MANAGING TRAFFIC CONGESTION IN COLOMBO AND ITS SUBURBS

D.U.A Edirisinghe
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D.U.A Edirisinghe
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by

D.U.A Edirisinghe

This is to certify that I have examined the above MPM Policy paper and have found that it is complete and satisfactory in all respects, and that all revisions required by the Policy paper examination committee/ supervisors have been made.

……………………………..
Dr. S.R.S.N Sudasinghe

School of Postgraduate Studies

20th October 2014
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I would like to express my special thanks of gratitude to Dr. S.R.S.N Sudasinghe my lecturer of Public Policy, who gave me this golden opportunity of doing this Policy paper.

And also I would like to express my thanks of gratitude to police officers of Ragama police station with very special thanks to Sub Inspector of Police Mr. Ramesh Nalindra Fernando Officer in charge Motor traffic unit and to Junior police officer Police Constable 61184 Mr. A.M.A.K.R Adikari of Motor traffic unit and also to police sergeant 26395 Mr. Chandana Wijesinghe Police Special unit, Katunayaka Sub unit for sharing their valuable time and knowledge with me.

Also, I would like to thank my loving husband for his understanding and support to me at every moment of my life.
EXECUTIVE SUMMARY

Colombo is the most attractive city in the country by the people. Transport problem that currently experienced by the city of Colombo is reflected in the increasing traffic congestion. One of the main reasons is roads are full with traffic congestion as an average 250,000 vehicles enter Colombo daily.

As government of Sri Lanka has identified the traffic congestion in Colombo city and its suburbs as a one of a major issue in Sri Lanka which affect to its GDP, manpower and environment many government policies has been taking place like develop sophisticated road network system, improving the public transport systems and traffic management strategic plan.

Currently the main government body to manage and control the road traffic is with Department of Police. During peak hours and school beat to reduce the traffic they find not obeying colour lights, heavy vehicles, passenger transport buses and three wheelers using right lanes, drive less speed than speed limits and passenger transport buses stop more time in bus stops in main roads as offences. Even above actions are taken place traffic congestion is not reduce to expected level.

Goal of this policy paper is to minimize traffic congestion in peak hours to ensure a satisfactory access to Colombo metropolitan city. For that three alternative policies which are world best practices for managing traffic congestion in different parts of the world has consider namely

1. Introducing Road user charging / Congestion charging through Area Licensing
2. Introducing High Occupancy Vehicle Lanes
3. Introducing of packet movement

The second alternative was taken as the most feasible alternative after critical analysis and taken for implementation.

Responsibility of monitoring can be given to Sri Lanka police department. Department of Planning as an independent party can evaluate whether the objectives of the project proposal has been achieved or not.
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LIST OF ACRONYMS AND ABBREVIATIONS

DIG - Deputy Inspector General of Police

GDP - Gross Domestic Products

RDA - Road Development Authority

USA - United States of America

HOV - High Occupancy Vehicle
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CHAPTER ONE

Policy Problem

1.1. Analysis of the Policy Problem

Colombo is the most attractive city in the country by the people because of its commercial and political significance and because it offers better facilities in health, education etc. than any other city in the country. The combination of all these aspects results in a greater attraction of the city for people from the rest of the country thus aggravating the transport problem in the city of Colombo.

Transport problem that currently experienced by the city of Colombo is reflected in the increasing traffic congestion. A few years ago, the traffic congestion was largely limited to the Colombo District but now it has spread to the entire core area lasting sometimes most of the peak period. Heavy traffic congestion prevails during school-opening hours especially between 7.30a.m-8.30a.m followed by office traffic between 8.00a.m and 9.00a.m. In the afternoons and evenings the same sort of traffic congestion is witnessed between 1.30p.m-2.30p.m and 5.00p.m-8.00p.m for the same reasons.

Roads are full with traffic congestion as an average 250,000 vehicles, made up of 15,000 buses, 10,000 trucks and 225,000 private vehicles, enter Colombo daily. Around 3 million vehicles are on the roads, though the number of vehicles registered was over 5 million.

But number of vehicles in the city is not the only factor that contributes to congestion. Shortage of parking areas, inadequate facilities for pedestrians, parking of heavy vehicles on busy highways during normal working hours and poor public transport

Figure 1.1: Traffic Congestion in Colombo
facilities are also equally significant contributors to the congestion problem. As a consequence the average vehicle speed has reduced to around 10 kilometers per hour within most parts of the city during the day.

