

***The World's Leading Eco-Cities  
- Success Factors***

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*A presentation at the*

**First Annual International Conference  
on Emerging Industry**

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# Global urbanization with explosive consumerism

*McKinsey Global Institute "Urban World: Cities and the rise of the consuming Class", June, 2012.*

From 2010 – 2025 –

- GDP of world's **top 600 cities = 65% global growth**, or by \$30 trillion;
- Of which **Emerging 400 cities** = \$23 trillion, or **47%** of global growth;
- Creating **one billion new consumers** ;
- Of whom **60% in Emerging 400**;
- Emerging 400's annual **consumption to rise by \$10 trillion** by 2025;
- **Global city expansion** = 85% more buildings, 80 billion cubic -meters more water, and 2.5 times current port infrastructure.

*National Bureau of Statistics (NBS)* - 18 January 2012 reported that China's urban dwellers now account for **51.27%** of population —or 690.8 million people.

*Brookings Institution*, "The Emerging Middle Class in Developing Countries", June XX, 2011, Homi Kharas

- **China's middle class consumers (157 m)** - world's second largest (after the US) but **only 12% of China's population**. **By 2030, to grow to > 70 %**, consuming \$10 trillion in goods and services with **100% population achieving average income of \$100 @day** (2005 PPP\$)



# Rise of the megacities

## RISE OF THE MEGACITIES

According to the UN almost 180,000 people move into cities every day – an estimated 2 people a second

**1.5 billion**

(22% of the population) people live in 600 cities

Set to rise to 2 billion by 2025  
These 600 cities generate 60% of global GDP

In Africa and Asia, the urban population is expected to double between 2000 and 2030

**50%**

of Africa's population will be urban by 2050. The figure currently stands at 38%

### TOP FIVE CITIES BY GDP IN 2025

- 1 New York
- 2 Tokyo
- 3 Shanghai
- 4 London
- 5 Beijing

There are currently 23 megacities with populations over 10 million ... (from highest population to lowest)

- |               |                   |
|---------------|-------------------|
| 1 Tokyo       | 13 Buenos Aires   |
| 2 Mumbai      | 14 Los Angeles    |
| 3 Mexico City | 15 Karachi        |
| 4 New York    | 16 Cairo          |
| 5 São Paulo   | 17 Rio de Janeiro |
| 6 Shanghai    | 18 Paris          |
| 7 Kolkata     | 19 Rhein-Ruhr     |
| 8 Delhi       | 20 Osaka          |
| 9 Beijing     | 21 Manila         |
| 10 Chongqing  | 22 Moscow         |
| 11 London     | 23 Istanbul       |
| 12 Dhaka      |                   |

... by 2025 there will be 36

**77%**  
of the Latin American population is urban and urbanisation rates keep rising

According to the UN World Urbanisation Prospects, Kinshasa in the Democratic Republic of the Congo is expected to see its population increase from

**8.75m** in 2010  
to **15.04m** in 2025

Urban population, 2030 forecasts

**1bn**

CHINA

**590m**

INDIA

By 2030 China will have...

**221**

Cities with 1 million or more inhabitants

**23**

Cities with five million or more

### TOP FIVE CITIES BY POPULATION IN 2025

- 1 Tokyo
- 2 Mumbai
- 3 Shanghai
- 4 Beijing
- 5 Delhi

By 2030 India will have...

**68** cities of more than 1 million

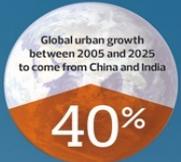


**6** mega cities with more than 10 million



These will need 2.5bn square metres of paved roads and 7,400 kilometres of metros and subways – 20 times what has been built in the last 20 years

**13** with more than 4 million



In 20 years, China's cities will have added 350 million people – more than the entire population of the United States today



In 2030 numerous Indian cities will have larger economies than many countries. Mumbai's GDP is projected to reach

**\$265bn**



Chengdu in China's Sichuan province: the municipality of Chengdu's population has risen from less than 900,000 in 1950 to more than 14 million today including an urban population of 7 million

