

Introduction

Part of being a sustainable city is having clean air which is vital for our health and well-being. Kuala Lumpur (KL), which is the capital of Malaysia is known to have air pollution which affects the quality of life of the citizens to work and to live in.

Background

It is only recently in 2008, that more than half of the human population lives in cities, so it is essential that cities are sustainable to accommodate their growing population. The advancement in the agriculture sector has led to the mass urbanisation as only a small proportion of the population will need to engage in farming to grow food (Sachs, 2015). Simultaneously, the economic development has also led to the rural-urban migration as people seeks for better opportunity in the city area. Because of this, Kuala Lumpur, whereby it is now the most populous city in Malaysia, is highly vulnerable to environmental issues such as the air pollution it is facing right now. The population growth dynamic has contributed to the air pollution in KL as it leads to the increase in industrialisation, demand for energy, and transportation. Nevertheless, population growth in cities are inevitable, and it is how the city managed itself that is significant in curbing the urban air pollution.

Air Pollution

Sulphur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO), and particulate matter with diameter 10 micron (PM₁₀) and ground level ozone (O₃) are identified as air pollution as it contributes to various respiratory problems including bronchitis, emphysema, and asthma (Ling, et.al, 2012). There are many factors causing the air pollution. According to Ahmad, et.al, 2012, the three major sources of air pollution in Malaysia are from automobiles with 70-75% of the total air pollution, stationary sources (including industries & power plants) and open burning sources. Research done by Ling, et.al, 2012, shows Kuala Lumpur are most polluted by O₃ and PM₁₀. O₃ is a secondary pollutants formed by volatile organic compounds (VOC) and nitrogen dioxide (NO₂) which are produced from motor vehicles and with the existence of sunlight. Since the emission of pollutants from power plants are not within KL, and the major sources of pollutants are from automobile, the main focus will be addressing the issue of air pollution from motor vehicles.

Transportation system.

As the population for cities grows, relying on automobile for transportation is a recipe for massive congestion and air pollutions. A sustainable city should have safe and clean air and so motor vehicles need to be reduced so that people can remain healthy and active.

Cities that plan and design infrastructure well are able to minimize the pollution impact on the environment caused by automobile (Sachs, 2015). The core infrastructure includes the transportation system. It should be increasingly directed toward mass transit, such as buses and metro systems, or properly managed biking and pedestrian roads to reduce reliance on automobile. For example, investment in mass public transportation, bus rapid transit on dedicated lanes, and safe open areas for bicycles and walking. Thus, well-managed transportation system is fundamental.

Secondly, densely settled cities tend to have lesser pollution than sprawling, low-density settlements (Sachs, 2015). High-density areas usually result to lower emission in transportation due to more walking and public transportation. This is because these areas have close proximity of people to shops, offices, amenities and other people. For example, in New York City with density of 33,000 people per square mile, 37% of the people commutes around by walking or public transportation (Sachs, 2015).

However, Kuala Lumpur is somewhat a high-density area with approximately 17,000 people per square mile, and yet still remains an automobile city for various reasons with approximately 5 million registered vehicles in 2011 (MotorTrader, 2011), and it is precisely these reasons that should be tackled in order to address the issue of air pollution caused by motor vehicles.

Reason for high usage of motor vehicle and existing solutions

Economic

In Kuala Lumpur, between 1985 and 1997, the modal share of public transport decreased from 34.3 percent to 19.7 percent (Dewan Bandaraya Kuala Lumpur, n.d). The economic development in the city has shifted the public transport, particularly bus transportation, to private cars due to higher personal affluence. Secondly, the increase in travel demand in the city has led to the increase usage of private vehicles because of the inefficiency in the public

transportation. For examples, trains and buses in some cases do not adhere to schedules (or did not have schedules), creating difficulty in time management for passengers. Also, many people working in KL live in suburban areas, and without proper transportation infrastructure, these urban sprawls are car-dependent.

Social

People perceptions towards car plays a huge role. As mentioned, car ownership has increased due to higher personal affluence. But the preference for private vehicles is because of the degree of freedom, accessibility, comfort, interest in cars/driving and negative perception on public transportation (Aldukali, et.al, 2011). Public view that public transportation has an extra time and hassle they will face due to the inefficiency and lack of coverage of public transportation in the suburban areas. Moreover, the people are less concern or unaware of the impacts of motorized transport and due to the hot weather, bicycles and walking is an uncommon means of travelling (Aldukali, et.al, 2011). Also, Datuk Paul Selvaraj, CEO of Federation of Malaysian Consumers Associations, mentioned that people view car as a necessity and it has become a necessity as people has less faith and in trains and buses (Malaysian Digest, 2015). Thus, the society view of cars must change and it is through awareness and proper infrastructure that would change this perception.

