Clean Earth – Clean Sky: IMPACT OF LOCATING BUS STATIONS ON SUSTAINABLE TRANSPORTATION SECTOR IN MALAYSIA

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ABSTRACT. Our climate condition is changing and there is now scientific, social and political recognition that it is definitely a consequence of increasing anthropogenic greenhouse gas emission. Transport now allocates for about 20% of global anthropogenic carbon dioxide emission, and these amounts are progressing faster than for any other sector. However, access to sustainable transportation supports our current way of life; indeed, good mobility is a fundamental component of our desires. The transport sector in particular depends entirely on system implementation, fuel consumption and planning, which is divided to urban planning and urban design. Networking efficient and public transportation helps to control transport sector in terms of urban planning, on the other hand, urban design presents some guidelines, for instance, land use functions, green integrative space, urban furniture design, transit oriented and green design _non-polluter vehicles such as bicycle _ which have the potentials to provide benefits to the sustainable transportation. The global climate policy is going to supply clean and healthy air with less fuel consumption and greenhouse gas emission; in urban furniture design locating bus stations in cities is one of the particular subjects proves it, which makes possible for fossil carbon to remain in the soil, instead of ending up in the atmosphere by optimizing distances between stations linking two main places.
The paper defines the sustainability on the basis of relevant subjects in the view of transportation; which are Greenhouses gas emission, Biodiversity, Environment, Prosperity and Social well-being. It intends to know how large could the locating bus stations play a role in sustainable transportation in Malaysia? Also, it aims to address this main question through critical review of the literature for exploring of key development strategies for suitable placement of bus stations in cities focusing particularly on transportation from public healthy and pollution aspects.

Keywords: Sustainable Transportation, Urban Furniture Design, Bus Station, Public Healthy, Greenhouse Gas Emission.

Overview

For many years Urban Designers has been working to create streets, bus stops and train stations that not only accommodate traffic, but also become places that benefit communities socially, economically and environmentally. In order to produce the types of urban environments that support public transport three factors must be improved: density, mix of land use and pedestrian friendliness. Higher-density environments are able to support a range of retail, commercial and transport services. The result is that people live closer to the retailers and service providers that they need to access on a regular basis and can often do so using public transport systems. Recognizing that this is a key moment to make wise transportation decisions that will

influence our quality of life for years to come; this paper undertakes a campaign to debate on transportation policy, practice to support Placemaking and create walkable, healthy and sustainable environment and communities.

Introduction

The power of this simple idea is that it reflects basic truths that are rarely acknowledged. One such truth is that more traffic and street capacity are not the inevitable result of growth. They are in fact the product of very deliberate choices that we have made to shape our communities around the private automobile. We as a society have the ability to make different choices; starting with the decision to design our streets not only as comfortable places for that people, but also for people all around of the world with less energy consumption and less harmful gas emission. Fortunately, over the past ten years, a growing number of neighborhood groups, cities, states, and even national transportation agencies in the Malaysia started to demand something better. The goal is showing the way forward, which helps communities realize how public transportation can support their visions for their future, and helping urban designers and traffic engineers deliver on that vision.

The word 'liveable' denotes a desirable quality of life, economic soundness, social health and environmental viability. Liveable cities are human oriented, environmentally friendly, economically viable, efficient and socially sound. Fundamental to the generation of such a liveable environment is the integration of transport and land use planning to ensure the production of development scaled to human needs, with excellent access to public transport and non-motorized transport facilities, while allowing an appropriate level of car access. Government's policies are to encourage public transport, walking and cycling over the use of the private car. This paper demonstrates how a coordinated spatial, urban design and transport planning approach can provide a transport system that will reduce the present excessive dependence on the private car while providing a more efficient transportation service that supports, rather than impeding the

development of a liveable community. In other words we should prepare healthy environment not only in city-scale, but in world-scale with maintaining ecological condition specially in terms of exhausting toxic gases in the air.

Transportation Program

Transit stops; bus or train were simply places to wait. Streets had been surrendered to traffic for so long that we hardly considered them to be public spaces at all. But now we are slowly getting away from this narrow perception of "transportation as conduit for cars" and beginning to think of "transportation as place." It means revitalizing city by creating a network of walkable streets and alleys that connect major public destinations and helps towns solve transportation problems by kicking the habit of sprawl-inducing land use and also preserve the small town sense of place by calming traffic and reviving public spaces that have been overwhelmed by car-centric development. This solution relieves gridlock and increase transit ridership by transforming auto-dominated downtown streets into pedestrian-friendly public spaces.