SOURCES: MCKINSEY GLOBAL INSTITUTE, UN  
PHOTO: JOSE FUSTE RAGA/CORBIS  
GRAPHIC: PETE GUEST

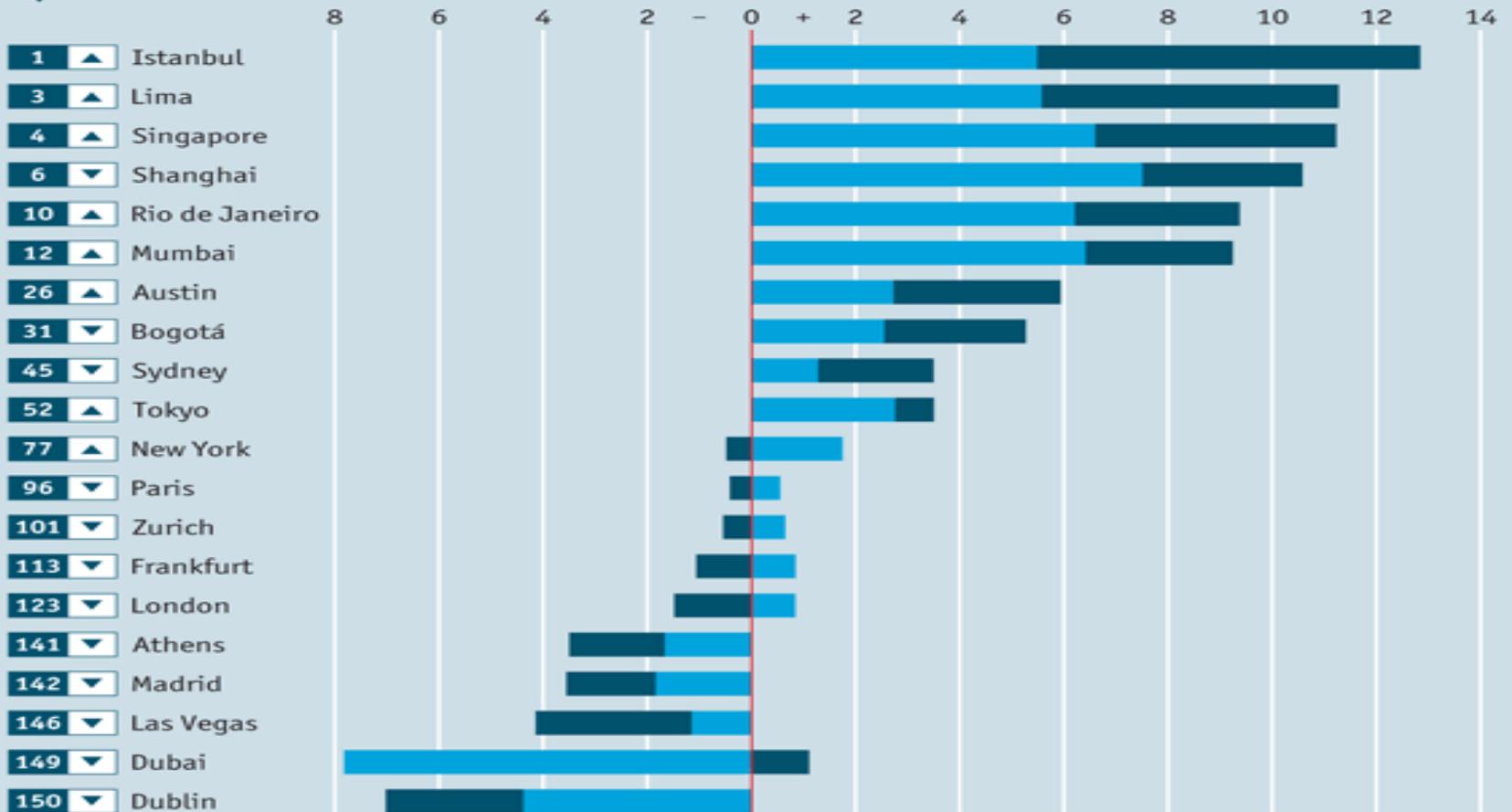
# Are income and employment growth the only yardsticks?

