



“ECO-CITIES” AND “SUSTAINABLE CITIES” – Whither?

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The concept of sustainable cities was first discussed by the Association of Southeast Asian Nations (ASEAN) in 2003, with the idea of eco-cities entering the picture in 2007. Are the two mutually exclusive, or do they overlap? The authors consider the implications of cities as engines of growth and examine case studies that reveal what lies ahead for sustainable cities and eco-cities.

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“The future will be predominantly urban, and the most immediate environmental concerns of most people will be urban ones.”¹

INTRODUCTION

The recognition of the potentially adverse environmental impacts of urban development has led to the inclusion of cities in the environmental sustainability discourse. Cities are the engines of growth, but rapid industrialisation has been accompanied by increased use of natural resources, growing energy consumption and fossil fuel dependence, which have contributed to carbon lock-in and rising greenhouse gas (GHG) emissions, as well as increased waste generation. These developments exacerbate the adverse impacts of climate change, which may expose the residents of cities to several problems, including air and water pollution, flooding and increased spread of diseases. Also, in 2008, for the first time in history, more than 50% of the world's population was concentrated in cities. This is attributable to several factors, including large-scale migration from rural areas for better employment opportunities and improved quality of life. But if this trend continues, the urban share of the world's population is expected to increase to 70% by 2050. The biggest growth will take place in Africa and Asia, where urban populations are expected to double between 2000 and 2030.²

Most of the population growth will occur in developing countries where a majority of the world's megacities and coastal cities that are most vulnerable to climate change are concentrated. These cities are also inhabited by the world's most vulnerable and poor populations with the least capacity to cope with climate change.³ In order to confront unprecedented urban expansion, rising energy prices and the adverse impacts of climate change, cities worldwide are adopting the principle of ‘think globally, act locally’. The need for a paradigm shift has provided the window of opportunity to introduce an overwhelming range of ‘solutions’ under different labels, such as ‘eco-cities’, ‘sustainable cities’ and so on, but there are no clear, universally acceptable definitions of these terms. This paper will explore these concepts with some examples.

ECO-CITIES: SETTING THE STAGE

The term ‘eco-city’ was coined by Richard Register to describe a city where human beings can exist in harmony with nature therefore greatly reducing

our ecological footprint.⁴ But the concept of eco-cities is not new. In 1970, the Cosanti Foundation in the United States began building Arcosanti, an experimental town in Phoenix, Arizona. It was conceptualised by Paolo Soleri, and was intended to be the first example of an arcology, or architectural eco-city.⁵ However, being a first generation eco-city, which was launched when the dangers of global warming and environmental degradation were not recognised, the project lacked the necessary public support, financial and other resources for timely completion.

The non-profit organisation, Urban Ecology, defines an ‘eco-city’ as “a human settlement that enables its residents to live a good quality of life while using minimal natural resources.”⁶ Other definitions include:

- An ecologically healthy city⁷
- “The most durable kind of settlement that humans are capable of building and a city that provides an acceptable standard of living without depleting the ecosystems or biogeochemical cycles on which it depends”⁸
- Ecological requirements combined with socio-economic conditions⁹

Although there is no universally acceptable definition of an ‘eco-city’, there is some consensus on the basic features of an eco-city amongst the available definitions. From an environmental sustainability perspective, an eco-city should be in balance with nature, dedicated to minimising the required inputs of energy, water and food, its waste output of heat, gases such as carbon dioxide and methane that cause atmospheric pollution and water pollution. However, in order to ensure sustainable development, which requires a balance between environmental, social and economic sustainability, the environmental features referred to above should be acceptable to the people and should be in harmony with their economic development aspirations. The World Bank defines eco-cities as “cities that create economic opportunities for their citizens in an inclusive, sustainable, and resource-efficient way, while also protecting and nurturing the local ecology and global public goods, such as the environment, for future generations.”¹⁰

The proposed Tianjin Eco-city is described as a “thriving city, which is socially harmonious, environmentally friendly and resource-efficient – a model for sustainable development.”²² It is inspired by the ideal of ameliorating the potentially adverse impact of climate change.

