since drivers substitute away from the priced lane.

## 5. Carpooling

Carpooling involves shared use of cars, in particular for commuting to work, often by people who each have a car but travel together to save costs. This solution has been applied for five years in the USA and for more than fifteen years in European countries with remarkable success<sup>43</sup>.

Case in point: a study from New Dehli, India, which found that while 83 percent of people favored carpooling as a traffic-congestion solution, only about 15 percent of people actively did it. Still, the numbers do speak for themselves -- carpooling does cut down on congestion, even if dedicated carpool lanes don't<sup>44</sup>.

<sup>42</sup> The Modern Transit Society, "Solutions for Traffic Congestion", p.11

<http://moderntransit.org/fmt/fmt07.html>.

<sup>43</sup> Matsoukis, E., (2006), "Congestion Charging, Carpooling, Car-sharing: Solutions for Reducing Traffic Congestion, Pollution and Vehicle kms traveled", University of Patras, p. 3.

<sup>44</sup> Rowe, R., (2005), "Carpooling as a Solution to Traffic Congestion",

<http://autoresource.internetautoguide.com/carpooling-solution-traffic-congestion-2273.html>.

The main issue which arises with this method of carpooling is the necessity to create lanes especially for carpoolers in order to distinguish solo drivers from carpoolers in order to reward the latter with a faster moving lane, this lane dedicated to carpoolers is known as “High Occupancy Vehicle” or HOV. However, practice has showed that HOVs are constantly being abused by solo drivers; also studies have shown that most carpoolers are from the same household, not to mention many of them are driving a spouse to work then making another trip back home for another family member, which defeats the whole objective of reducing congestion via HOV, research has also shown that there were more people carpooling in the 1980s before HOVs were dedicated to carpoolers. As a study on the San Francisco Bay Area provided, that in 1980 when there were no carpool lanes 16.3% carpoled compared to 14.3% in 1998, this was despite constructing 266 miles of carpool lanes<sup>45</sup>.

From the above, it is obvious that carpooling can be successful if no special lanes were dedicated to carpoolers as this only encourages abuse.

## **6. Improving Public Transportation and Other Minor Solutions**

### **The Importance of Multiple Policy Instruments**

As there is no single policy that fits all prescriptions when it comes to designing appropriate fiscal instruments to combat transport sector externalities, many cities around the world, particularly in developing countries, are experiencing difficulty in trying to determine appropriate sets of policy instruments to reduce the transport sector externalities.

Many strategies provide short-term relief, but only pricing strategies resist triple convergence and manage congestion in the long run. Often called congestion pricing, these strategies involve charging drivers more for their use of roadways when travel demand is highest<sup>46</sup>. They include assigning higher tolls for driving during peak hours or collecting higher fees for parking in the most convenient curb spaces at the busiest times. Triple convergence does not diminish the effect of pricing strategies, because the peak-hour charges encourage some drivers to change their travel patterns and deter others from converging on the freed capacity when prices rise with increased demand.

Pricing strategies must be complemented by significant alternative transportation improvements. Certain forms of pricing may introduce concerns about the ability of lower-income drivers to pay. To mitigate such concerns, policymakers must offer faster, more reliable, and more convenient public-transportation options throughout the region<sup>47</sup>. Sri Lanka incurs a huge economic loss of around Rs. 40 billion annually due to road traffic congestion and air pollution with too many vehicles on a limited road network. Unless the authorities take measures to modernize and improve public transport, the country cannot curb this massive, unproductive cost<sup>48</sup>.

In 2010, the Texas Transportation Institute (TTI) in the USA released a congestion report, which looked at road congestion in 439 United States urban areas. As in past years, the data overwhelmingly shows the importance of public transportation in relieving congestion. In

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<sup>45</sup> Goodwin, Ph., (1996), “Emperical Evidence on Induced Traffic”, Transportation, Vol. 23, No. 1, pp. 35.

<sup>46</sup> Reducing Traffic Congestion in Los Angeles, [http://www.rand.org/pubs/research\\_briefs/RB9385/index1.html](http://www.rand.org/pubs/research_briefs/RB9385/index1.html)

<sup>47</sup> *ibid* (see footnote 46).