When the average speed decreases, it leads to longer travel times, causing an economic loss as a result of high fuel consumption and rise in pollution levels.

According to statistics a large number of Sri Lankans spend more time on the roads, paying more for fuel, as the number of vehicles on the roads is rapidly increasing and it takes longer to reach one’s destination.

Private companies incur at least 10 percent loss due to heavy fuel bills and in addition they suffer man hour losses as well due to a decline in productivity even after providing vehicles for some of their top executives.

Because of traffic congestion there are many adverse effects have been identified in general, such as

- Delays, which may result in late arrival for employment, meetings, and education, resulting in lost business, disciplinary action or other personal losses.
- Inability to forecast travel time accurately, leading to drivers allocating more time to travel "just in case", and less time on productive activities.
- Wasted fuel increasing air pollution and carbon dioxide emissions owing to increased idling, acceleration and braking.
- Wear and tear on vehicles as a result of idling in traffic and frequent acceleration and braking, leading to more frequent repairs and replacements.
- Stressed and frustrated motorists, encouraging road rage and reduced health of motorists.
- Emergencies: blocked traffic may interfere with the passage of emergency vehicles traveling to their destinations where they are urgently needed.
As mentioned earlier increasing the number of vehicles in the road becomes one of the key reasons for increasing Traffic Congestion in Colombo City and its suburbs. From 2003-2013, the Sri Lankan vehicle population has more than doubled. There were 2.07 million vehicles on the road in 2003 and now there are nearly 5 million. Over 50% of the vehicles on the road are motorcycles.

Table 1.1 Total Vehicle Population (2003 - 2013 July) in Thousands

<table>
<thead>
<tr>
<th>Class of Vehicle</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013 end July</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Cars</td>
<td>275</td>
<td>294</td>
<td>311</td>
<td>339</td>
<td>361</td>
<td>381</td>
<td>387</td>
<td>410</td>
<td>468</td>
<td>500</td>
<td>514</td>
</tr>
<tr>
<td>Motor Tricycle</td>
<td>169</td>
<td>213</td>
<td>254</td>
<td>319</td>
<td>362</td>
<td>407</td>
<td>444</td>
<td>530</td>
<td>668</td>
<td>767</td>
<td>818</td>
</tr>
<tr>
<td>Motor Cycles</td>
<td>1,010</td>
<td>1,135</td>
<td>1,266</td>
<td>1,422</td>
<td>1,605</td>
<td>1,761</td>
<td>1,896</td>
<td>2,101</td>
<td>2,354</td>
<td>2,546</td>
<td>2,642</td>
</tr>
<tr>
<td>Buses</td>
<td>70</td>
<td>72</td>
<td>74</td>
<td>77</td>
<td>80</td>
<td>81</td>
<td>82</td>
<td>84</td>
<td>89</td>
<td>92</td>
<td>93</td>
</tr>
<tr>
<td>Dual purpose vehicles</td>
<td>163</td>
<td>174</td>
<td>181</td>
<td>188</td>
<td>193</td>
<td>196</td>
<td>198</td>
<td>209</td>
<td>243</td>
<td>280</td>
<td>295</td>
</tr>
<tr>
<td>Lorries</td>
<td>199</td>
<td>209</td>
<td>224</td>
<td>244</td>
<td>263</td>
<td>277</td>
<td>285</td>
<td>297</td>
<td>312</td>
<td>324</td>
<td>327</td>
</tr>
<tr>
<td>Land vehicles- Tractors</td>
<td>154</td>
<td>165</td>
<td>181</td>
<td>200</td>
<td>221</td>
<td>246</td>
<td>260</td>
<td>277</td>
<td>297</td>
<td>316</td>
<td>322</td>
</tr>
<tr>
<td>Land vehicles- Trailers</td>
<td>34</td>
<td>35</td>
<td>37</td>
<td>39</td>
<td>41</td>
<td>43</td>
<td>44</td>
<td>46</td>
<td>50</td>
<td>53</td>
<td>55</td>
</tr>
<tr>
<td>Total</td>
<td>2,074</td>
<td>2,298</td>
<td>2,527</td>
<td>2,828</td>
<td>3,126</td>
<td>3,391</td>
<td>3,595</td>
<td>3,954</td>
<td>4,480</td>
<td>4,877</td>
<td>5,066</td>
</tr>
</tbody>
</table>

Source: Department of Motor Traffic Sri Lanka
According to the World Health Organization in the South-East Asia Region there are 124.7 registered vehicles per 1000 population. The number of registered vehicles per 1000 population is highest in Thailand 412.1, followed by 303.2 in Indonesia and 189.6 in Sri Lanka.