These projects are evidence that we can redesign our transportation networks to reflect their true importance as public spaces and supporters of our vision for our towns and cities. We are responsible to create a future where priority is given to the appropriate mode, whether pedestrian, bicycle, transit or automobile. To be sure, cars have their place, but the newfound ease of walking and "alternative transportation modes" can make driving less prevalent in most towns and cities. Therfore we will see significantly more people on the streets, which will turn into public forums where neighbors and



friends can connect with each other. The street itself will fulfill the critical "town square" function that is missing in most communities today.

Land Use and Transport

Systems are inextricably linked - if one is to change, the other must respond. Land use planning decisions have a significant impact on transport needs, car ownership and public transport viability. Transport technology and planning has a similar impact on land use, influencing the location demands of businesses and households. In many respects, land use planning and transport planning have failed to provide positive urban environments. Increasingly, many cities are faced with serious traffic congestion, declining public transport networks and residential and business environments that are mono-functional and sterile.

Historically, land use planners have attempted to separate different land uses. This thinking has its basis in the unpleasant mixed use areas of cities that grew rapidly during the industrial revolution. The split between residential and industrial areas was originally facilitated by the development of transport technology which allowed people to travel the increased distances necessary to live away from their place of work. This desire to separate different land uses in order to maximize the benefit that each can derive from its location has guided land use planning until fairly recently, particularly in the Malaysian city context. In addition to the over-separation of land uses, planners have also been responsible for focusing on planning for buses and cars, which has resulted in urban environments which are built at very low densities with large road reserves and are not at a human scale. Of late there has been a demand for a change in the style of transport and land use planning resulting from the variety of negative externalities arising from an over dependence on cars. From a transport perspective, the major problem is increasing traffic congestion, often exacerbated by a lack of alternative means of transport such as public transport system and a need to travel due to the separation of land uses. As our understanding of the environment has developed, it has become apparent that the reliance on the car, with its internal combustion engine, is not sustainable. This unsustainability has two elements: (1) the production of greenhouse gases that are a by-product of the combustion of either petrol or diesel, and (2) the finite nature of these fuel reserves and the increasing demands being placed on these reserves as

more fuel is demanded by growing economies. It seems these problems would be solve with using more public transport devices such as bus and train by attachment of them with city transport network.

Concerns have developed within the urban planning profession regarding the quality and liveability of many modern urban environments. The claim is made that many of the newer environments are mono-functional and sterile and fail to meet the needs of people who work and live in them. Of particular concern are the effects of urban sprawl, which results in increasing travel times, decline in transit ridership, loss of valuable farm and environmental land.

These concerns have lead to a reconsideration of the traditional separation of land uses and resulted in the ideas of New Urbanism which is focused on the development of mixed use urban environments focused on encouraging transit ridership and public transport. The primary cause of sprawl and its negative externalities is the low density of many new developments. The need to accommodate cars in large numbers exacerbates the problem of low density, as more land is required for road reserve and parking. Low densities reduce the population in an area, impacting on the viability of public transport and commercial and retail activity. The result is the development of 'big box' retail centers to which people have to drive, and the decline of public transport networks as high frequency services are not economically viable with low population thresholds. People are forced to drive more often and further, thereby exacerbating traffic congestion and fuel consumption with its attendant problems. Apparent from the foregoing is the need for better transport systems that offer a range of transport options without maximizing any one. To complement these transport networks, there is a need for better human environments that minimize the distances that people are required to travel in order to access the goods and services, social networks and recreational opportunities that are necessary for everyday life.

In order to achieve this end, there is a need for integrated planning that considers both transport and land use together in order to develop urban

environments which support a range of transport options and at the same time meet the needs of the people who use them. Such planning is necessary if truly sustainable cities are to be developed. Transport planning needs to consider solutions to transport problems in an integrated and systemic manner. The basis for it needs to be the integration of different modes of transport and the acceptance that there is not one form of transport that should be dominant, but rather a range of options should be offered. Of particular importance is the need to ensure that car dominance in transport planning no longer prevails and, instead, means are found to make public transport more efficient and convenient.

In order to produce the types of urban environments that support public transport usage, three factors must be improved: density, mix of land use and pedestrian friendliness. Higher-density environments are able to support a range of retail, commercial and transport services. The result is that people live closer to the retailers and service providers that they need to access on a regular basis and can often do directly impact on sustainable environment as our purposes with less fuel consumption and then its reflections on healthy environment. Higher density results in more people using an area, which equates to more potential transit users. Increased demand for transit results in more frequent services with attendant increasing efficiency and convenience; thus, encouraging more users. In Malaysia a general correlation between density and public transport usage has been identified, with a 10% increase in density resulting in a 5% increase in public transport usage.