## Cities

2010, % change on previous year, forecast

Rank out of 150 ▲ Since recession low ▼

Income\* Employment



Source: Brookings/LSE Global Metro Monitor

\*Gross value added per person

# Economic dynamos or hotbeds of socio-economic divide

- Bruce Katz, Brookings Institution, *Why cities shape the global economy* - [http://www.time.com/time/video/player/0,32068,643135723001\\_2026838,00.html](http://www.time.com/time/video/player/0,32068,643135723001_2026838,00.html)
- *State of the World's Cities 2010/2011- Bridging the Urban Divide*, Earthscan, UN Human Settlements Program, 2008 - While cities may concentrate wealth and economic growth, they may become hotbeds of urban divide - income, space, opportunities, and food, shelter, health and education. Urban sprawl, social segregation and ecological strains may degrade and limit a city's future growth.
- Intelligent Cities, *TimeSpecials* of Time Magazine on October 21, 2010 – an *intelligent city* is not just a matter of better urban planning and design. A high-level strategy of economic, social, political, regional and ecological policies and effective implementation.



# Combating urban sprawl

- ***City of Raleigh, North Carolina*** ranked third worst in density, mixed use, centeredness, and road connectivity. 240 hours @year in commuting traffic. 2030 Comprehensive Plan to increase density for young in-town jobs, plus walkable and recreational neighborhoods for aging boomers.
- ***Shanghai – to redevelop Expo site*** (formerly 272 pollution-belching factories). ***By 2020***, an eco-friendly zone of parks, conference and convention centers plus pedestrian-friendly retail and commercial space. Renewable energy — mainly wind and solar — to be the primary source of power. Goal of reducing energy intensity @ GDP 16% by 2015. All new construction to use eco-friendly materials, some recycled from demolished pavilions. ***Audaciously straightforward goal : to invent own model of urban development"*** - Yu Kongjian, head of Beijing-based urban-design firm Turenscape, as no other nation with problems on the same scale.



# How Chengdu copes with rural-urban migration

- ***Encouraging families to stay in the countryside*** by improving schools, shops, garbage collection, the sewerage system. Even people in the city considering moving to the country
- ***China's only super-large central city that has narrowed the urban-rural income gap*** by modifying ***the household registration system, (hukou)*** and ***equalizing services into the surrounding countryside*** e.g. pension insurance, allowing women over age 55 and men over 60 to claim a rudimentary pension after premiums for 15 years
- Hundreds of new schools have been built in the villages; ***successful head-teachers from city schools are being recruited to move into the countryside,*** while ***partnerships between struggling rural schools and the best urban schools*** are being set up.
- Developing ***well-designed prototype cities (80,000 residents)*** where they live and work within 15 minutes walk (half a mile), reducing landfill by 89%, wastewater by 58%, and energy use by 48%.



# Torino – how decaying cities can be transformed

- In the former Detroit of Italy, the Fiat *Lingotto* plant stands once again as the symbol of the city. Redesigned in the 1990s by Italian architect Renzo Piano, it forms the *hub of a revitalized commercial district*. The assembly floors host a shopping mall, a multiplex, two hotels and an art gallery, a rooftop meeting room, a panoramic restaurant and a helicopter landing pad. The test track remains at the disposal of hotel guests looking for a jog high above the city streets.
- Torino turned outward. An aggressive urban plan, expansion into *international markets, investments in innovation* and new sectors like *food and tourism* have made the city one of the most dynamic in Italy. *60% of Torino's abandoned industrial land has been repurposed*. The city would concentrate on its *core competences* — *automobiles, aerospace, industrial design* — *but market them elsewhere*. Its per capita GDP is more than 10% higher than the national average.