Sri Lanka incurs a massive financial and man-hour loss due to traffic congestion as a result of no proper vehicular traffic in Greater Colombo areas and in 2009 this loss was estimated at Rs 32 billion per annum and also that the country was losing 1.5% of the GDP due to traffic congestion.

1.2. Government Intervention

Currently the main government body to manage and control the road traffic is with Department of Police. The Traffic Police is a specialized unit of the Sri Lanka Police responsible for overseeing and enforcing traffic safety compliance on roads and highways.

With the enactment of the Motor Traffic Act of 1950, the Colombo Metropolitan Police identified the need for a unit for traffic control in the city of Colombo. This unit was formed in 1951 and was expanded in 1953 to cover the whole island with the establishment of the Traffic Police Headquarters. Administration of the unit is carried out by the Traffic Police Headquarters, while there is a Traffic Unit in all police stations island wide.

Followings are the current actions taken by the Department of Police to manage the traffic congestion in Colombo and its suburbs. Sri Lanka police has identified the peak hours of traffic congestion as 6a.m to 9.30a.m and 4.30p.m to 7.30p.m in Colombo and its suburbs. And in afternoon 1.30p.m to 2.30p.m also identify as heavy traffic congestion period and named as ‘School beat’. 
In peak hours police officers attached not only to traffic units in each police station but all other units are also report to the traffic control duty. In school beat officers of traffic police units report to the traffic control duty. To control the traffic they charge fines for following offences.

- Not obeying Colour lights.
- Heavy vehicles, passenger transport buses and three wheelers using right lanes as they are permit to use left lanes only.
- Drive less speed than speed limits.
- Passenger transport buses stop more time in bus stops in main roads.

Even though these actions are there the traffic congestion in Colombo city and its suburbs are very high. According to Camillus Abeygunawardena, Retired DIG – who served as the Head of Traffic Police for a considerable period, that the police have found it difficult to handle traffic in a fair manner due to political interference and break down in law. The other main reason was the lack of proper training for newly recruited traffic policemen.

1.3. Goals and Objectives

Goal

The goal of this police is to minimize Traffic Congestion in peak hours to ensure a satisfactory access to Colombo metropolitan city.
Objectives

1. To minimize the vehicles enter in to Colombo city by improve public transport system.

2. To deliver a predictable travel times.

3. To reduce the unnecessary waste on fuel.

By implementing proper policy amendments to the existing policies it is expected to ensure predictable travel time within city of Colombo and its suburbs. By managing the large number of vehicles enter in to city carbon dioxide emission is expect to reduce and as a result air pollution will be reduce too. As traffic Congestion is less, motorist need not to use the vehicle horns and it will result for reducing the sound pollution.

More importantly financial and man-hour loss due to traffic congestion as a result of no proper vehicular traffic in Greater Colombo areas can be reduced by implementing proper policy amendments and can save currently loosing GDP due to traffic congestion.
CHAPTER TWO

Policy Alternatives/Solutions for the Problem

2.1 Existing policies to overcome the problem

As government of Sri Lanka has identified the Traffic Congestion in Colombo City and its suburbs as a one of a major issue in Sri Lanka which affect to its GDP, manpower and clean environment many government policies has been taking place by many government organizations.

To reduce the traffic one of the method that the government has identified is develop sophisticated road network system in the country. RDA is the premier highway authority in the country and is responsible for the maintenance and development of the National Highway Network, comprising the Trunk (A Class) and Main (B Class) roads and the planning, design and construction of new highways, bridges and expressways to augment the existing network.

In the other hand to reduce the traffic congestion government has identify the important of improving the public transport systems. To develop the railway transport system Department of railways, Sri Lanka is responsible. Rail transport in Sri Lanka consists of a heavy-rail intercity network connecting major population centers and commuter rail serving Colombo commuter traffic. Sri Lanka Railways operates the country’s railway network, which includes about 1,450 km of track. Colombo is the main node of the network. Train routes connect the main cities of all nine provinces in the country.

The Ministry of Transport has introduced a transport policy in 2010 to reduce the number of vehicles coming to Colombo to minimize traffic congestion, save fuel consumption and reduce air pollution. The proposed strategic plan for traffic management in the city targeted to reduce the number of private vehicles from 175,000 to 125,000 by the end of 2010 and to improve traffic speed by 50 percent and the impact of air pollution by half.
Other than the above organizations and policies currently the main government body to manage and control the road traffic is with Department of Police. The Traffic Police is a specialized unit of the Sri Lanka Police responsible for overseeing and enforcing traffic safety compliance on roads and highways.