<sup>48</sup> Sirimana, B., (2013), “Better Public Transport Key to Reducing City Traffic”, <http://www.sundaytimes.lk/130728/business-times/better-public-transport-key-to-reducing-city-traffic-congestion-experts-say-54075.html>.

fact, the report's improved methodology indicates that public transportation has an even greater role in reducing congestion than previously thought. This 2010 Urban Mobility Report makes clear that without public transportation services, travelers would have suffered an additional 785 million hours of delay and consumed 640 million more gallons of fuel. Had there been no public transportation service available in the 439 urban areas studied, congestion costs for 2009 would have risen by nearly \$19 billion from \$115 to \$134 billion. "There is no doubt that expanding public transportation use is key to reducing traffic congestion," said American Public Transportation Association (APTA) President William Millar. "Clearly, even if you don't ride public transportation, it is still in your best interest to support investment in public transit. Better public transportation in your community means less congestion on the roads."<sup>49</sup>

The improvement of public transportation is a vital key to relieving traffic congestion, and in the case of Kuwait especially where the weather conditions don't permit cycling or walking no matter how short the distance an individual wants to travel. At the moment, the services provided by public busses in Kuwait are very poor; the busses are extremely old, worn out, and unhygienic, in addition to lack of punctuality. If Kuwait is serious about solving traffic congestion issues it needs to start with improving the quality of public transportation in addition to using other fiscal policies.

#### **Minor strategies that can help relieve congestion:**

- School Breakfast Clubs

Many primary and elementary schools in the UK offer a breakfast club service, where students can arrive to school earlier than start time and have breakfast before starting classes. The initial idea was to help parents who need commute to work earlier due to longer distances. The initiative also served as an incentive to help more young people eat healthier breakfasts especially in the many cases where parents had to commute to work early and might not have time to prepare breakfast for their children in the morning.

School Breakfast Clubs are for a small charge, however, if parents make use of them this allows a child to be driven to school earlier and therefore avoiding the rush hour and for parents to beat the rush hour which eventually helps relieve some traffic congestion.

- The Happy Maps

A smart phone app can be introduced directing road users to choose less congested roads, which drivers can download on their smart phones, such apps can show drivers what are the fastest, the nicest looking and the least congested routes to use to wherever their destination may be.

- Park and Ride

Another scheme introduced in the UK is the Park and Ride scheme, where a large and free parking facility at a public park can be used for drivers to leave their cars and hop on a bus to travel into a busy town where they know parking spaces are either scarce or too expensive especially when they plan spending all day there. This helps relieve the already congested traffic of the town Centre especially during weekends.

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<sup>49</sup> Public Transportation Relieves Traffic Congestion, (2011),  
[http://www.apta.com/mediacenter/pressreleases/2011/Pages/112001\\_TTI\\_Report.aspx](http://www.apta.com/mediacenter/pressreleases/2011/Pages/112001_TTI_Report.aspx).

## CONCLUSION

As the Kuwaiti population is growing and more drivers are flooding the insufficient roads of the small state causing ongoing traffic congestions, it's crucial to implement different long and short term strategies to relieve this problem. As has been seen in this paper both Singapore and London have used congestion charges successfully, what makes congestion charges so efficient is that they induce people to efficiently exploit alternatives to peak-hour driving, such as using mass transit, driving on other (non-congested) routes, re-scheduling trips at less busy times, and carpooling. But it's also the principle which congestion charges impose; in that road users should be forced to pay for their road usage in proportion to the negative effects that this usage creates.

On the other hand, company shuttles can be a great incentive for employees not to drive to work and thus decrease congestion. Another option is fuel tax which can help serve as another source of income for Kuwait but also discourage drivers from over-usage of cars, although fuel tax can be viewed as disadvantageous for the mere reason that it falls on all drivers without distinction. HOT lanes as has been seen in this paper can exacerbate the problem of congestion further since drivers substitute away from the priced lane. Carpooling as this paper shows invites abuse by solo driver when special lanes are created for that particular purpose. What is needed in addition to the fiscal solution in Kuwait is to improve public transportation, there would be many more individuals using public busses in Kuwait and relieving congestion if more care was put into making the service better quality, business men, graduate students and entrepreneurs would gladly swap their hours spent on the road stuck in traffic and hop on a bus where their hands are free to finish last minute work on their laptops, make important calls, eat a meal or answer urgent e-mails but only if that service was efficient, reliable and on time.

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