The concept of the eco-city

The next new wave in city planning is “ Eco-City” in response to global climate changes crisis. It is a relatively new concept, combining together ideas from several disciplines such as urban design, urban planning, transportation, health, housing, energy, economic development, natural habitats, public participation, and social justice (Register 1994). In simple word, Eco-city is settlement where it allows the citizen to live and work using minimum resources.

As cities continue to grow and population increase rapidly, the needs for sustainable form of development become increasing urgent. The search for appropriate solution and to create more sustainable cities has become the main concerns of designer, policy makers and environmental groups. The locations, types of buildings and infrastructure have direct impacts on its environment, economy and society. As city continue to grow and alters over a periods of time, it is difficult to change after inhabitation and construction. So, designers are trying to avoid that problems and prefer a new, master planned eco-cities. They argue that new eco-cities can fully integrate sustainable concepts of urban planning principle to create sustainable living environment as we go along with retrofitting existing cities. The master plan eco-city will be built using all the latest green technologies. But there people who oppose eco-city concept and called it a utopian city. But is eco-city really feasible or is it utopian concept? To fully understand, origin of eco-city concept will be analysed.

Eco-city originated in 1975 when Richard register and few friends founded Urban Ecology in Berkeley, California, as Non-profit organisation to make built our cities in balance with nature. According to Register (1994), the

purpose of urban ecology was to build in Berkeley a “ slow street” which is to have many trees along road, solar green houses, energy ordinance, establish good and efficient public transport, promoting pedestrainization as alternative to automobile, holding regular conference meeting with different stake holder.

But it was until the publications of Register’s visionary new book called Eco-city Berkeley in 1987, that the urban ecology gained momentum (Roseland, 2001). And the organisation’s new journal called The Urban Ecologist. The organisation held First International Eco-City Conference, in Berkeley in 1990 and ever since it held conference every year inviting people from around the world to discuss urban problems and to submit proposal for designing our cities based on ecological principles.

In 1992, David Engwicht, an Australian community activist, published Towards an Eco-City, in which he talks about how city planners and engineers have virtually eliminated effective human interaction by buildings more roads, shopping malls, gutting communities and increasing dense traffic. For Engwicht, a city is a place for inventions of maximizing exchanging and having minimized travel distance. The book was later reissued in North America as Reclaiming Our Cities and Towns (1993). Engwicht talks about how city planners and engineers have eliminated effective human exchange by building more roads, taking commerce out of the cities into strip malls, gutting communities, and increasing traffic fatalities. A city is an invention for maximizing exchange and minimizing travel (Engwicht, 1993). He advocates eco-city where there is transaction of all sorts of goods, money, ideas, emotions, genetic material, etc and where

people move freely via foot, bicycles, and mass transit and interact freely without fear of traffic and pollutions.

But it was until the 1960’s, the use of fossil fuels, chemically controlled agriculture, deforestation and depletion of marine resources was thought to be not in dangers. In 1987, the World Commission on Environment and Development (the Brundtland Commission), released a summary report called “ our Common Future” which cause widespread concerns on world deepening environmental degradation(WCED 1987). And this pushed sustainable development on the forefront. Various industries and sector are also going for sustainable development. The issue of sustainable planning is also a concern for planner, urban designer, construction industries, development authority and the population at large.

Register, Engwicht and Urban Ecology certainly deserve credit for popularizing the term “ eco-city” in the last decade, but the eco-city concept is strongly influenced by other movements as well(Roseland, 2001). The mission of Urban Ecology is to create ecological cities based on the following 10 principles (Urban Ecology 1996):

1. Revise land-use priorities to create compact, diverse, green, safe, pleasant, and vital mixed-use communities near transit nodes and other transportation facilities.
2. Revise transportation priorities to favour foot, bicycle, cart, and transit over autos, and to emphasize “ access by proximity.”
3. Restore damaged urban environments, especially creeks, shore lines, ridgelines, and wetlands.

4. Create decent, affordable, safe, convenient, and racially and economically mixed housing.
5. Nurture social justice and create improved opportunities for women, people of color, and the disabled.
6. Support local agriculture, urban greening projects, and community gardening.
7. Promote recycling, innovative appropriate technology, and resource conservation while reducing pollution and hazardous wastes.
8. Work with businesses to support ecologically sound economic activity while discouraging pollution, waste, and the use and production of hazardous materials.
9. Promote voluntary simplicity and discourage excessive consumption of material goods.
10. Increase awareness of the local environment and bioregion through activist and educational projects that increase public awareness of ecological sustainability issues.