There are several reasons for the emergence of ‘eco-cities’. They represent local governments’ response to the need for sustainable development. Such initiatives can distinguish areas and add to a region’s attractiveness for foreign investment inflow. They can also place the local governments in a good position to receive preferential financial treatments (such as tax breaks etc.) from the national government.¹¹ Eco-cities may also serve as pilot projects or technological niches where new ideas to tackle urgent environmental issues are developed and tested. Their success may create a demonstration effect and these technologies can be replicated on a larger scale.

EMERGENCE OF ECO-CITIES IN ASIA

The Association of South-East Asian Nations (ASEAN) is an inter-governmental organisation, which is responsible for the active promotion of an ASEAN Community.¹² ASEAN inter alia provides the framework for regional cooperation on sustainable development and climate change.¹³

- The ASEAN Vision 2020 calls for “[a] clean and green ASEAN with fully established mechanisms for sustainable development to ensure the protection of the region’s environment, the sustainability of its natural resources, and the high quality of life of its peoples.”¹⁴
- The Blueprint for the ASEAN Socio-Cultural Community, which forms a part of the Roadmap for the ASEAN Community (2009-2015) expresses ASEAN’s commitment to work towards achieving sustainable development as well as promoting a clean and green environment.¹⁵
- The ASEAN Declaration on Environmental Sustainability includes commitments in the areas of environmental protection and management and conservation of natural resources, as well as responding to climate change.¹⁶
- The Singapore Declaration on Climate Change, Energy and the Environment reaffirms “the need to take an effective approach to the interrelated challenges of climate change, energy security and other environmental and health issues, in the context of sustainable development.”¹⁷
- ASEAN Member States are encouraged to promote synergies between initiatives, such as ‘Low Carbon

Society’, ‘Compact Cities’, ‘Eco-Cities’, and ‘Environmentally Sustainable Transport’.¹⁸

- The Network of East Asian Think-tanks (NEAT) Working Group Meeting on the Environment views eco-cities as an important model of sustainable development and as low carbon cities that utilise fewer resources and reduce waste output (paragraphs 3 & 9).¹⁹

Thus, there is emerging consensus in the region regarding the potential of eco-cities as an innovative and practical strategy for climate change mitigation and adaptation.

THE TIANJIN ECO-CITY: A SINO-SINGAPORE COLLABORATION

Singapore has emerged as a leader in the field of environmental innovation, including the development of green technologies and a public housing system that promotes social harmony and addresses some of the concerns associated with urban sprawl, and more recently, green buildings with a focus on energy efficiency, together with a supportive legal and policy framework.²⁰ In the year 2007, the growing salience of the climate change issue, concerns about China’s increasing GHG emissions and energy efficiency requirements and Singapore’s development experience, led Premier Wen Jiabao to accept the proposal of Mr Goh Chok Tong, Senior Minister of Singapore, for a government-driven public-private collaboration to develop an eco-city in Tianjin, China on 30 square kilometres of what was previously a salt farm. The governments signed the Framework Agreement on 18th November 2007 for the Sino-Singapore Tianjin Eco-city, which will accommodate a population of 350,000 people by 2020.²¹

The proposed Tianjin Eco-city is described as a “thriving city, which is socially harmonious, environmentally friendly and resource-efficient – a model for sustainable development.”²² It is inspired by the ideal of ameliorating the potentially adverse impact of climate change. Thus, its main features include energy efficiency and the use of clean, renewable energy, green buildings, green transportation, ecologically friendly water management and waste management.²³ At the same



time, the city must be economically vibrant with its population living in social harmony. This is a more flexible and eclectic three-in-one approach, which combines ‘eco-cities’ or ‘ecological/green cities’ with ideas of ‘compact cities’ (which addresses the problems of urban sprawl by promoting amenities such as schools, shopping centres and recreation facilities all within a given area to minimise transportation) and ‘sustainable cities’. This collaboration was followed by the groundbreaking ceremony for the Singapore-Nanjing Eco High-Tech Island in Jiangxinzhou in May 2009.²⁴

