

Eco-cities in China

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Introduction

There have been longstanding efforts to make our urban areas more environmentally friendly, for example, the garden city movement of the late nineteenth century inspired by the work of Ebenezer Howard. More recently, eco-cities have moved to the fore in thinking on urban development because they seem to suggest a means by which urban dwellers can have the benefits of city living (employment, culture, recreation and consumption) without the negative environmental consequences (air and water pollution, noise, waste) associated with the city. Interest in more eco-friendly forms of development has been heightened because of the need to tackle climate change, and in Asia, Africa and South America ever more people living in urban areas. In China, the challenge of developing urban areas in more environmentally friendly ways is acute. The land to the west of the country is largely undeveloped and relatively under populated. Most of the development pressures are to be found in the centre and east of the country and this is also where the most agriculturally productive land can be found. Farm land is a protected resource and government is only sympathetic to development when it takes place on poorer quality land and can claim to be of a higher environmental standard than current development. As a result, as Chinese cities expand to accommodate rural migrants their political leaders and developers have quickly embraced the idea of eco-cities and there are well over 200 eco-cities planned or underway.

Findings

What is an eco-city?

An eco-city is not easy to define. It includes new development and retro-fitting of existing urban areas. It is development that seeks to:

- Reduce environmental impacts, such as by reducing energy use, promoting renewable forms of energy over coal, gas or oil, reduce the consumption of water.
- Enhance environmental quality, for instance, by encouraging public transport, cycling and walking over the car to improve air quality.
- Protect environmental assets and the resource base, for example, new development should not be on agricultural land, it will be of high density.
- Improve the efficiency of material use, for example, by creating industries to reuse waste materials.
- Promote social integration through the building of housing suitable for a wide range of social groups.
- Encourage city dwellers and visitors to live low carbon lifestyles, for example, by consuming less energy intensive products, purchasing local goods and services.
- Attract low carbon industries, such as media, environmental technologies and services and encourage employment opportunities for those who live in the eco-development.

Rarely, though, will any development be able to fulfil all of these actions. Matters are further complicated by the proliferation of alternative terms to describe development, such as low carbon cities or smart cities. Consequently, the Chinese government has sought to develop key performance indicators for its most high profile eco-city development at Tianjin (see below).

Sino-Singapore Tianjin Eco-City

On 18 November 2007, Singapore Prime Minister Lee Hsien Loong and Chinese Premier Wen Jiabao signed a Framework Agreement for Singapore and China to jointly develop Sino-Singapore Tianjin Eco-city. The Chinese Government set two criteria for the location of the Eco-city site: It should be developed on non-arable land; and it should be located in an area facing water shortage. The chosen site comprised mainly saltpans, barren land and polluted water-bodies, including a 2.6 sq km large wastewater pond. Whilst the site was an environmentally challenging one, economically it was very well located as it is in a major growth pole in North eastern China. It is 40 km from the Tianjin city centre and 150 km from Beijing.

The city has a total land area of 30 sq. km. When fully completed in around 2020, it will have a population of 350,000 residents. It is estimated that the cost of the development will be some 250 billion yuan (£25 billion) (made up on money from the Chinese and Singaporean governments and a number of private companies). The first residents moved into the Eco-city in Spring 2012.

Chinese national government bases its approach to sustainability on the notion of harmonious development. This means people live in harmony with one another, with economic activities and the environment. For the eco-city's this entails: "A thriving city which is socially harmonious, environmentally-friendly and resource-efficient – a model for sustainable development". There are three principles which underlie the planning of the city: mixed land use that minimises the need for travel; discourage use of the car; and enhance the land-based and water ecology and ensure that they are assets for the community (e.g. for recreation).

Performance indicators

Performance indicators help to separate an eco-city development from a conventional development. The indicators for the Tianjin eco-city have been set by a mix of national standards in China and Singapore and best international practice. They include the following:

Indicator
i) The air quality in the Eco-city should meet at least China's National Ambient Air Quality Grade II Standard for at least 310 days
ii) The daily water consumption per day each person should not exceed 120 litres by 2013
iii) The amount of domestic waste generated by each person should not exceed 0.8 kg by 2013
iv) At least 90% of trips within the Eco-city should be in the form of green trips by 2020 i.e. cycling and walking, as well as trips on public transport
v) The proportion of renewable energy utilised in the Eco-city should be at least 20% by 2020
Assessment
i) May be missed because of growth in polluting industries and transport outside of the city
ii) Depends upon the consumption habits of individuals (e.g. frequency and length of showers)
iii) Depends upon consumption habits and packaging
iv) Depends upon a) perceptions of car b) attitudes to non-car based forms of travel and c) income
v) Depends upon provision of technology by private sector. Target will very likely be met as long as energy consumption does not rapidly increase

More sustainable living?

Eco-cities, like other forms of development in China, are top-down initiatives. Participation takes place amongst political and economic elites but does not involve communities. So, within the development model is an implicit assumption that more sustainable lifestyles can be designed into urban areas. For example, if citizens are provided with more energy efficient technologies it is expected that they will reduce their energy consumption. Such thinking, though, can be rather naive. Even if individual units become more efficient, with increasing prosperity there is every possibility that Chinese citizens will consume more and more goods and that this may increase their overall energy consumption. This is more likely to occur in an eco-city such as Tianjin because it will be attracting younger upwardly mobile wage earners. Since there is little attempt to consult with citizens on how they might lead their lifestyles much of the infrastructure that is going into place may be redundant or used in inappropriate ways (for example, rubbish is to be sucked into an underground network but may

malfunction if waste is not properly separated).

A new form of development?

The rapid spread of eco-cities across China might suggest that there is widespread recognition that current patterns of development are unsustainable. Whilst there is some truth in this claim, and central government is certainly committed to promoting more environmentally friendly forms of development, at the local level a more traditional form of thinking frequently prevails. Cities rely upon selling land for development to fund their infrastructure and services. Undoubtedly eco-cities can attract a price premium and smooth the development process, so some eco-developments will be much about property development than pioneering a new form of development. Even in Tianjin – a flagship eco-city – individual developments are being built that do not add to the environmental credentials of the site.

Despite the large number of eco-city developments in China, they are only a small proportion of total urban development. With just over a third of the population (460m) living in urban areas in 2000, it is estimated that by 2015 that number will have grown to 60% (660m). Tianjin will be home to 350,000 people, a nearby city of Caofeidian is planned to accommodate nearly one million but even so these and other similar developments are outnumbered by fringe developments to existing urban areas and new conventional developments.

Conclusions

- China has more eco-cities than any other country in the world. These new cities are being built at a remarkable rate. Chinese eco-cities are marked by their commitment to new technologies to produce low carbon lifestyles for their citizens. What might emerge from these developments is more questionable.
- Some are simply conventional developments with a green tinge, others such as Tianjin have the potential to be much more innovative. Indeed, the Tianjin eco-city is an experiment in the making. How will its citizens interact with a host of new technologies? Which of these technologies will work best? Can these technologies be retrofitted to existing urban areas? Can sufficient employment be attracted to the eco-city so that its residents do not need to commute to jobs elsewhere? Here Tianjin is a unique position.
- As a government sponsored development low carbon industries (such as film animation and environmental technologies) are being encouraged to relocate to the eco-city. Other eco-cities will not have the same level of investment or national government support and so how they fare will depend much more upon how markets perceive a potential environmental premium.