



The next generation of cities

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By Dr Reese Halter

More than 50 per cent of 6.9 billion people live in cities. Cities consume 75 percent of the world's energy and produce 80 percent of anthropocentric greenhouse gases.

Clearly, we need to reinvent the way of the cities of the future are designed.

In fact, on the outskirts of Shanghai the most remarkable and intriguing 21st century urban project is just getting underway. It will redefine the way in which people live, work and enjoy leisure time in a metropolis.

China has experienced explosive urban growth. Shanghai's economy is growing three times faster than the U.S. economy did at the height of the dot com boom. Over the past decade and a half about 2,200 high-rises have gone up within the city limits. One hundred and thirty million people live within a two and a half hour drive of downtown Shanghai.

China's economy really began to rumble in the early 1980s. Foreign firms began putting the most toxic manufacturing plants in China. Prosperity and a rush to boomtowns like Shanghai have driven the demand for energy sky-high.

Today, China is opening a new coal-fired power plant every other week. Its government conservatively estimates that 300,000 people die prematurely each year because of polluted air. The prevailing westerly jet stream carries toxic mercury vapor and 60 trace minerals and heavy metals from the burnt coal across the Pacific to the western

half of the U.S. and including Anchorage, Vancouver, Seattle, Portland, San Francisco, Los Angeles, and San Diego.

Moreover, 400 million Chinese daily drink contaminated water.

An intrepid Chinese government biologist is on a mission to protect one of the rarest birds on the globe – the black-faced spoonbill. The bird uses the marshy easterly tip of a massive, mostly undeveloped island – Chongming – at the mouth of the Yangtze River.

Chongming Island is about three quarters the size of Manhattan and its located on the outskirts of Shanghai.

The Shanghai Industrial Investment Corporation attained the rights to develop Chongming Island. They have two mandates: protect the black-faced spoonbill habitat and create the world's first sustainable city or *ecopolis*, designed around village-style neighborhoods instead of separate business and residential areas. The city has been named Dongtan.

The Chilean architect and urban designer Alejandro Guitierrez from the design giant Arup and a team of 100 planners including architects, engineers, landscape designers, energy and water specialists and conservation biologists have set about to change the course of history.

The first task was to set the density levels at 105 residents per hectare (2.2 acres equal one hectare; density equivalent to Stockholm). They decided on buildings ranging in heights between four and eight stories allowing for a population of about 500,000.

The ecopolis began to take shape: a reasonably dense urban middle with important breaks for green space, all surrounded by farms, parks and undisturbed wetlands.

Guitierrez visited some magnificent water towns along the Yangtze River Delta, which are much older and better designed than Venice. He's incorporated the clever Chinese design into Dongtan by creating canals in one zone, ponds in another, and a big lake in a third. Courtyards and lawns will drain away from buildings.

Essentially, the design has created flood-cells within the city – analogous to chambers in a submarine. When a one in a century storm hits Chongming Island the sea-water will stay in a single cell. Along

the water's edge there is no high levee but rather a gentle hill, which recedes into the native wetlands.

The city will derive energy from burning rice husks to drive steam turbines, also photovoltaic cells and wind mills will augment its clean renewable green energy.

Along the edge of the city underground "plant factories" will grow organic crops powered by solar LED lights – they will yield six times more produce per hectare than conventional farming.

Twin water networks throughout the city will supply drinking water to kitchens and treated wastewater for toilet flushing and farm irrigation.

Trucks delivering goods from throughout China will park at consolidated warehouses on the edge of the city, load-up shared, zero-emissions delivery trucks to reduce traffic.

Waste will either be recycled or gasified for energy – captured heat will be converted into more power and only 10 percent of the city's waste will be designated for the thermal conversion landfill.

Trees will be planted to promote cool summer breezes, block icy winter winds thereby reducing demand by 40 percent for heat or air conditioning.

Each neighborhood will have two downtowns: one at the centre and one on the edge, both within easy walking distance from homes and offices.

Dongtan's power company will sell excess energy into Shanghai's grid. To help people use less power, easily visible meters will be located in kitchens and offices – once a reasonable energy limit has been exceeded the price will spike.

Only electric and hydrogen cars will be allowed in Dongtan. Wide bicycle lanes will provide excellent, safe and clean transportation corridors throughout the ecopolis.

Construction began in late 2007 (and despite the worldwide recession that began in 2008 work is proceeding) and over the next decade or so an interesting and most necessary ecopolis with a near-zero footprint will begin to take shape, setting the standard for the rest of the world to follow.

**Dr Reese Halter is an Earth Doctor; Science Communicator:
Voice for Ecology, conservation biologist at Cal Lu University
and public speaker. He can be contacted through
www.DrReese.com**