China also recognises the need to build institutional capacity to support eco-city projects.²⁵ The other eco-cities that are ‘under construction’ in China include the Caofeidian Eco-city (Tangshan – with Sweden), and Wanzhuang (Hebei province) and Changxingdian (Beijing) with Arup, a global engineering company, and Guiyang (Guizhou province). Singapore is also developing its ‘My Punggol 21’ initiative as a model for future HDB waterfront towns.²⁶ Other eco-city projects in Asia include the Songdo International Business District (South Korea), the Ecocity 2050 Vision (Taipei), and the project to develop eco-cities in Trirupati, Vrindavan, Kottayam, Ujjain, Puri, and Tanjavur (India). Outside Asia, Abu Dhabi is developing Masdar city as a showcase for zero-carbon, zero-waste and car-free technologies. In the United Kingdom, the EcoCities initiative seeks to provide a blueprint for the first climate change adaptation strategy for Greater Manchester.²⁷

LESSONS FOR THE FUTURE DEVELOPMENT OF ECO-CITIES

It would be premature to speculate on the success or failure of ‘eco-cities’, as most projects are still at the planning stage or ‘under construction’. The development of the necessary infrastructure and

expertise, policy support and affordable technology will also take time. However, this section considers some eco-city projects in China in order to identify lessons for the future.

- In 2003, China’s first “ecologically sustainable” model village was completed in Huangbaiyu in the Liaoning province in north-eastern China. However, there was no consultation with local communities, the agreed materials were not used in the construction, the houses were not affordable, and the utility costs were very high. As a result, the occupancy rate was low.²⁸
- In 2005, the Shanghai Industrial Investment Corporation and Arup (a British engineering consultancy firm) agreed to develop the Dongtan Eco-City for a population of 500,000 people on a 8,600-hectare site on Chongming Island near Shanghai.²⁹ During the construction phase, wetlands were destroyed and the island was depopulated. However, the project has been stalled due to several reasons, including the conviction and imprisonment, on corruption charges, of the local politicians who supported the project, as well as miscommunication between the project partners regarding their respective financial responsibilities.³⁰

These two projects highlight the gap between the conceptualisation stage and the actual completion and management of an eco-city. They also illustrate the importance of local involvement. The completion of the Dongtan project also suffered due to lack of political support.

On the other hand, small, locally based and low-profile projects, involving the local community and businesses, have been moving forward. The population of three million people in Rizhao, located in Shangdong province in north-east China, has adopted solar power, promoted by a local

The environmental sustainability of eco-cities is also questionable. Undoubtedly, eco-cities employ several ecological ideas and clean technologies to test their potential to reduce the ecological footprint of eco-cities. But less attention is paid to the environmental impact of eco-cities during the planning and construction stage. At times, eco-cities are built on previously contaminated land, irrigable land or ecologically fragile/protected areas, as was the case in the failed Dongtan project.



entrepreneur, for housing and public services. While the clean-up of the environment emerged as a secondary benefit, it has attracted investment, employment and tourism and facilitated the establishment of several sports universities in the area.³¹

The environmental sustainability of eco-cities is also questionable. Undoubtedly, eco-cities employ several ecological ideas and clean technologies to test their potential to reduce the ecological footprint of eco-cities. But less attention is paid to the environmental impact of eco-cities during the planning and construction stage. At times, eco-cities are built on previously contaminated land, irrigable land or ecologically fragile/protected areas, as was the case in the failed Dongtan project. Their potential to contribute to sustainability is restricted by the continued presence of unsustainable cities and development projects around them. Critics have therefore labelled eco-cities as ‘greenwash’.