Mixing of land uses allows people to access all of the services and goods that they require without having to travel long distances. People are often able to access the retail, commercial and service activities that they use on daily basis using public transport; hence, reducing the number of vehicle kilometers travelled. They do not feel the need to have a car at work, as they do not have a sense of being 'stranded' when they are able to access all of the services and goods that they require. When mixed land use and higher density are correctly combined, ensuring that commerce, retail and services are located close to public transport routes and terminals, a further incentive

for public transport use is found. In such cases public transport users are able to consolidate trips. It becomes possible to drop the children at a school on the way to the transit stop; or on the way home it is possible to purchase essential groceries and collect the laundry while walking home.

If the urban environment is not pedestrian friendly, then all of the above will have been wasted. For public transport facilitation measures to work and be used, the pedestrian environment has to be such that people are prepared to walk. If the pedestrian environment discourages walking, people will not use public transport as all public transport trips have an element of walking and regardless of how close services and goods are to places of work or residence people will still drive.

- **Toward Sustainability with Building Community through Transportation**

As we are faced with ever rising gas prices and mounting evidence that how we have planned and shaped our communities over last 50 years is a major contributing factor in the degradation of our natural and human environments, more and more people are beginning to recognize that this is a key moment to make wise transportation decisions that will influence our quality of life for years to come. This is imperative now to face a public health crisis; uncertain energy supplies; global climate change; loss of our natural environment; ever increasing social inequity; and declining civic and community engagement.

The overarching goal of *Building Community through Transportation* is to support Placemaking and transform federal, state, and metropolitan transportation policies and practice that currently prioritize moving people and goods over creating walkable, healthy and sustainable communities. This campaign is also focused on influencing the design of streets and transit facilities so they become assets and gathering places for civic life.

Through research, advocacy, training, tool development and its fee-for-service projects, the objectives are inspire and organize citizens, policy makers, and the transportation industry to reshape community transportation networks and streets into places that provide greater economic vitality in

terms of energy consumption and more opportunities for civic engagement, as well as promoting the priorities of human health and environmental sustainability.

The campaign will achieve these goals by focusing on two major areas:

- **Streets as Places**
  Approach: Transforming the design and construction of public streets into places that improve the quality of human life and the environment rather than simply move vehicles from place to place.
- **Thinking beyond the Station**
  Approach: Influencing the planning and design of transit centers (bus, railway, subway stations) to become catalysts for increased economic vitality and environmental sustainability as well as improving health, civic engagement, and servicing people's transit needs.

Why Transportation needs Transformation through Place making.

Over the last ten years, studies and investigations demonstrate the critical role that transportation plays in the big picture of creating sustainable places and communities. As Carol Murray, former Commissioner of New Hampshire DOT, has often said, *"Transportation is the game board upon which all other factors are played."*The transportation system is everywhere, and its impacts are a major issue for virtually every community. If we can influence decisions on the dimensions and designs of transportation networks and facilities so that they are perceived as public places and improve the quality of the human and natural environments, rather than simply moving vehicles from place to place, we can open the door to visionary community planning and design. With an estimated numerous numbers of new American residents expected in the next 50 years, community planning needs to change, and it needs to change fast.

The transportation establishment has clearly organized itself into a well-structured, disciplined, and cohesive profession, designed to deliver on its perceived mandate to provide people with a system for high speed and safe travel. It only follows that *if we transform the way the transportation establishment views its mandate, we can positively affect community*



building, so we can approach to have livable city.

It is not unusual for bus lanes to be installed as a separate feature. However, the impact is usually limited to improving operational efficiency of the buses and does not include the effect on the livability of a street. For example, in New York City, two lanes on Madison Avenue were converted to bus-only lanes during morning and evening rush hours. The level and intensity of bus usage, while operationally more efficient, creates an unpleasant pedestrian environment, especially during rush hours.

The Malaysian Context

In Malaysia, a change in travel patterns is taking place. Increasingly there is a move away from traditional public transport modes such as buses to taxis. The western side has the highest rate of car access in the country, with 45% of households having access to cars.

Nationally, 60% of households that have access to cars spend nothing on public transport. This indicates that these households use the car exclusively as their means of transport. Clearly there is a shift to road-based transport. The effect of this is increasing congestion in the urban areas. Malaysia has not reached the same point as the United States, where more than 90% of households have access to cars and transit usage is as low as 5%. It is still possible to encourage people to return to transit, which they have a history of using.

