

Master plan



A suburb of Shanghai could become the blueprint for green cities worldwide. Fred Pearce reports from Dongtan

THE two ruddy-faced women are weighed down by their huge bundles of reeds. They have been out on the wetland, braving the winds from the South China Sea for two months, they say. They are hundreds of kilometres from their homes in Anhui province, cutting reeds for sale to a paper-maker. The money isn't great, but Anhui is a poor province and there is certainly no shortage of reeds out here.

Welcome to Chongming, the world's largest alluvial island, a 100-kilometre-long shifting mass of sand and mud in the delta of the Yangtze river. Chongming island has doubled in size since 1950, thanks to silt coming down the river from the deforested headwaters of the Yangtze. Now the rural backwater is about to be invaded by city folk.

Within two years, 25 kilometres of tunnel and bridge will link Chongming to the mainland for the first time. The island, now only reachable by antiquated ferry, will be just 20 minutes' drive from the central business district of Shanghai, the world's fourth-biggest city.

Shanghai is already bursting at the seams. In downtown Shanghai people live at a density

of 42,000 people per square kilometre – more than four times that of New York City, which has a similar size population. Shanghai already has more than 4000 buildings taller than 30 storeys. In 15 years of breakneck growth, the city's planners have built a modernist cityscape reminiscent of the film *Blade Runner*, centred on the Pudong business district.

Around Shanghai, 10 satellite cities are under construction, of which four will have a population of at least half a million. There will be a university city; a "motor city" that will house car manufacturing plants and already hosts an annual Formula 1 Grand Prix event; and a harbour city to service the world's largest deep-sea container port being built on an island 30 kilometres out in the South China Sea and connected to the mainland by a bridge. The fourth will be on Chongming.

The permanent residents on the island, whose average income is only a quarter of that in the city, are rubbing their hands. A new Pudong on their doorstep would mean an influx of wealth and new markets to sell their wares. They are going to be disappointed. Ma Cheng Liang, the man in charge of Shanghai's development plans for the island, has

Wind turbines and green space will be a common sight in Shanghai's new eco-suburb

something different in mind. "The plan is for an ecological island," he tells me when we meet on the 30th floor of an office block in downtown Shanghai. "We want to skip traditional industrialisation in favour of ecological modernism. Chongming is a strategic green space for Shanghai, but also a chance to develop new ways of living." Instead of 100-storey tower blocks, the city to be built on Chongming will take the form of low-rise development surrounded by forests and organic farms, lakes and golf courses.

Later this year, construction workers will move in to begin building the new city, to be called Dongtan, close to the island's exposed eastern shore. The master plan, drawn up by British engineering firm Arup, envisages a city of 86 square kilometres with a population of half a million people by 2040. Ma promises that Dongtan will be a zero-pollution, largely car-free, renewable-energy powered, sewage-recycling, green-fringed utopia that will ▶

give full protection to the millions of birds that congregate in the internationally recognised wetland sanctuary at the island's tip.

China is straining against its ecological limits, and Dongtan is an experiment that is trying to redress that. "We face the challenges of shortages of energy and damage to the environment," Ma says. "We need to reduce our ecological footprint. So Dongtan is very significant for Shanghai and for the nation."

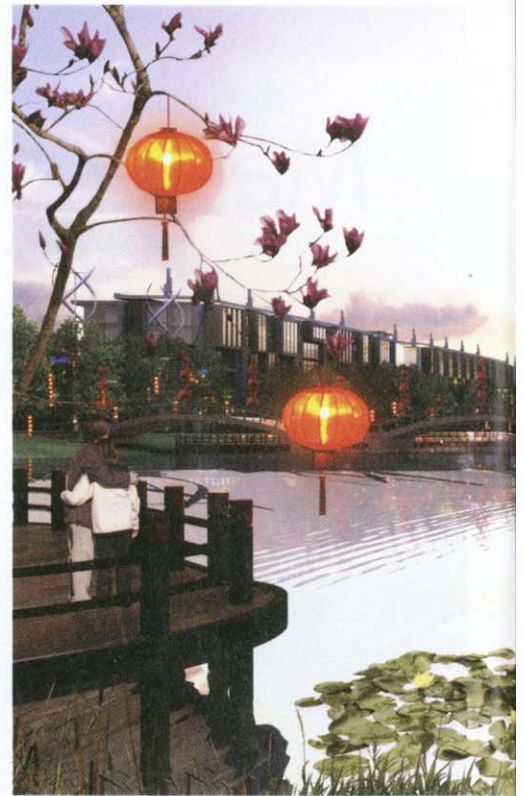
The stakes are high. China is urbanising at record speed. It already has 90 cities with more than a million inhabitants, and expects 400 million people to move from the countryside to cities over the coming 30 years. The ecological implications of this urbanisation are immense. Shanghai's ecological footprint per head of population is already four times the Chinese average.