Eco-cities are also confronted with the issue of equity. These are small-sized cities with limited populations while developing countries are characterised by large cities inhabited by millions of poor people. The high cost of the required state-of-the-art technology and the business logic guiding developers may also lead to affordability issues and render eco-cities inaccessible to the wider population. However, proponents of eco-cities argue that this is linked to the general misunderstanding of the purpose of eco-cities, which offer great showcase potential for low-carbon or non-carbon technologies. Nevertheless, projects like the Tianjin eco-city, which draws on Singapore’s successful public housing scheme and provides that 20% of accommodation will be public/affordable housing, may address some of the equity concerns associated with eco-cities.³²

Governments in developing countries are also faced with trade-offs between different objectives, such as poverty alleviation, economic growth and environmental protection, which does not bode well for the future of eco-cities. Institutional and regulatory limitations, such as lack of good governance, effective policy support in the form of financial subsidies or tax preferences, competition for limited (financial and technical) resources and paucity of effective supervision, implementation and enforcement mechanisms, also act as barriers. At the local level, detailed local planning and performance indicators are absent.

In the short term, eco-city projects should be small in size, meet local economic and social priorities, and involve the local community, private sector and the government. The adoption of an integrated approach – within the eco-city as well as with its surrounding environment – is also necessary. In the long term, life cycle analysis – from planning and construction to the operation of eco-cities – is essential to determine their sustainability. This will also require appropriate regulatory frameworks. The potential of eco-cities to address climate change challenges will also depend on the degree to which stakeholders buy into the eco-cities’ potential to contribute towards a greener future. This will require capacity building for the various stakeholders (including governments,

the private sector, and the members of the public) in order to generate greater awareness regarding the rationale and long-term benefits of eco-cities. Sharing of information, experience, expertise and technology related to eco-cities is also required to develop individual and institutional capabilities.

The bottom-line is that eco-cities represent an adaptive and flexible approach to showcase new technologies and new ways of urban living in an era of scientific uncertainty. It is a means-to-an-end rather than an end-in-itself. Further, while developing eco-cities is challenging, given the financial and technological resources required for their development, the development and maintenance of eco-cities will require a reconceptualisation of current legal and policy frameworks to cater to new ways of living in eco-cities. This includes provisions relating to the implementation of energy efficiency, sustainable building construction and management, and recycling practices, among others.

SUSTAINABLE CITIES

The term ‘sustainable development’ is defined as ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’.³³ The three pillars of sustainable development - economic, environmental and social – are integral to the development agenda worldwide. The idea of ‘sustainable cities’ is closely aligned with this understanding.

Two definitions of ‘sustainable city’ are:

- ‘A sustainable city enables all its citizens to meet their own needs and to enhance their well-being, without degrading the natural world or the lives of other people, now or in the future’³⁴
- Sustainable cities are environmentally safe, socially inclusive and economically productive³⁵

One of the earlier references to the term ‘sustainable city’ is included in Agenda 21, one of the chief outcomes of the United Nations Conference on Environment and Development 1992, which inter alia proposed integrated urban management to ensure that environmental, social, and economic factors are considered together in a framework for the sustainable city (chapter 7). The Sustainable Cities Programme was established by the United Nations Human Settlements Programme (UN-HABITAT), the agency responsible for the promotion of sustainable urban planning.³⁶ ‘Sustainable cities’ also form the basis of UNESCAP’s Kitakyushu Initiative for a Clean Environment.³⁷

ASEAN built upon these programmes and endorsed the Regional Environmentally Sustainable Cities

Programme (‘RESCP’).³⁸ Recognising the difficulties associated with achieving agreement on common targets, given the differences between Member States, the RESCP adopted a common vision - Clean Air, Clean Water, Clean Land - and the participating cities were required to establish appropriate targets and goals.³⁹ The ASEAN Working Group on Environmentally Sustainable Cities (‘AWGESC’)⁴⁰ has been responsible for the development of:

1. Framework on Environmentally Sustainable Cities (ESC) in ASEAN: to map out the vision, principles and scope under the RESCP and identify the goals, objectives, strategies and activities/programmes.⁴¹
2. ASEAN Initiative on ESC: to broaden the RESCP and to encompass strategies, policies and philosophies of environmental sustainability.⁴² This includes the development of the ASEAN Implementation Plan for ESC for each of the participating cities,⁴³ and the establishment of the ASEAN Network on ESC to share and exchange experiences and best practices in environmental management and protection, and to articulate capacity development needs.⁴⁴
3. Key indicators for Clean Air, Clean Water and Clean Land.
4. ASEAN ESC Award: to recognise exemplary national efforts in Member States and to promote further efforts towards environmental sustainability in ASEAN cities.⁴⁵ Some Member States, such as Malaysia, have also launched their own sustainable city awards.

The Singapore Resolution on Environmental Sustainability and Climate Change refers to the promotion of sustainable environmental practices and use of indicators under the Initiative to achieve clean air, land and water, and the continuance of the ASEAN ESC Award.⁴⁶ The ASCC Blueprint also calls for expanding the existing work under the Initiative; sharing experiences, expertise and technology in areas such as urban planning and developing internationally comparable measures for environmental sustainability for major cities in ASEAN by 2015.⁴⁷

The EAS Environment Ministers also recognise “environmentally sustainable cities” as “an immediate priority area” to address the challenges posed by rapid urbanisation and the related issues of climate change, energy and environment.⁴⁸ Similarly, one of the strategic objectives of the ASCC Blueprint is to

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ensure the environmental sustainability of ASEAN cities/urban areas, while meeting the social and economic needs of the people.⁴⁹ Clearly, 'sustainable cities' are gaining political legitimacy and support in the ASEAN context. Additional fillip has been provided by the proposed "Cool Asean, Green Capitals" initiative to encourage efforts by the ASEAN capital cities and other major cities to mitigate climate change.⁵⁰ The initiative is expected to be launched early this year. Outside the ASEAN framework, the Asian Cities Climate Change Resilience Network supports the development of sustainable cities.⁵¹

The concept of sustainable cities illustrates the importance of simple, environment-friendly measures and good governance in modifying existing cities or creating environmentally sustainable cities. Such 'retrofitting' of cities to become sustainable can also provide a platform to mainstream green ideas and technologies that are developed in 'eco-cities'. However, as this process is concerned with the gradual and less immediately dramatic implementation and injection of 'sustainable' ideas into existing cities, rather than building new cities, sustainable cities attract less attention than eco-cities. The latter are scrutinised and studied more closely for the lessons they can provide in the long-term. In that respect, eco-cities are more evolutionary.

In practice, the umbrella term 'sustainable cities' is often used to refer to piecemeal, narrow sector-specific approaches due to the uncertainty surrounding the extent and impact of climate change and the ability

of technology to address climate change challenges. Undoubtedly, these small changes play a part in the process but in order to be truly sustainable, cities must adopt a comprehensive and more inclusive approach that caters to the needs of the urban poor. The absence of a universally acceptable definition allows cities to define sustainable urban planning in accordance with their different sizes, needs, capacities and financial resources.

CONCLUSION

The terms 'eco-cities' and 'sustainable cities' have entered the policymakers' lexicon at different points in recent times but now they are both firmly embedded in the urban environmental sustainability agenda, more recently in the context of climate change. There is no single accepted definition of 'eco-cities'. The broad definition of 'sustainable cities' is based on the principle of 'sustainable development' although clarity and consistency remain elusive. This ambiguity allows different cities with diverse characteristics to develop strategies that are better suited to local conditions. Therefore, the absence of a strict definition has proven useful.