Government

According to Schwarcz, 2003, the government does not actively promote public transportation, bicycling and walking and there is a lack of government focus on the issue. This is shown in the inefficiency of the public transport such as delays and infrequency, and the lack of pedestrian network, which can be clearly observed in Kuala Lumpur. The lack of pedestrian linkages is a major deficiency in KL due to the poor city design and landscape (Dewan Bandaraya Kuala Lumpur, n.d). These are major factors which encourages usage of private vehicles as necessity when commuting in KL.

The existing solutions

Government has announced during the 10th Malaysia Plan in June 2010 with the “Klang Valley Integrated Transportation System” proposal, which is to build a Mass Rapid Transit,

MRT, with 3 different phase, and the extension of the existing Light Rail Transit, LRT. Phase One of the MRT Project, which is 51km in length will become operational by the end of 2016. During the Budget 2016, the government has allocated RM10 billion for the LRT3 extension project and RM28 billion for the MRT II project. Both projects expected to be completed by 2020 and 2022 respectively. The heavy investment in the rail network will increase the modal share for public transportation as it connects most suburban areas in Greater Kuala Lumpur and to ease congestions, as well as the air pollution.

Also, in order to encourage public transportation, government addressed some of last mile problems through “skywalk”. Last mile is the mobility from a transportation hub to a final destination such as workplace. So far, only the Bukit Bintang - KLCC Pedestrian Walkway, has been built in 2012, which is a 1.173km-long pedestrian bridge that connects Pavilion KL to Impiana KLCC Hotel and the Kuala Lumpur Convention Centre, with many others proposed, according to Pemandu. an agency under the Prime Minister Department of Malaysia.

Gaps:

Government/ Urban Design and Landscape

Many investments have been poured on building more public transportation to serve the suburban areas, such as the MRT projects and the LRT extension line. However, proper pedestrian roads are still required to change the public perceptions and convenience for most road users. A system of continuous covered walkways linking major activity centres and in areas of high pedestrian activity in KL is important. This can also be done through the introduction of car-free zones in high density areas. By providing restraint to private vehicles in certain areas, emphasis on pedestrian mobility can be given priority rather than cars. Also, the pedestrian network will increase pedestrian movement in activity centres. Also, it will help increase the utilisation of public transportation by connecting with terminals and transit stations and reduce short vehicle trips.

Creating a compact city or city of short distances instead of an urban sprawl. Although Kuala Lumpur has a high population density, many suburban areas are not. Government can consider building more township in these suburban areas as a city of its own. This will advocate walking and cycling and thus low energy consumption and pollutions. Also, a high

density area also provides opportunities for more social interaction. It is therefore a more sustainable urban settlement type than urban sprawl because it is less dependent on the car, and thus reduced air pollution.

To reduce congestion and the pollution, congestion/carbon tax for cars can be imposed in the city.

Community empowerment

First/Last mile

Although, extensive and efficient public transportation infrastructure are being built, the first/last mile problem still exist. Users have difficulty getting from their starting location to a transportation network or from the transportation hub to their final destination. Since bicycles and pedestrian are still less considered in Malaysia, the infrastructure for this non-motorised transportation can be implemented to overcome the shortcoming of the problems.

Public awareness

Efforts are needed to encourage road users to have reduced carbon footprints by opting for public transportation when possible and walking/cycling for short distances instead on the continuous dependency on motor vehicles.

With these, road users will be encouraged to switch to public transport especially if they feel it's more convenient than private vehicles especially during peak hours where congestions emerge.

Technology

With the technology advancement, zero-emission cars through electric vehicles should be considered as well.

Lesson learnt

Malaysia is still a developing country. Many infrastructures for rail network are still being built to curb the air pollution from motor vehicles. Proper pedestrian network is needed to address the first/last mile problem, and to emphasis on pedestrian mobility in major activity centres. Introduce car-free zones in highly dense areas in Kuala Lumpur to encourage

walking in major activity centres. Nevertheless, things will get better. The government and the community will play a huge role in overcoming this problem.