The practical application of these principles has not been really encouraging for many years until literature that promotes the ideas began to appear. It appears in different terminology as per the orientations of the authors. The Authors include Designers, Practitioners, Visionaries and Activists, and the terminology includes everything from neotraditional town planning, pedestrian pockets, reurbanization, post-industrial suburbs, sustainable cities, green cities and eco-communities.

Although, the authors' orientation has discernible differences in analysis, emphasis, and strategy between the variations as shown in table-1, the "

eco-city” theme can encompass any and all of them. The term eco-city can be applied to existing eco-city or master plan eco-city as affirm by Register’s when he explains that “ there are two ways to go about building eco-cities: changing existing towns or building new ones” (Register 1987).

Citizen organizations and municipal officials in cities and towns around the world have recently started experimenting on this eco-city concept to meet the social and environmental challenges (Roseland 1997, 1998). There is a urgent realization that Urban planning is a significant management tool for dealing with the sustainable urbanization challenges facing 21st century cities. Many cities has applied eco-city planning concept although most of them in small scale. Chattanooga and the San Francisco Bay Area in the U. S., Ottawa, Hamilton-Wentworth, and Greater Toronto in Canada, and Curitiba in Brazil are some of the earliest cities where this concept has been successfully applied.

Curitiba, a small Brazilian city, is one of the most sustainable cities in the world. It has received international recognition for its integrated transportation and land-use planning, and for its waste management programs. The city’s success is due to strong leadership-city officials who focused on simple, flexible, and affordable solutions. Throughout the project, the government conducted regular meeting with citizen so that citizen are involved in the process (Rabinovitch 1996).

Emboldened by the success of the above projects, Designer and local government are planning for massive overhaul of traditional way of city

planning. They are looking at a way to plan new cities incorporating the entire above concept.

China, one of the world most populous countries in the world, faced massive environmental problem. It has emerged as major industrial power but at a great cost. The environment degradation is so severe that it is a cause for concern in china and could have international repercussions. Since pollution know no boundaries. Sulphur dioxide and nitrogen oxides produce by China's coal-fired power plants fall as acid rain on Seoul, South Korea, and Tokyo. Suspended particulate over Los Angeles city originates in China, according to the Journal of Geophysical Research (Kahn and Yardley 2007).

The Shanghai Industrial Investment Corporation (SIIC) hired Arup in 2005, to design a city which would exclusively use sustainable energy (solar panels, wind turbines and bio-fuels), self-sufficient and reduce energy consumption by 66% in comparision to Shanghai. The eco-city of Dongtan, which is be located on the island of Chongming, not far from Shanghai will be one of the world largest eco-city to provide housing for 500, 000 people from rural areas. The Dongtan city will cover about 8, 800 hectares which is roughly equal to the size of Manhattan Island. Dongtan will have ecological footprint of 2. 2 ha per person by means of a combination of behaviour change and energy efficiency which is very close to limit of sustainability of 1. 9 ha set forth by World Wide Fund for Nature.

China is also partnering with Singapore to build eco-city in Tianjin based on three harmonies principles which are people-people, people-environment and people-economy(Quek 2008) . The 30-square-kilometer site is a wasted

land and water scarcity area which will be built over a period of 15 years at a cost of around 50 billion yuan (S$10 billion). The criteria for selection of site are that it should be wasted land and water scarce area. First, restoring the jiyun river will be top priority for propose new city of 350, 000. Renewable energy like solar and wind power, rainwater harvesting, wastewater treatment and desalination of sea water are some of the proposal.

United Arab Emirates has planned to build the world's most sustainable city, called Masdar City, initiatives of Abu Dhabi Future Energy Company. It is an ambitious project which will cost $22 billion to build a new, zero-emissions city for 50, 000 residents in Abu Dhabi. The project is launched in 2007 and is designed by British firm Foster + Partners. The propose new city will have new university, the Headquarters for Abu Dhabi's Future Energy Company, special economic zones and an Innovation Center. According to the designer, Masdar eco-city is to be constructed in an energy efficient way that depends on large photovoltaic power plant to meet energy needs, which shall be for 2nd phase of the city expansion. The city is a car free, with a maximum walking distance of 200m to the nearest transport link and amenities. The streets are compact to encourage walking and are complemented by a personalised rapid transport system. Due to it compactness, the walkway and streets are shaded creating a pedestrian-friendly environment. The city will have wind, photovoltaic farms, research fields and plantations, so that it is entirely self-sustaining. Masdar City will be built in seven phases, the first of which is the Masdar Institute, which is set to be completed in 2010. The city's phases will be progressively built over the next decade with the first phase reaching completion in 2013(Foster and Partner).