In practice, the term 'eco-cities' is often used to describe new cities rather than modification of existing cities (as in the case of 'sustainable cities'). Such a concept provides rapidly urbanising developing countries with the opportunity for technological leapfrogging, as they are still in the early stages of development. However, this would require significant capacity building. Further, like other proposals to



address the threat of climate change, 'eco-cities' and 'sustainable cities' reaffirm the growing trend of focusing on supply-side factors and the exclusion of demand-side considerations, including consumption patterns. Population control in developing countries, especially in Asia, can also play an important role. Efforts to maintain productivity and the efficient functioning of rural systems can also ebb the tide of rural migration to urban areas.

Finally, the greatest challenge when developing eco-cities and sustainable cities will be public acceptance, as the two concepts mandate radical changes

in their established views, lifestyles and patterns. Two factors will be integral to assure their popularity and subsequent implementation. First, the advantages of creating eco-cities and making existing cities sustainable will need to be communicated in a clear and convincing manner. Second, and perhaps more critically, policy makers will need to work on encouraging public acceptance and ownership of these ideas.

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- ¹ World Commission on Environment and Development. *Our Common Future*. (Oxford: Oxford University Press, 1987).
 - ² United Nations Population Fund (2007). *State of the World Population 2007 – Unleashing the Potential of Future Growth*. <http://www.unfpa.org/swp/2007/english/introduction.html>.
 - ³ UN-HABITAT (2009) *Planning Sustainable Cities – Global Report on Human Settlements 2009*, xxii. <http://www.unhabitat.org/downloads/docs/GRHS2009/GRHS.2009.pdf>.
 - ⁴ R. Register, *Eco-city Berkeley: Building Cities for a Healthy Future* (Berkeley: Berkeley Hills Books, 1987).
 - ⁵ Arcosanti (2005). *Arcosanti Project History*, <http://www.arcosanti.org/project/background/history/main.html>.
 - ⁶ Ecocity Builders (2010), *International Ecocity Standards*, <http://ecocitybuilders.org/IESproject.html>.
 - ⁷ "Shenzhen Declaration on Eco-city Development 2002", <http://preview.tinyurl.com/shenzhenecocitydevt>. World Summit on Sustainable Development in Johannesburg, September 2002. The Declaration was delivered but it has not been adopted or approved in any international document.
 - ⁸ Rodney R. White, *Building the Ecological City 11* (Cambridge: Woodhead Publishing Ltd., 2002).
 - ⁹ R. Wittig, Principles for Guiding Eco-City Development 29 in M.M. Carreiro et al. (eds.) *Ecology, Planning, and Management of Urban Forests: International Perspectives* (New York: Springer, 2007).
 - ¹⁰ World Bank (2009) *Eco2 Cities: Ecological Cities as Economic Cities Program*, <http://preview.tinyurl.com/ecocitiesfullreport>.
 - ¹¹ Organisation for Economic Co-operation and Development, *Eco-Innovation Policies in the People's Republic of China 26*. (Paris: OECD Environment Directorate, 2009.) <http://www.oecd.org/dataoecd/29/47/44293445.pdf>.
 - ¹² See Koh Kheng-Lian (ed.) *ASEAN Environmental Law, Policy and Governance: Selected Documents*, Vol I (Singapore: World Scientific, 2009).
 - ¹³ B. Yuen & L. Kong., *Climate Change and Urban Planning in Southeast Asia*, 2(3) *S.A.P.I.E.N.S.* 1, 5 (2009).
 - ¹⁴ *ASEAN Vision 2020*, Kuala Lumpur, Malaysia, December 15, 1997. <http://www.aseansec.org/1814.htm>.
 - ¹⁵ *Blueprint for the ASEAN Socio-Cultural Community (2009-2015)*, Cha-am, Thailand, March 1, 2009. <http://www.aseansec.org/22336.pdf>.
 - ¹⁶ *Declaration on Environmental Sustainability*, Singapore, November 20, 1997. <http://www.aseansec.org/21060.htm>.
 - ¹⁷ *Singapore Declaration on Climate Change, Energy and the Environment*, Singapore, November 21, 2007. <http://www.aseansec.org/21116.htm>.
 - ¹⁸ Ministerial Statement of the Inaugural East Asia Summit (EAS) Environment Ministers' Meeting in Hanoi, Vietnam, 9 October 2008. <http://www.aseansec.org/23292.htm>. See also, *supra* note xv.
 - ¹⁹ Report of the Working Group Meeting on the Environment. "Towards a Livable and Sustainable Urban Environment: Eco-cities in East Asia". Singapore, April 20, 2009, http://www.ceac.jp/e/pdf/neat_07wg02.pdf.
 - ²⁰ Low Sui Pheng et al., "Institutional compliance and the Sino-Singapore Tianjin Eco-city Project", 27 (9/10) *Facilities* 368 (2009).
 - ²¹ T. Quek, "Singapore-Tianjin eco-city project – How Tianjin won tough fight to be an eco-city", *Social Studies Singapore*, November 27, 2007. <http://www.socialstudiesmontfort.blogspot.com/2007/11/sg-tianjin-ecocity-project.html>.

