



Barcelona towards Sustainability

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Abstract

This paper describes two main aspects of environmental management in Barcelona; city mobility and waste management. The observation is documented through hard evidence of photographs, local authority database and information accessible to the public. This paper is divided into three sections; 1) current urban planning and management 2) the sustainability and environmental approaches governed by the city 3) personal thoughts and experience overlooking the general attitude and culture of the people of Barcelona. The lessons learned can be applied to Malaysia in a organized locality.

Keywords: sustainability, waste management, city mobility, Barcelona

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1.0 City Transformation Of Barcelona

For the past two centuries, Europe has undergone conversion from rural to urban areas as now 80% of the European inhabitants are living in cities (Europe for Citizens Programme, 2011). Barcelona is a city in Europe by the Mediterranean Sea, with a population census of 1.6 million as of the year 2012, is the second largest metropolis in Spain after Madrid and the capital city of the region of Catalonia. The population of Barcelona is 67% of the population of the region Catalonia (Generalitat de Catalunya, 2013). Barcelona is well-known for its magnificent 'art nouveau' architecture by Antonio Gaudi such as La Sagrada Familia, Casa Bttilo, Casa Mila and Parc Guell. It is rich in cultural heritage and has become a major tourist destination from all over the world especially during the summer months for those who enjoy the abundance of sunshine throughout the year.

The world's cities are responsible for 75% of the world's energy consumption which consists mainly of food, fuel, concrete, water supply and 80% of Greenhouse Gases emissions even though only 2.7% of the world's surface is occupied by cities (Ash et al., 2008). The statement is alarming and has become the wake-up call that managing urbanisation must be realistic especially when sustainability is at stake. Sustainable paths of urbanisation are favourable and acceptable by the government and the public since the damaging effect can be mitigated.

Many studies are using Barcelona as a case study to take up a new approach to sustainability, for example, using the Life Cycle Assessment approach. Various urban fabrics including concrete sidewalks in the urban neighborhood have their impacts on Global Warming Potential (Oliver Sola et al., 2011). Therefore, Life Cycle Analysis of new development should include the most relevant urban infrastructures, i.e. buildings, streets, pipelines, etc. The impacts during operation are the most critical stage. The impacts of constructing a building may represent 15% of the total impact whereas the operation may account for the remaining 85% of the whole impact. The importance of considering the use stage of the urban infrastructures should be emphasised in any city or neighbourhood development because how the city is managed after it is in the use phase is the very crucial part in environmental management. Also, the city is also moving forward towards eco-design where strategic actions and indicators for a neighbourhood are established and monitored which includes energy, water, wastes, green space, mobility and public space (Farreny et al, 2011).

The advanced movement of environmentally extended economic input-output analysis in determining an environmental burden of a city can be seen as a very timely. The economic input-output flows that occurs within a city can actually be converted into a meaningful value of Global Warming Potential (Dias et al., 2014, Shafie et al., 2013). Ideally, the high density residential development planning approach would have added to the benefit of reducing car dependency where residences are constructed closer to urban centres and public transport infrastructure with relatively low emissions intensities. The state and value of urban metabolism were assessed to influence urban sustainability and conclude that for urban metabolism to be effective, it also requires a political-ecological-theoretical framework and an understanding of power and money (Pincetl et al., 2012). With that being said, the non-

environmental spectrum of the urban environment shall never be disregarded in an impact assessment.

Reduction of environmental pollution contributes to the status of a sustainable city. Barcelona is seen to take up two primary approaches: 1) management of the source of pollution 2) involvement of the citizens in environmental awareness programme. The golden rule to sustainability is that the improved quality of the environment must surpass the immediate emergency and persist in anticipated pollution. In the case of waste, for example, putting in place a sorting and recycling system is just as essential as cleaning up the pollution at the garbage collection point or a landfill. To illustrate the management of pollution, two main aspects will be discussed which are city mobility and waste management.

2.0 City Mobility

The everyday life of the city citizens is largely determined by their mobility. The day starts with school for kids and work for the adults. In a non-sustainable city, the day might start with sluggish car movement in a massive traffic jam but with a user-friendly public transportation (which includes walking), the day could be less hassle. A scheduled and punctual public transportation gives confidence for the user to rely on to carry on their daily routines. In a comparative study on the financing of public transportation in European metropolitan cities (Barcelona, Madrid, Brussels, Amsterdam, Paris and Berlin), Barcelona came up highest with 41% for its citizen travelling on foot (this is followed by Paris with 34% and Madrid with 31% respectively) (European Metropolitan Transport Authority, 2010).

In another study conducted by European Metropolitan Transport Authority in 2013, it has been concluded that most of the main cities achieve more than 60% of modal share for what the authority consider as “sustainable mobility” (as sum of public transport and soft modes). Amsterdam, Barcelona, Budapest, Copenhagen, Helsinki, Madrid, Paris, Stockholm, Vienna and Warsaw stand out with a rate of over 70%, illustrating the very dense public transport systems irrigating the heart of those capital cities, and the deep-rooted habit of walking and/or biking in the European cities.

As a resident who lived in Barcelona, I find Barcelona a very pedestrian-oriented city. Essential needs are within walking distance or easily around the corner. The pedestrian walkways are relatively safe and in good condition. I am also amazed by the vehicle driver's attitude in giving way to pedestrians to cross the road at zebra crossings at any time. This attitude serves the purpose of zebra crossing where pedestrians can cross safely. Grocery shopping which is an essential part of a resident routine can be straightforwardly done within 200-250 meters. I observe the use of wheel carts to carry the goods and facilitate the walking to home part.