This is why Dongtan is such an important experiment. If it succeeds, it will demonstrate

that even rich cities don't have to have a devastating impact on the environment. Right from the start, environmental scientists have been involved to advise on minimising its ecological footprint before a stone is laid. The plan is to keep Dongtan's footprint to 2.2 hectares per head, less than a third of a typical Shanghai resident's footprint. To achieve this, they are stipulating how to design transport, energy and waste-disposal systems, and how best to spread the population.

"Nobody has done anything like it before," says Peter Hall of University College London, who is a planning adviser on the scheme. If Dongtan works, China could find itself with a template for green cities that could change the world.

The city's energy will come entirely from renewable sources. Supplementing the predictable wind farms and solar panels, a waste treatment plant on the fringe of the city will have anaerobic digesters to convert sewage



"China is urbanising at record speed. It expects 400 million people to move to the cities within 30 years"

CONSTRUCTION OF AN ECO-CITY

City planners expect Dongtan will eventually be home to half a million people

- Mixed-use urban area built to a density of 280 people per hectare. Residents to move in by 2010. Completion expected by 2020
- Mixed-use urban area built to a density of 280 people per hectare. Completion expected by 2040
- Mixed-use urban area built to a density of 210 people per hectare. Completion expected by 2040
- Wildlife park ● Organic farmland ● Golf course ● Wetland Park ● Hotel ● Wind turbines
- Roads for all traffic — Zero-emission vehicles only — Canal and waterbus



and compost into biogas that will be used for cooking, heating and power generation.

The city's planned half a million inhabitants will live in three compact districts, separated by parks, farms, lakes, pagodas and leisure facilities designed to attract tourists. Unlike most of China's existing frenetic cities, it will be quiet, too. "That will probably be the first thing you'll notice," says Peter Head, head of the Dongtan project at Arup. Dongtan will be dense enough to be walkable, with shops, schools, jobs and services close to housing, but not so dense as to need high-rises or to generate a "heat island", in which the temperature of the whole city is raised.

Most people will live in apartment blocks six to eight storeys high, designed with natural ventilation to minimise the need for air conditioning. Uniquely, they will have two water-supply systems: one with drinking water and another providing "grey water", a mixture of river water from the island's existing canal grid and recycled drainage water, to supply toilets and garden irrigation. That should cut fresh water use by two-thirds.

Deterring the car is also vital, says Dong Shanfeng, the senior architect on the project. "Cars won't be banned, but driving will not be made easy." A single road will meander through the first phase of the city, with traffic lights that automatically switch to give priority to the planned hydrogen-fuelled buses. How successful the anti-car policy will be remains to be seen. Dongtan will be only a



A yachting marina and leafy residential area will be completed by 2010



couple of kilometres from the end of the road bridge from Shanghai (see Map, left). The hope is that residents and visitors driving onto the island will park their cars and walk, cycle or use the buses. The streets are being laid out to favour public transport, bikes and pedestrians, and to make it difficult for cars.

The first section of Dongtan, with a population of 25,000, is scheduled to be completed by 2010, in time for the Shanghai International Expo. The first residents will staff hotels and exhibition halls on the mainland. Afterwards, Ma wants leisure industries to move in to attract tourists. The first foreign development deal, a €1.2 billion contract signed with Treasury Holdings of Dublin, Ireland, last year, will create a golf course and equestrian centre, and also a yacht marina on the site of what is now a small fishing port.

Some observers are concerned the plan for Dongtan is flawed. Golf courses, for example,

are incompatible with the principles of sustainable living, says Zhiping Tang, deputy director of urban planning and architecture at Tongji University, Shanghai. He says the golf courses will occupy land that could be used for growing food.

Dongtan could even make China's ecological footprint worse, if it is populated by rural people, rather than by existing polluting urbanites. At 2.2 hectares per person, the footprint of a typical Dongtan citizen will still be higher than the average for a rural Chinese, which stands at 1.6 hectares – not to mention the idealised global per capita footprint of 1.8. “The city will certainly be ecologically superior to a normal city, but if its inhabitants come from rural areas, their footprint will increase,” says William Rees, a planner at the University of British Columbia in Canada and a pioneer in the science of measuring the ecological impact of cities. Dongtan is “less

bad” than conventional development, he says, “but unsustainable, just the same”.

The greatest long-term threat to Dongtan's ecological integrity is its proximity to Shanghai. The bridge that will feed it may also destroy it. Even if Dongtan doesn't become a tourist resort, it could become a car-dominated middle-class dormitory for Shanghai.

The city planners are confident they can make it work, and Arup is already contracted to design two more eco-cities in the region. Last month Ken Livingstone, the mayor of London, visited Shanghai to inspect the plans for Dongtan, and announced a project to build a 1000-home eco-development modelled conceptually on the city. Dongtan could yet become the ideal to which other cities aspire. ●

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