- ²² Ministry of National Development, "Press Release - Agreements to Develop Eco-city in China Signed", Singapore, November 18, 2007. <http://www.mnd.gov.sg/Newsroom/newsreleases/2007/news181107.htm>.
- ²³ Government of Singapore (2009). "Features - Sino-Singapore Tianjin Eco-City". <http://www.tianjinecocity.gov.sg/Features.htm>.
- ²⁴ G. Chong, "DPM Wong officiates at S'pore-Nanjing eco project groundbreaking", *Channel NewsAsia* (Singapore), May 25 2009. <http://www.channelnewsasia.com/stories/singaporelocalnews/view/431604/1/html>.
- ²⁵ The State Environmental Planning Agency has issued the Guidelines for the Building of Eco-Communities (1996-2050). The Ministry of Environmental Protection issued "Guidelines on building ecological province, ecological city and ecological county", which were revised in 2007. The Urban and Rural Planning Law 2008 provides the strategic opportunity to promote and implement the planning for eco-cities in China. See Food and Agricultural Organisation (2008) *Urban and Rural Planning Law of the People's Republic of China*. <http://faolex.fao.org/docs/texts/chn83266.doc> and Yip, Stanley (2009) "Towards a New Paradigm in Development Control – Low Carbon City Zoning Codes for Beijing", 45th ISOCARP Congress, Porto, Portugal, October 18-22, 2009. http://isocarp.net/Data/case_studies/1403.pdf.
- ²⁶ Housing Development Board (2007). <http://heartland.hdb.gov.sg/resources/hwsep07.pdf>.
- ²⁷ Bruntwood (2009) EcoCities, "The Bruntwood Initiative for Sustainable Cities at the University of Manchester". <http://www.ecocitiesproject.org.uk/ecocities/page.aspx>.
- ²⁸ S. May, "A Sino-U.S. Sustainability Sham", *Far Eastern Economic Review* 57, 2007.
- ²⁹ M. Hald, 'Sustainable Urban Development and the Chinese Eco-City: Concepts, Strategies, Policies and Assessments', 47 (Lysaker, Norway: Fridtjof Nansen Institute, 2009). <http://www.fni.no/doc&pdf/FNI-R0509.pdf>.
- ³⁰ Malcolm Moore, 'China's pioneering eco-city of Dongtan stalls'. *Daily Telegraph* (London). October 18, 2008. <http://www.telegraph.co.uk/news/worldnews/asia/china/3223969/Chinas-pioneering-eco-city-of-Dongtan-stalls.html>.
- ³¹ Kwan See and L. Calvin, "Rizhao: China's Green Beacon for Sustainable Chinese Cities" 14:215 in Woodrow W. Clark (ed.) *Sustainable Communities* (New York: Springer, 2009).
- ³² J. Cheam, 'HDB-style living in Tianjin eco-city – The \$5.8b project is the biggest Singapore-China venture in 15 years', *Straits Times* (Singapore), April 17, 2008.
- ³³ See note 1 above.
- ³⁴ H. Girardet, *Cities People Planet: Liveable Cities for a Sustainable World* 6 (Chichester: John Wiley & Sons, Incorporated, 2004).
- ³⁵ UN-HABITAT (2009), *Planning Sustainable Cities – Global Report on Human Settlements* 2009, 113.
- ³⁶ UN-HABITAT (1996) Sustainable Cities Programme. <http://preview.tinyurl.com/sustcitiesprogram>.