As discussed above there are several solutions has been introduced by the government to manage the traffic congestion. For this policy paper preparation among above current policies one of the influential policy that is manage and control the road traffic by the Department of Police is used to justify the proposed solution.

Current policy of the Police Department to control the traffic congestion in Colombo and its suburbs is, in peak hours police officers attached not only to traffic units in each police station but all other units are also report to the traffic control duty. In school beat officers of traffic police units report to the traffic control duty. To control the traffic they charge fines for following offences.

- Not obeying Colour lights.

- Heavy vehicles, passenger transport buses and three wheelers using right lanes as they are permit to use left lanes only.

- Drive less speed than speed limits.

- Passenger transport buses stop more time in bus stops in main roads.

2.2 Alternative 1: Introducing Road user charging / Congestion charging through Area Licensing

Road user charging is a mechanism through which motorists pay to use a defined area of road. It can be seen that road pricing can be used as a flexible way of charging people for road use.
Area Charge is an area licence scheme involves a payment for a period during which the vehicle may be used or kept on the road inside the charging area and can be paper, or electronic, by storage of a registration number.

Colombo metropolitan areas can be identified as the charging area to reduce traffic congestion during rush hours. This charging system can be introducing during the rush hours i.e. morning 6.00 a.m.-9.30 a.m. afternoon 4.30 p.m. to 7.30 p.m. In the initial stage this can be done by manually by establishing ticket points at the main entrance to Colombo city area. As example Paliyagoda, Battaramulla, Moratuwa etc. Road Development Authority can administrate the ticket points. When entering the city between 6.00 a.m.-9.30 a.m. and existing from the city between 4.30 p.m. to 7.30 p.m. they can charge from the vehicles an “on the spot” considerable charge and issue a ticket.

To encourage the public transportation, passenger buses, school vans and other group transportation like staff transport services can be eliminated from this charging system. Motor bicycles also can eliminate.

Initially government has to set up ticket counters at entrance point and existing points according to traffic lines in the respective place. As the charges are same for all the vehicles irrespective of their travel destinations or travel times pre printed tickets can be issue.

Before introduce this kind of a charging system government has to give well understand to the public regarding the charge and reason for the charging system. Other wise people will get wrong idea about the charge and they feel it also as another tax burden on public.

In many countries this road user charging has been introduced and some are called as congestion pricing scheme. The road user charging has become one of the best traffic congestion mechanisms.

The world's first congestion pricing scheme was introduced in Singapore's core central business district in 1975 as the Singapore Area Licensing Scheme. It was extended in 1995 and converted to the 100% free-flowing Electronic Road Pricing (Singapore) in
September 1998. Variable pricing based on congestion levels were introduced during 2007.

Another best example of use of this is London's 'Congestion Charging' scheme which as introduced on the 17th February 2003. It was an immediate success, reducing congestion levels by about 20%. With the scheme now well established, analysts agree that it is working well. Congestion is lower, journey times quicker, and business has survived without a significant impact. In fact, the scheme has been far more effective than expected, and has removed far more cars from the road than was planned.

The success of the London scheme has already resulted in plans to extend the area over which it operates. Similar schemes are also being looked at in many other cities in United Kingdom and Heathrow Airport.

In addition to control the traffic from this alternative government can earn extra income from this congestion charges. In the other hand government has to take steps to ensure that violations can be identified and dealt with.

By putting an additional charge on vehicle owners other than already existing fuel, time etc they will consider of reducing that extra charge. For that they will use different actions to minimize entering to the Colombo on rush hours. Because of that vehicles enter in to Colombo metropolitan area will reduce at the rush hours.

To go for road user charging / Congestion charging through Area Licensing Government of Sri Lanka has to do certain activities. Different kind of Government Organizations has to involve for this.
RDA has to identify the exact places for to establish ticketing points and to decide the “on the spot charge” for the vehicle entered and exist from the ticketing points at the decide time i.e. peak time. With parallel to establishing ticketing points, has to carry out awareness programs for the public. This can be done through the Mass Medias like television, radios, newspapers, internet etc. Department of Police has to monitor the process.