It appears that there is something of a disjuncture within government policy between the objectives of government in relation to the promotion of public transport and the requirements for traffic impact assessments. The Manual for Traffic Impact Assessment provided by the Department of Transport requires trip generation rates to be produced through the analysis of existing similar developments or the use of the Malaysian Trip Generation Rates booklet. Modal split is produced by observing existing modal split for similar developments within the area. Essentially, this ensures that the existing situation of car-dominant planning is enforced for future developments by ensuring that the current trip generation rates and modal split, with associated low dependence on public transport, is maintained. This has implications for the road network and parking areas that must be developed to meet the future demand. The problem is exacerbated by the demand that the 75th percentile demand be used, further exaggerating the over design of road infrastructure. On the other extreme, government policy calls for an increase in public transport usage and a prioritization of public transport over private vehicle usage, with the aim of shifting modal split.

How It Works

Malaysian Regional Transportation Authority found that by making people-friendly improvements to such transit centers, it is able to reach beyond the boundaries of building typical bus stops to the larger goal of helping to reshape communities. The Commercial Street station brings more passengers to the area, thereby encouraging economic activity. Inside, it provides enhanced passenger services, greater comfort, and a sense of safety and community among users and staff, as well as further opportunities for protecting ecological environment.

- **What Makes Commercial Street Bus Station a Great Place?**

Access and Image: The station is across the street from Commercial Buildings.

Useage and Activity: Ridership increased notably with the consolidation of area bus stops at this one station. The station design allows for small retail uses to be accommodated on site: retail kiosks within the walls in front, and vending carts in the open space. These opportunities have not been taken advantage of, though they're

under consideration. The surrounding area could also use more restaurants and retail to serve the large numbers of riders congregating here.

Socianibilty: The new bus transfer center has become almost a town square or plaza not only because of the number of people who are compelled to pass through it, but also since it attracts other people who simply come there to "hang out." Transit users know that they will encounter friends and acquaintances there and even meet new people, as they wait for their buses. In the afternoon, when the largest numbers of people are present, the station has a festive feeling about it, with people socializing and meeting friends. Bus drivers waiting for their riders appear to be well-known by passengers and often greet them, chatting with their colleagues as well.

International Success Stories

The problems identified above have been a concern for transport and land use planners for decades and attempts have been made throughout the world to provide the solutions outlined above. When combined correctly, these solutions have proved to be highly successful in the development of quality urban environments. Below are some examples of interventions and developments which have been highly successful.

- In the 1950s and 1960s Munich in Germany was one of the most congested cities in Europe. In the late 1960s a multimodal transport plan was developed for the city. The plan comprised the development of a regional rail system and an underground rapid transit system .Streets around the city centre were improved and traffic flow in the city centre was impeded, while some of the most congested streets were pedestrianised. By the early 1970s a 12% shift in modal split in favor of transit occurred for travel into the central area. Since the 1970s car ownership in Munich has remained high, but the modal split has continued to change in favor of transit usage.
- Melbourne in Australia has been rated as one of the most liveable cities in the world. This is due, in no small part, to the Melbourne Metropolitan Strategy. The strategy set a series of priorities to boost the attractiveness of Melbourne as a place to 'live, work, invest and do

business'. Part of the strategy was an integrated transport plan that ensured that land use and transport planning contributed to produce an urban environment with high levels of accessibility, using a range of modes of transport. Melbourne integrates train, tram, bus and car transport to ensure high levels of public transport access and acceptable levels of car access. Much work has been done on the production of pedestrian areas within central Melbourne and new layouts for suburban residential areas have been developed that focus on producing mixed use areas that facilitate pedestrian and transit trips.

- In Washington and Portland, in the United States, transit-oriented developments that aggressively promote transit have experienced an average increase in transit ridership of 58%. Not only has ridership increased in these developments, but there has also been a change in car ownership patterns developments. Only 35% of households in transit-oriented developments own two cars as opposed to 55% for the city as a whole.

Conclusion

The integration of transport and land use planning offers the potential to produce positive environments that are at a human scale while at the same time providing high levels of mobility. Fundamental to this process is the shift in transport planning away from a focus on providing for car users to balancing the needs of all transport users instead. In order to achieve this end, it is necessary to reconsider traditional traffic impact assessment techniques and instead produce a transport impact assessment. Such an assessment will allow the development of a composite understanding of all transport needs and not simply those of car users. With such a composite understanding it is possible to develop an usage of public transport systems and infrastructure plan that can appropriately respond to these needs while producing a high-quality and healthy urban environment which does not priorities any single user to the detriment of other users. There is no doubt that integrated land use and transport planning can result in significant changes in travel patterns, with a shift from car dependence to higher levels of transit

ridership. These changes can bring about far-reaching improvements in terms of liveability by reducing time spent commuting and increasing accessibility, while improving the quality of the urban environment.

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