# Greener and smarter transport systems

- **Curitiba, Brazil** - *Bus rapid transit network* - 92-ft.-long (28 m) megabus powered exclusively by biofuels.
- To turn **LA** into America's EV capital- multi-million dollar grants to build an *EV grid infrastructure*. LA electric car drivers are paying the equivalent \$0.70 a gallon for fuel.
- February 2011, **Chicago** announced plans to build a *network of high-speed chargers to "fill-up" an electric car battery in 30 minutes*.
- Putting a *park within a 10-minute walk of every New Yorker*, drawing people away from the inefficient suburbs and into the city, where their with lower carbon footprint.
- **Atlanta** is a sprawling city - 15th-longest average commute time in the U.S. Plus 7 other cities, including **Miami and San Diego** to experiment with pay lanes, converted from *High Occupancy Vehicle (HOV) lanes* grinding to a halt as traffic grows. Cars carrying three people, upped from two, still allowed to ride for free. A source of revenue to pay for other congestion relief, like public transportation. Another form of congestion pricing (e.g. London). But more to facilitate auto use than to discourage it, *in line with less-dense, more car-dependent lifestyle of most American cities*, particularly in the West and Sun Belt.



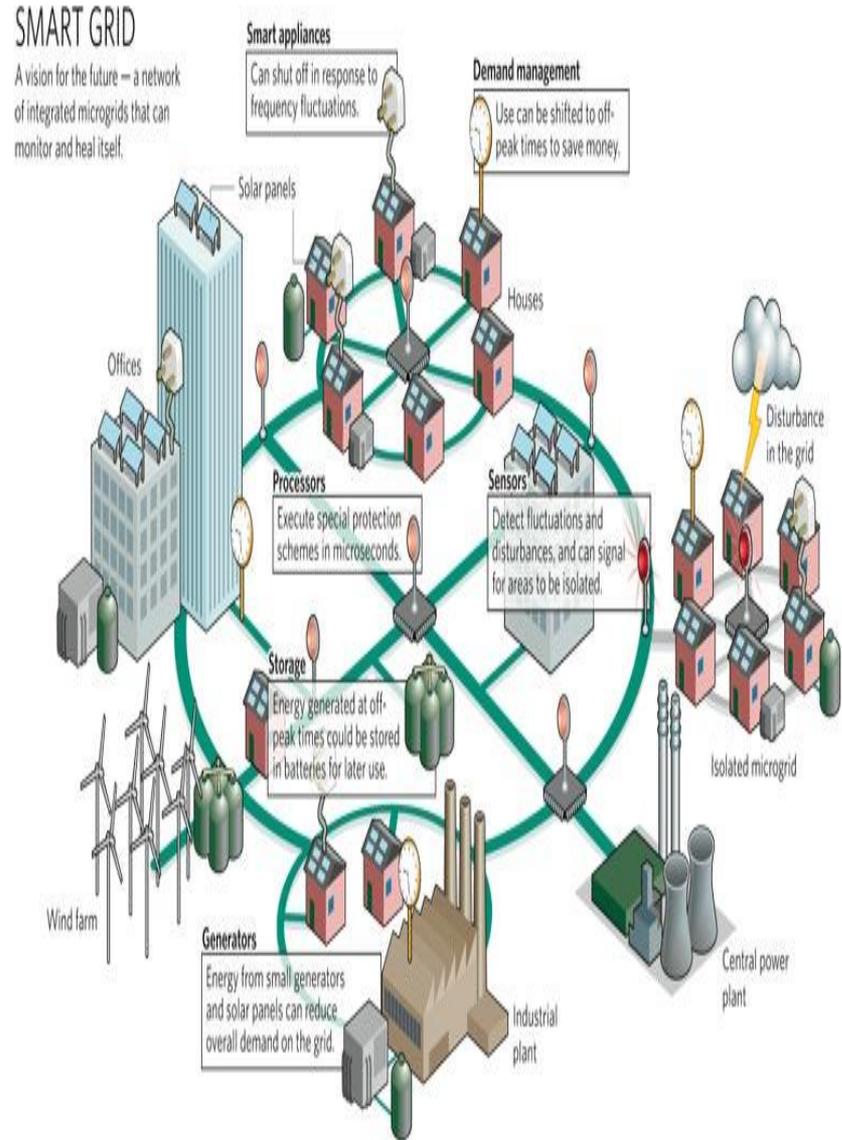
Curitiba, Brazil



Santa Monica Pier, CA

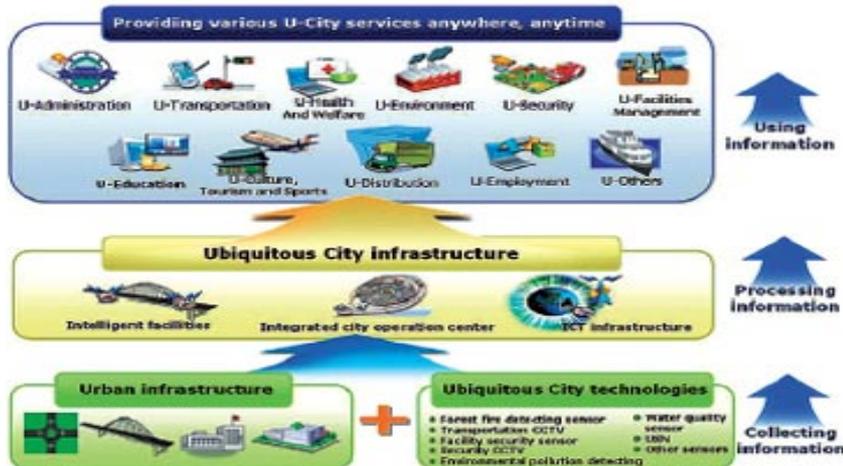
# Smarter way to build Smart Grids

- **To capture irregular renewable sources** e.g. solar energy or wind power. To let prices fluctuate according to demand, **to achieve optimized consumption**, decreased costs, fewer power outages, lower environmental impact. Essential for expansion of electric cars.
- **Boulder, Colorado**, launched Smart Grid City project with Xcel Energy in 2008. Creating grid infrastructure to automatically adjust energy strains e.g. remotely turning down air conditioners according to outside temperature.
- Xcel relied **on expensive fibre-optic cable** while **wireless technologies have since improved dramatically**. Misplaced initial focus on big infrastructural improvements to the aging grid, instead of **helping consumers to reap early benefits in usage and pricing**.
- Cities as diverse as Houston, San Diego and Chattanooga, Tennessee are now joining the act. Private investors increasingly interested. However, questions about **privacy, security, technology, and regulation**.