Expected cost and time for mainly identified activities to approximate value are as follows.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Expected Period</th>
<th>Expected Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishing Ticketing Points</td>
<td>3 months</td>
<td>150Mn</td>
</tr>
<tr>
<td>Awareness Programs</td>
<td>3 months</td>
<td>2Mn</td>
</tr>
<tr>
<td>Documentary expenditure</td>
<td>2 months</td>
<td>0.5Mn</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5 months</strong></td>
<td><strong>152.5Mn</strong></td>
</tr>
</tbody>
</table>

2.3 Alternative 2: Introducing High Occupancy Vehicle Lanes

A High Occupancy Vehicle lane is a specially designed lane that is designated for use by certain types of vehicles with specified number of occupants.

HOV lanes can move a greater number of people than a general traffic lane, and encourage carpooling and transit use, by providing travel time savings and a more reliable trip time. HOV lanes help to manage congestion.

HOV lanes may be a single traffic lane within the main roadway with distinctive markings, or alternatively as a separate roadways with one of more traffic lanes either parallel to the general lanes or alternatively grade-separated, above or below, the general lanes.

This can be introducing during the rush hours morning 6.00 a.m.-9.30 a.m. afternoon 4.30 p.m. to 7.30 p.m. This HOV lanes can be started at the main entrance points to the
Colombo city like Paliyagoda, Battaramulla, Moratuwa etc. Police Department has to
direct the heavy occupancy vehicles into one lane. World best practice of HOV is driver
plus one but in Sri Lanka most vehicles enter in to Colombo during rush hours have
driver plus one so to achieve the purpose of reducing traffic congestion Sri Lanka can
define the HOV as for

- Motor Cars - Driver + 3
- Three wheelers - Driver + 2
- Vans - Driver +6
- And to encourage public transportation passenger buses without any limitation
  about passengers inside the buses.

Additional cost for implementation and maintain is very much low as can use the existing
traffic police officers for the process. Traffic congestion in the remaining traffic lanes
will be increase in the initial stages.

Before implementation public awareness about the HOV lanes program is very much
essential. What are HOV what are the punishments for misuse of the HOV lanes by other
vehicles are to be clear before implementing the program.

There are over 130 HOV lanes programs operating in more than 30 North American
cities, totaling over 4,000 kilometers. Many large cities in the U.S.A have operated HOV
lanes for 30 years. HOV lanes are popular with commuters in states such as Texas and
California, and in cities such as Washington, D.C., Atlanta, Denver, and Seattle.

The introduction of HOV lanes in the U.S.A progressed slowly during the 1970s and
early 1980s. Major growth occurred from the mid-1980s to the late 1990s. The first
freeway HOV lane in the United States was implemented in the Henry G. Shirley
Memorial Highway in Northern Virginia, between Washington DC and the Capital
Beltway.

Not only U.S.A but also Canada and Europe applying this HOV strategy for managing
traffic congestion.
Using this alternative it encourages entering limited vehicles into Colombo in rush hours. If we take as example 100 people enter into city by using single vehicle then there is 100 vehicles in the road. But 2 people use 1 vehicle it will come down to 50 vehicles that means 50% reduction in vehicles enter into city.

Drivers who are drive alone can found partners among co-workers, family, neighbors, or friends and also they can make agreement to share the cost of fuel. This can be easily arrange by the public and private organizations by providing group transport facilities to their employees other than providing separate vehicles or travelling allowances. Government can promote this by identifying such organizations and awarding and appreciating them.

By introducing HOV lanes it provide fast, reliable travel for HOV users at the rush hour within the Colombo metropolitan area. By introducing HOV lanes many benefits can be gain by each individual passenger as well as to whole community.

RDA, Sri Lanka police and mass media has to involve in introducing and implementing this policy alternative. Before introducing thorough awareness for the public has to take place including which lane can be use by HOV vehicles, what are HOVs and what are the punishments to other motorist use HOV lane.

Expected cost for the policy is mainly for awareness programs and to develop relevant laws. Expected cost is Rs 16Mn.
2.4 Policy Alternative 3: Introduction of packet movement

Consider one of the examples from Belgium, which is used to counter the peak hour traffic congestion. They make the main roads one way for 15-30 minutes, blocking all incoming access roads to main road.

In Sri Lanka this method can be implemented in morning and afternoon peak hours. That is from morning 6.30a.m to 6.45a.m and again 7.45 a.m. to 8.00 a.m. During that time, what the police can do is open both sides of the main road towards one destination, for example, from Malabe to Borella, Kiribathgoda to Borella, Moratuwa to Fort etc. At the afternoon same roots at revised way between 4.30p.m to 4.45p.m and again 5.45p.m to 6.00p.m. All the incoming vehicles to exit points towards the destination can move with a greater speed from both lanes, while blocking all the other access roads to the main road. In particular, the speed limit during this time has to be increased up to 70 to 80. Otherwise, the whole purpose of the exercise will not be effective.