The idea of a city without any waste, landfill, car, self contained or without any carbon emission seem very desirable for a city but for some sceptic it a utopian dream which will never materialise. Sceptics are questioning whether totally designing a new city is possible incorporating all the eco-city concepts due to time and cost involved. The main weakness for master plan eco-city is the large inputs of energy required to construct an entire, functional city as a long continuous project. They are concern that it might just be a strategy used to shield from environmental criticism while countries like China and UAE continue to grow along the same unsustainable path. However, countries like China and UAE are in a position to fund such kind of projects and if it is successful it will create a precedent for other parts of the world as well.

Unfortunately, Dongtan eco-city never materialise. Although, the highest echelon in Chinese official expresses has shown keen interest in the project, the first phase of construction which is to be ready for Shanghai expo 2010 has not even started. The Dongtan eco-city in spite of being a government endeavour has failed to materialise. The Mayor of Shanghai has been sentence to 18 years jail term on corruption charges and abuse of power in 2008(Larson 2009). Sceptics of eco-city are saying that policy makers in China misuse the term of eco-city, to reduce criticism of china’s poor environment records without having any real commitment to the idea.

As for Masdar eco-city, work has already started for phase 1. However, sceptics are concern that it might be just an isolated green in the desert where the rest of UAE proceed in the same line of big ecological footprint which is even bigger than United State. They are also apprehensive about

the embodied energy used in buildings and infrastructure which are very high. The heavy dependent on technology for personal rapid transport and infrastructure is another issue. Since the technology for personal rapid transport is not fully developed and co-ordinating infrastructure with different agencies is difficult.

The concept of building a city from a scratch or retrofitting existing building or redeveloping existing city are some of the burning issues. Designing a new city from scratch permits a greater comprehensive, whole systems approach, and more degrees of freedom than adaptation of an existing city(Fox 2008). On the other hand, the resources and energy needed for new construction of a city will be far greater than redeveloping an existing city. However, the beliefs and movement toward eco-cities has spread worldwide and has taken strong hold among planner. In spite of setback for some project, eco-city has will be main driving force for today cities and tomorrow cities. Eco-cities can be built on existing eco-cities or new master plan eco-city. Most propose master plan eco-city is to be developed in several stages in the next fifteen to forty years.

Some of the relevant issue for Eco-city planning concept for developing new city or adapting for existing cities are as follow:

- Eco-city is based on holistic approach. This integrated approach is hindered by fragmented administrative structures, political rivalries and a disregard for citizen expertise. As in Dongtan case, the surrounding inhabitants are not even consulted and not aware of the projects.

- Eco-city concept is not really encouraged by policy makers and planner as there are suspicious of the intention as it involve alternative ways of decision-making (e. g. community involvement), the implementation of new technologies (e. g. like Personal rapid transit for Masdar or energy generation) and new organisational solutions (e. g. multiple use). The additional costs involved and loss of influence are some of their main concerns.
- Eco-city concept may fail due to lack of political will and commitments on the part of everyone involved.
- The Initial investments are very high compared to traditional approach to planning which can scarce potential investor.

Nevertheless, for successful implementation of eco-city, commitment from individual or Party involved is paramount. Vision, ambition and thinking big in long term are some of the necessary requirement. Besides, there has to be free flow of information and trust between the policy maker and non-policy maker. There has to be creation of win-win situation for everyone to make it successful. There has to be compromise in difference of opinion and unity of alliance.

A series of challenges exist for developing cities in many part of the world, particularly in developing countries where rapid economic development will put pressure on cities to accommodate rising population and more infrastructures. It is the place where next megacities are coming up. The designer, public policy maker are committed to developing eco-cities and other types of sustainable communities in the face of climate change, environmental pollution, water shortage, and energy demand. Today utopia’s

vision can become tomorrow reality. Many of the sustainable city emphasize on compact land use, clean transport, waste management, renewable energy(wind turbines and solar energy).

Most of eco-city plans are huge and need long term investments. But should we turn away from utopian visions they provoke? Planning completely new cities is expensive, and it is not possible to build all new cities. However, we can strive to improve existing cities when there is an abundance of already established cities and urban areas. In my opinion, I think we should embrace them and work towards searching for improving them. Perhaps, the scales of new master eco-city project need to be smaller so as to have short construction time and less costly. Someday the impressive catchphrases, such as “ carbon-neutral”, “ zero-waste”, and “ car-free” for a city might be reality.

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