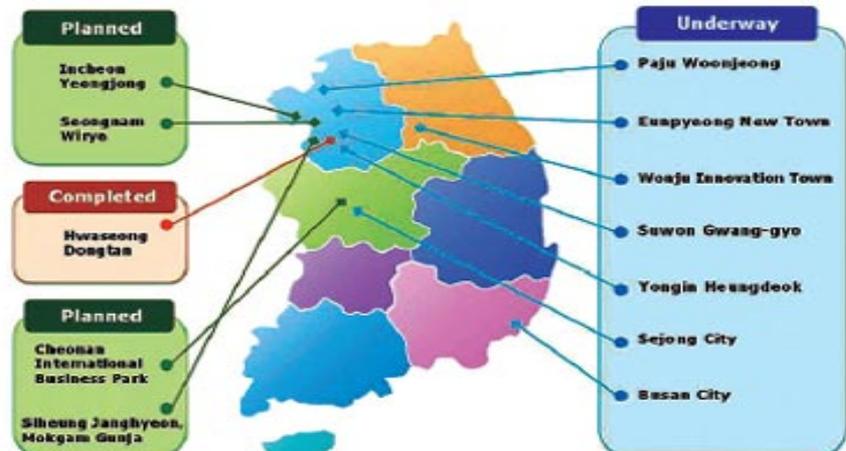


# Korea's ubiquitous cities

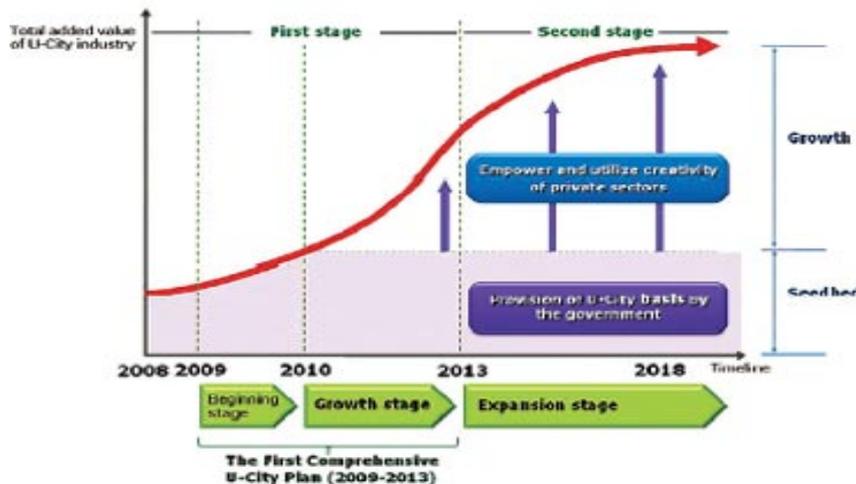
## Concept of U-City



## U-City construction by region



## Implementation strategies by stage



## Comprehensive U-City Plan



# Ubiquitous City Apps

- A society of *Ubiquitous Information Networking for every citizen* by 2050 – Science and Technology in China: *Roadmap to 2050*, Chinese Academy of Sciences, 2010
- Super-high speed internet – Tennessee’s Chattanooga - *one gigabyte@second, or 200 times faster.*
- *London Datastore*, public info on city budgets, hospital performance, traffic congestion, tube operations, train schedules and bicycle-hire scheme locations
- *San Francisco* - smart phone *to hail a cab, track a bus and pay a parking ticket.* “*SF Trees*”, approach any tree in the city to find out its type, *potholes, trash and graffiti problems.* more than 50 privately produced apps from restaurants, health codes to most popular biking routes.
- *Los Angeles, Seattle, Chicago, Boston, New York and Washington* banded together with SF to brainstorm,



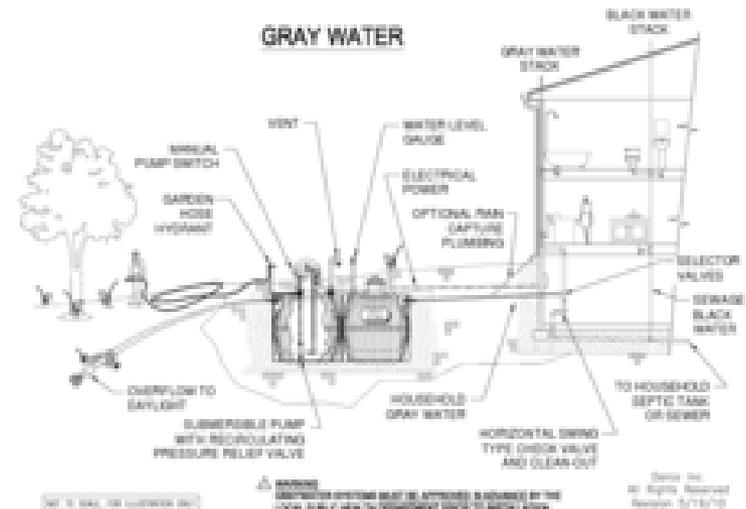
Seongnam U-City, Korea



Bryant Park, New York, 2010 <sup>12</sup>

# Urban water conservation

- At least *a third of the water used in California could be saved* with existing technology – “*Waste Not, Want Not: The Potential for Urban Water Conservation in California*, the Pacific Institute, November 2003.
- Governor Schwarzenegger in his *20x2020 Plan* determined that for California to continue to have enough water support its growing population, it *needs to reduce the amount of water each person uses per day by 20 percent by 2020*. This was supported by legislation passed in November 2009.
- A decade ago, *Tucson, Arizona* legislators made it legal for homeowners to irrigate their trees and plants with the water going down their drains or out of their washing machines. Now, *gray water* (v "black water" that goes down the toilet) is not only legal in Arizona, but promoted, and, in some cases, required. In 2007, a tax credit of up to \$1,000 for homeowners who install gray water systems. A law went into effect in Tucson requires builders to include gray water plumbing in new construction.