To implement this kind of alternative the roads use for the purpose want to be well maintain, otherwise the expect speed limits can not be achieve. Proper awareness prior to implementation must be important. As the both lines of the selected roads are close for the selected period alternative by-roads has to identify and maintain to use by the other users.

As using this kind of alternative most of the vehicles can go to their travel destinations within limited and predictable time periods.

Before implementing this kind of policy RDA has to identify the roads to be use for the packet movement and has to develop such roads as sophisticated roads. Otherwise expected speed limits cannot achieve.

Thorough public awareness is very much
essential as motorist from by roads and motorist going to opposite direction at packet movement period will otherwise have to face to a very difficult situation.

Expected cost and time for mainly identified activities to approximate value are as follows.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Expected Period</th>
<th>Expected Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify the suitable roads and develop them</td>
<td>3 months</td>
<td>100Mn</td>
</tr>
<tr>
<td>Awareness Programs</td>
<td>3 months</td>
<td>2Mn</td>
</tr>
<tr>
<td>Total</td>
<td>5 months</td>
<td>102Mn</td>
</tr>
</tbody>
</table>

2.5 Analysis of Alternatives

Analysis of alternative will be done based on five criteria’s. That is Efficiency, Effectiveness, Distributional equity, Political criteria and Eventual ecological impacts.

2.5.1 Efficiency
When considering the efficiency mainly the cost of the alternatives is considered.

When introducing Road user charging / Congestion charging through Area licensing there will be additional cost for initial set up of ticket counters. But additional income is available. Other main source of expenditure is for the public awareness programs. Awareness for the officers involve in this also important like for police officers. Expected cost is Rs 152.5Mn.

When introducing HOV lanes main expenditure is for awareness programs. It also has to develop relevant laws such as chargers for other motorist for using HOV lanes. Expected cost is Rs 16Mn.

Before introducing packet movement roads which are identified to use for the purpose has to develop as sophisticated roads. Other wise expected speed limits can not achieve. Other main expenditure is for awareness programs. Expected cost is Rs 102Mn.
2.5.2 Effectiveness

Under this criteria the degree to which objectives are achieved under the alternatives and extent to which targeted problems are solved are consider.

When consider the effectiveness of alternative one, by putting an additional charge on vehicle owners other than already existing fuel, time etc they will consider of reducing that extra charge. For that they will use different actions such as

- Route change
- Reducing the frequency of trips
- Retime trip
- Not make the trip
- Consolidate trips (trip becomes part of a trip chain)
- Change vehicle occupancy

Because of above different actions the vehicles enter in to Colombo metropolitan area will reduce at the rush hours. But after the congestion charging hours all the vehicles retime their trips can be enter in to the city which again can make new traffic congestion or rush hours on Colombo and suburbs.

When consider the effectiveness of introducing HOV lanes HOV lanes will provide fast, reliable travel for HOV users at the rush hour within the Colombo metropolitan area. By introducing HOV lanes many benefits can be gain by each individual passenger as well as to whole community.

- Reduce the number of vehicles enter in to Colombo at rush hours.
- Save Time: HOV lane users avoid congestion, arriving at their destinations more quickly.
- Save Fuel: Less fuel wasted sitting in traffic.

So by introducing HOV lanes all three objectives of this policy can be achieved.
By introducing packet movement most of the vehicles can go to their travel destinations within limited and predictable time periods. As the vehicles are moving faster oil consumption also not wasted. But it will not reduce the number of vehicles enter in to the Colombo at rush hours.

2.5.3 Political Criteria

Under this criteria it is consider how the public accept theses alternatives and how politicians will be gained.

When consider introducing Road user charging / Congestion charging through Area Licensing general public may feel like another tax burden on their head. In the other hand this can be criticizing by opposite political parties as another tax burden on public.

Even though introducing HOV lanes do not have big political impact, attitudes of the people will be heavily impact on success of this alternative as some people do not like to share their vehicles with other peoples. In the other hand policy makers has to develop relevant laws to punish the motorist using HOV lanes but actually not HOVs.

Introduction of packet movement also do not have big political impact but people who are traveling to opposite sides and people who are using by roads in between at the same time will not be happy as they have to wait for fifteen minutes to continue their journey. But this can be justify because under current situation of Sri Lanka one way roads are already in operation and people are uses to one way roads.