- ³⁷ Kitakyushu Initiative for a Clean Environment, <http://kitakyushu.iges.or.jp>. The network comprises 62 cities from 18 countries in the Asia-Pacific region, including Siem Reap (Cambodia); Balikpapan, Bekasi, Gianyar, Jakarta, Medan, Semarang, Sidoarjo and Surabaya (Indonesia); Sibul (Malaysia); Yangon (Myanmar); Bago, Cebu, Puerto Princesa and San Fernando (Philippines); Bangkok, Korat and Nonthaburi (Thailand); and Ho Chi Minh (Vietnam).
- ³⁸ Regional Environmentally Sustainable Cities Programme 2003, <http://www.aseansec.org/background.htm>. The participating cities include Bandar Seri Begawan (Brunei); Phnom Penh and Siem Reap (Cambodia); Balikpapan, Medan and Sidoarjo (Indonesia); Luang Prabang, Vientiane and Xayaboury (Lao PDR); Kuantan and Putrajaya (Malaysia); Mandalay and Yangon (Myanmar); Cagayan de Oro, Quezon City and Iloilo City (Philippines); Singapore; Bangkok, Chiang Mai, Krabi and Phuket (Thailand); and Da Nang, Ha Noi and Ha Long (Vietnam).
- ³⁹ UNESCAP, 'Summary of Discussions', Expert Group Meeting on Sustainable Infrastructure Development in Asia and the Pacific, 11-13 June 2007, Bangkok, Thailand. <http://preview.tinyurl.com/unescapegm>.
- ⁴⁰ ASEAN Working Group on Environmentally Sustainable Cities in ASEAN. <http://www.aseansec.org/awgesc.htm>.
- ⁴¹ Framework for Environmentally Sustainable Cities in ASEAN, prepared at the 'Workshop on Environmentally Sustainable Cities in ASEAN', Singapore, December 2-4, 2003. <http://www.aseansec.org/framework.htm>. The Framework was adopted by the Yangon Resolution on Sustainable Development, Myanmar, December 18, 2003. <http://www.aseansec.org/15522.htm>.
- ⁴² ASEAN Initiative on Environmentally Sustainable Cities, <http://www.aseansec.org/aiesc.htm>.
- ⁴³ ASEAN Implementation Plan, <http://www.aseansec.org/implementca.htm>.
- ⁴⁴ ASEAN Network Activities, http://www.aseansec.org/network_activities.htm.
- ⁴⁵ The ESC Award was endorsed in the Cebu Resolution on Sustainable Development 2006. <http://www.aseansec.org/18915.htm>.
- ⁴⁶ "Singapore Resolution on Environmental Sustainability and Climate Change", Singapore, October 29, 2009. <http://www.aseansec.org/documents/Singapore-AMME-Resolution.pdf>.
- ⁴⁷ See note 15 above.
- ⁴⁸ See note 28 above.
- ⁴⁹ See note 15 above.
- ⁵⁰ 'Joint Media Statement', Special ASEAN Ministerial Meeting on the Environment, Hua Hin, Thailand, September 7, 2009. <http://www.aseansec.org/JMS-Special-AMEM-2009.pdf>.
- ⁵¹ Asian Cities Climate Change Resilience Network (CCCRN), <http://preview.tinyurl.com/asiancitiescccrn>. The Network was launched by the Rockefeller Foundation in April 2008 and includes Chiang Rai and Hat Yai (Thailand); Da Nang, Quy Nhon and Can Tho (Vietnam); and Bandar Lampung and Semarang (Indonesia).