# Zero-carbon buildings

- Claimed World's first zero-carbon building. *HQs of the Netherlands chapter of the World Wide Fund for Nature* completed in October 2006. In Driebergseweg (Zeist). Naturally ventilated. Obtains heat from staff and office equipment while solar arrays provide electricity and hot water. Backup biomass system. Ceilings moisture-balancing made of mud with continuous circulation of water through little glass tubes spreading human and mechanical warmth and cooling.
- *China's first zero-carbon building - CSET (Centre for Sustainable Energy Technology, Nottingham University, Ningbo) designed by Italian firm Mario Cucinella Architects.* A large roof opening shines natural light inside and creates a natural ventilation system. Façade features a dramatic folded pattern inspired by paper lanterns. Exterior made from double skin of glass printed with subtle historical pattern.
- *Hong Kong's first zero-carbon building in Sheung Yuet Road in Kowloon Bay completed on 26 June, 2012*, developed by Construction Industry Council together with HKG. Three-story naturally-ventilated building producing more energy than it uses, surplus energy back to public power grid. Solar panels and bio-diesel made of used cooking oil to generate renewable energy. ECO-MAX adsorption chiller made in Athens by Power Partners, Inc. as part of tri-generation system providing power, heat and cooling.



# Green and chic minimalist lifestyles?



# Cities of the Future

*BBC News Technology*, 20 August, 2013,  
Jane Wakefield

- **Greenification** (carbon-neutral transportation, air quality, green spaces)
- **Internet of Things** – Network of Sensors (Crime prevention analytics (Portland, Oregon), water databases (California), smart public transport system (Zhenjiang, China), City Nerve Centre (Rio de Janeiro, Brazil))
- **Open-source (Crowd Sourcing)** design and stake-holding
- **Songdo, South Korea** (\$35b project 2005-15) Ubiquitous U-City with sensors and teleconferencing linking offices, schools and homes)
- **Masdar, Abu Dhabi, UAE**, carbon free solar-power and wind farms, carbon-free driverless pod-cars, digital water supply and waste treatment