2.5.4 Eventual Ecological Impacts

The globally identified problems created by traffic congestion including environmental pollution specifically wasted fuel increasing air pollution and high traffic jam created sound pollution. There for it is worthwhile to consider how these alternatives will positively impact on the environment.
By introducing Road user charging / Congestion charging through Area Licensing motorist will try to reducing the extra charge. For that they will use different actions to minimize entering to the Colombo on rush hours. Because of that vehicles enter in to Colombo metropolitan area will reduce at the rush hours. As a result less number of vehicles emissions of carbon dioxide will reduce and less traffic congestion result for less sound and sound pollution will also reduce. But the case is people who want to enter into Colombo city will avoid the Congestion charging hours and will enter to the city. That will again make sound and air pollution.

By introducing HOV lanes it is expected to reduce the vehicles enter in to Colombo. Introducing HOV lanes more passengers and fewer vehicles will reduce the air and voice pollution. It will positively impact on the environment by reducing environmental pollution and oil waste.

By introducing packet movement it is not expecting to reduce the vehicles enter in to Colombo city. But to provide predictable travel times. As the vehicles are moving faster oil consumption also not wasted. But it will not reduce the number of vehicles enter in to the Colombo at rush hours. So sound pollution cannot expect to reduce drastically.

2.5.5 Operational practicality, technical and administrative feasibility

Under this criteria it is consider whether these alternatives have enough operational capacity to actually operationalize the policy if it will be generated.

When consider about alternative one, in rush hours heavy lot of vehicles enter in to Colombo city. Issuing ticket to them also take time. In the other hand vehicles enter after these ticketing points also are problems. To avoid those vehicles to enter has to close all the incoming roads and by roads other than main roads which have the ticketing counters or has to establish ticketing counters for all these roads also.

If to introduce HOV lanes has to separate lane for HOVs. That can be creating heavy traffic jam in other lanes at rush hours at the initial stage. To avoid this RDA can develop
new roads like fly over’s or underground road tunnels. Mahinda Chinthana government policy document has identified the important of developing the road network of the country developing new road can be done easily.

Packet movement method is very easy to operate as already one-way roads, closing of roads for some period is in operation. Existing police officers can be use for operating this. Development of selected roads can be also done easily as Mahinda Chinthana government policy document has identified the important of developing the road network of the country.

2.6 Comparison of the alternatives

Table 2.1 Multi Goal Analysis

<table>
<thead>
<tr>
<th>Criteria/Goal</th>
<th>Status Quo</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
<th>Alternative 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Political criteria</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Eventual ecological impacts</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Operational practicality, technical and administrative feasibility</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>11</strong></td>
<td><strong>8</strong></td>
<td><strong>17</strong></td>
<td><strong>14</strong></td>
</tr>
</tbody>
</table>

Scale: 1 = little to 4= great
2.7 Proposed Solution

Introducing High Occupancy Vehicle Lanes

After evaluating each policy alternatives under the criteria of efficiency, effectiveness, political criteria, eventual ecological impacts and operational practicality most viable solution is given from introducing HOV lanes. It is the least cost solution among the considered alternatives as the expected cost for this policy is mainly for awareness programs and to develop relevant laws. By introducing HOV lanes the amount of vehicles enter in to the Colombo will be reduces at the peak hours. It will help to save the time of the motorists who are using HOV lanes because HOV lane users avoid congestion, arriving at their destinations more quickly and within predictable time duration. As there is no sitting in the traffic jam reduces the unnecessary waste on fuel. By that way this alternative achieves all the three objectives.

In the other hand it will indirectly reduce the numbers of vehicles enter in to the Colombo daily. Because people who want to come to the city has already enter to the city during the peak hours using HOV lanes. Reduction of vehicles in the city will help to reduce air pollution and sound pollution cause by vehicles. So this is the most environmental friendly solution too.

RDA has to take the initiation for introducing HOV lanes as they are the premier highway authority in the country. Prior to implementing this policy RDA has to clearly identified and announce to the public what are HOV for each vehicle category, what are HOV lanes, during which time period that lanes are treated as HOV lanes and relevant laws to punish the motorist using HOV lanes but actually not HOVs.
CHAPTER THREE

Decision, Implementation and Monitoring

3.1. The decision process

When implementing the HOV lane there are mainly two government organizations have to involve namely RDA and Sri Lanka Police Department. For to support them Ministry of Finance, Attorney generals department, Mass Medias and local authorities also have to involve.