As for public transportation, the buses in Barcelona are now equipped with a GPS indicator to inform the users of the arrival. The waiting time is displayed on the screen at the bus stops giving users the estimated time of arrival. The use of multiple-trip passes which is cheaper than one-time pass encourages users to continuously use the service. The validation process when one uses the bus can be improved into a laminated or plastic card with touch

options (i.e. similar to Malaysia's Touch & Go card) which could be a lot faster instead of the inserting and punching the soft card.

Walkability and public transportation should never be overlooked in the urban planning of Malaysia. Walkability factor may differ due the tropical climate but with suitable facilities like covered arcades, walking may be encouraged which is a healthy culture and lifestyle. In a study by Azmia et al., 2013 on walking behaviour of Malaysians, only primary school children group achieved the international guideline of 5 minutes of walking time within 400 meters. This finding shows the sedentary life of Malaysians who depend on private vehicles. As for public transportation, the challenge is to establish an effective connection with the current urban setting that may have been poorly planned. It may take additional years to achieve the public transport amenities that would reduce the urban residents' dependence on private vehicles.

3.0 Waste Management

The manner a city manages its waste reflects its commitment to environmental sustainability. The important public service indirectly informs about the sustainability and livability of a city because waste disposal entails a long and complicated process and it poses significant environmental health threats (Shafie et al., 2012). In every part of the city of Barcelona, a set of waste containers (refer Figure 1) is provided in almost every 300 meters in the residential area for waste disposal and recycling. The yellow bin is for plastics, green bin for glass and blue bins for papers. The grey bin marked "R" is for mixed waste where waste segregation is not possible. The smaller brown bin is for organic material such as food waste and garden trimmings.



Figure 1: A set of waste containers in Barcelona

Like other metropolitan cities in Europe, among the aim of the good waste management is to encourage selective waste disposal and this is achieved by installing a range of waste containers around the entire city. From my observation, these containers are fully made use of by the residents. As a person who never recycles before, I felt the need to sort my garbage accordingly because the facilities provided are very systematic and user-friendly which I

believe is the basis of its effectiveness. It can also be seen that there is no garbage outside the bins, and the bins are emptied regularly. It was also observed that waste collection is carried out at least once a day and usually carried out during the night where the traffic is less heavy (Abdul Latif et al, 2013).

The establishment of recycled oil bin and unwanted clothing bin are very proactive. Normally, one would just pour used oil into the sink where the oil would harden in the pipeline and cause blocking after some time. The oil will also eventually get in the wastewater system where the separation could be an extra burden for the treatment system. With the establishment of the used oil bin, used oil can now be discarded safely. Users just need to store the used oil in a plastic bottle and put it in the bin (refer Figure 2).

It is of high potential to install these used oil bins in urban settlements in Malaysia. Malaysian cuisines are rich in oil and fats and imagine how much used oils have gone down the drains and the pipelines without active treatment. The wastewater treatment is also burdened with the high content of oil and fats that would require more treatment. Malaysia's local authorities should consider this establishment at strategic places within a neighbourhood. I strongly suggest the Perbadanan Putrajaya to take up this plan as their recycling collection day is already in place and is receiving very positive feedback from the residents.



Figure 2: Used oil recycling bin

The most interesting addition to the set of waste containers is the collection bin for unwanted and unused clothes. Shirts, jackets, shoes, and bed sheets can be given up for donation. Barcelona has four seasons and with the change the season, there will be clothing that will be unsuitable for a particular season and some would opt for charity or donation. The bin is provided with shelter to prevent rain and shine from destroying the clothes. All the garments must be put in a plastic bag, tied up and placed in the bin. This establishment could potentially put a stop to wastage, and the needful can fully make use the donated items.

Another project that is still under development is the one-stop recycling centre called Punt Verd (green point) where all recyclable items can be taken to this point even in large

quantities and sizes. The drop off centres are provided in some major areas of the city and are accessible to vehicles with loading and unloading facility and are now expanding to encourage more people to recycle.



Figure 3: A bin for unwanted clothing

4.0 Lesson To Be Learned

The significant remarks that can be made on what is keeping the city as it is are; 1) the public participation which comes internally with their attitude and culture towards human and environment 2) the governing mechanism which implements the written framework into action. In general, I could see that the residents of Barcelona are genuinely concern about humanity and the environment. They look friendly on the outside and have very nice attitude towards others and their surroundings. Responsible people clean their pets' dropping off the street, dispose garbage sensibly and respect the pedestrians and other road users. Designated parking space for the less able is also not misused as they are considerate to other road users. They are also helpful and polite to others especially to children, women and the elderly. The attitude and mentality are seen to be nurtured in their lifestyle from the very young age. With this attitude, any governing mechanism towards sustainability is easier to be put in place. The people seem naturally acceptable to action plans that could benefit them and their future generation.

The government, on the other hand, should always put the people's interest first, and the support will occur naturally. The people seek for improvement in the governing body by voicing out their dissatisfaction via set of procedures and sometimes through calm manifestation. These two central remarks mentioned in the previous paragraph uphold the sustainability in place because effective governance requires the continuous support from the community which set any environmental directive or plan in motion.

The most valuable lesson is that the success of every decision or action plan that is introduced for a city always depends on the attitude and acceptance of the society. The city governance can always come up with an ambitious goal, but if the people are not responding and cooperate to the plan, the action will not materialize. Positive attitude towards other

human being and environment starts at home where parents should instill good values to the children by practicing it themselves.

The Malaysian people are yet to see that a sustainable and livable city shall benefit the current and future generation society. If we could just care a little more about sustainability and be less selfish towards others and the environment, we could make a difference. I see very high potential in our society where our religion teaches us to do good to human and environment, and our culture taught us to be modest and kind which is an excellent combination towards a change of mentality and attitude. With the mass media and social media in our hands, the society can be kept well informed of our aspiration towards a developed nation; economically, socially and environmentally.

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