RDA has to identify project structure, targets and the time frame. They have to decide the roads and respective lanes of such roads to be used as HOV lanes. Then RDA has to decide what is the period to be used the road lanes as HOV lanes. They have to decide which vehicles to be treated as HOVs i.e with how many passengers in the vehicle for each vehicle category. Then has to decide and develop laws for the punishments for misuse of the HOV lines by other vehicles.

Then the awareness programs have to carry out. For that Ministry of Finance has to provide enough funding. Firstly awareness has to given to police department because they have to carry out the monitoring part. Then to the local authorities because most incoming roads to Colombo are maintain by local authorities.

Awareness to public can be done by using mass media. To motivate them to use HOV lanes alternative methods such as inviting public and private organizations to providing group transport facilities to their employees other than providing separate vehicles or travelling allowances. RDA can promote this by identifying such organizations and awarding and appreciating them.
3.2. Implementation plan

By implementing this kind of a policy government is expecting to minimize traffic congestion in peak hours to ensure a satisfactory access to Colombo metropolitan city. But initially after introducing such policy it can expect more traffic in other lanes in the road and more traffic in those lanes. So government has to take necessary actions to promote HOV lanes to achieve the objective of the policy.

Table 3.1: Implementation Plan

<table>
<thead>
<tr>
<th>No</th>
<th>Activity</th>
<th>Estimated Cost</th>
<th>Time (Months)</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Identifying relevant roads and lane to use as HOV lanes</td>
<td>1Mn</td>
<td>3</td>
<td>RDA, Police Dept &amp; Local authorities</td>
</tr>
<tr>
<td>2</td>
<td>Get approval for the project</td>
<td>-</td>
<td>3</td>
<td>RDA, Dept of Planning</td>
</tr>
<tr>
<td>3</td>
<td>Awareness programs to police department and local authorities</td>
<td>2Mn</td>
<td>3</td>
<td>RDA</td>
</tr>
<tr>
<td>4</td>
<td>Define what are HOVs, time period for to use roads as HOV lanes &amp; decide punishment for misuse of HOVs</td>
<td>1Mn</td>
<td>5</td>
<td>RDA, Police Dept &amp; Attorney General Dept</td>
</tr>
<tr>
<td>5</td>
<td>Awareness programs to Public</td>
<td>2Mn</td>
<td>3</td>
<td>RDA, Police Dept &amp; Local authorities &amp; Mass Media</td>
</tr>
<tr>
<td>6</td>
<td>Introducing reward system for Government and private sector organizations who are promoting HOV within their employees</td>
<td>10Mn</td>
<td>After introducing HOV lanes</td>
<td>RDA</td>
</tr>
</tbody>
</table>
3.3. Provisions for Monitoring and Evaluation

Effective monitoring system is essential for successful implementation of the proposed policy. Responsibility of monitoring of this policy can be given to Sri Lanka police department. Currently also they are responsible for traffic control. So after RDA implement the relevant policy, Sri Lanka police department has to monitor whether the HOV lanes are used by HOVs only. If not relevant punishment introduced by RDA has to impose.

Monitoring is the key to success of any effort and ensures the success of the policy. Evaluation is the key for study an endeavor or an organization to find out whether it is succeed or not and to design a more appropriate future endeavor or policy. For this final evaluation has to be done independent party to get more impartial report on actual influence of the policy. That can be done by a research unit in local university like Moratuwa university. As the project is carrying out by using government fund t Department of Planning also has to evaluate whether the objectives of the project proposal has been achieved or not. In addition to that from the ministry and department level evaluation can be done to evaluate the progress by both RDA and police department.

Table 3.2: Monitoring and Evaluation Plan

<table>
<thead>
<tr>
<th>Institute</th>
<th>Activity</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDA</td>
<td>Rewarding the organizations promoting HOV within their employees</td>
<td>Chairman, RDA</td>
</tr>
<tr>
<td>Department of Police</td>
<td>Monitoring of use of HOV and measure the reduction of traffic</td>
<td>DIG Traffic</td>
</tr>
<tr>
<td>RDA</td>
<td>Measure the reduction of traffic</td>
<td>Chairman, RDA</td>
</tr>
<tr>
<td>Department of planning</td>
<td>Measure the utilization of government funds</td>
<td>Director General</td>
</tr>
<tr>
<td>University of Moratuwa</td>
<td>Measure the achievement of project objectives by way of independent research</td>
<td>Dean of faculty</td>
</tr>
</tbody>
</table>
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