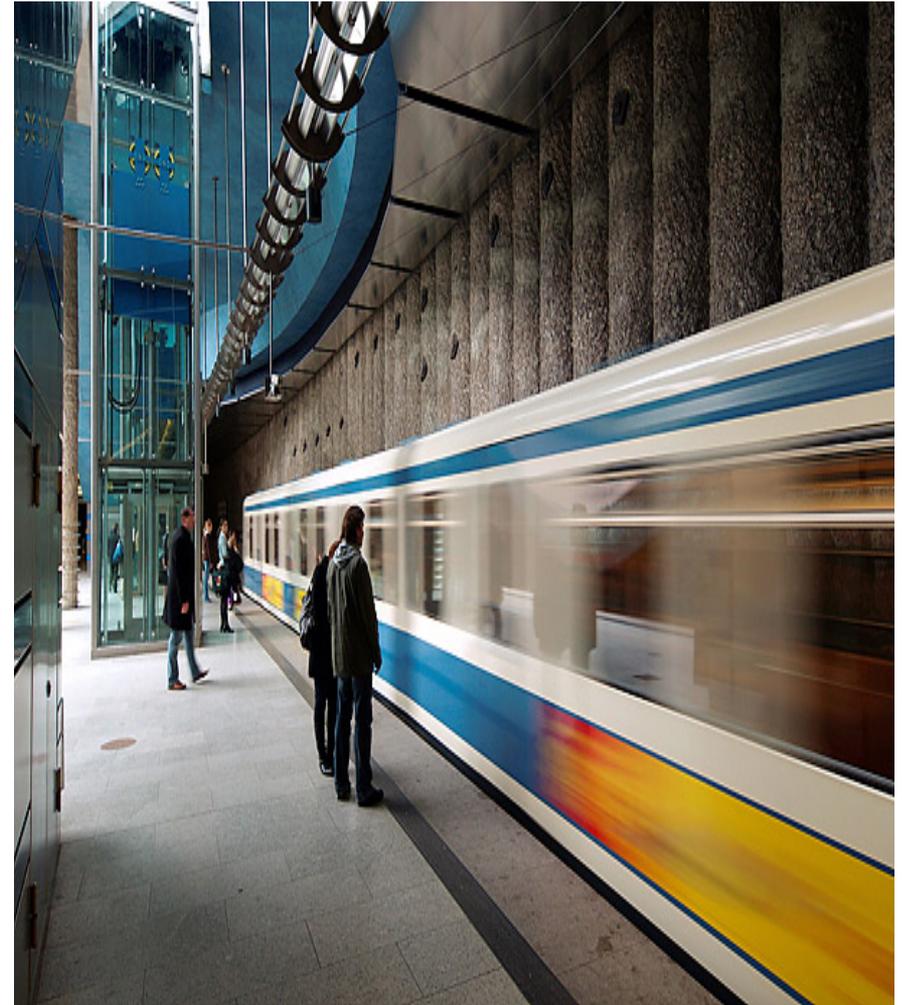
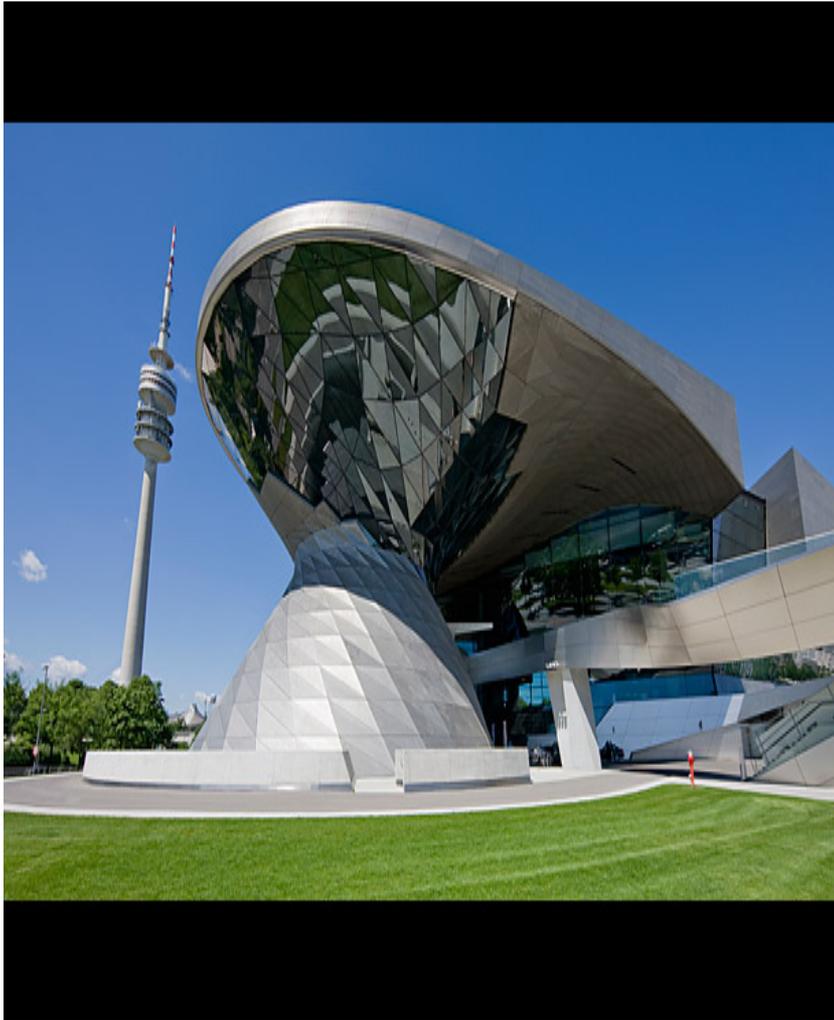
# How cities are positioned matters (1)

**San Diego, CA** – high tech cluster and smart cars



## How cities are positioned matters (2)

**Munich** – cutting-edge technological innovation with high-speed rail links to whole Europe



# Strategic Singapore

- \$55,000 for "*certificate of entitlement*." rationing cars
- *Singapore-MIT Alliance for Research and Technology (SMART)* "Funded by Singapore's National Research Foundation, ~ 600 researchers.
- *Clustering* — *attracting an entire industry segment* so it builds on itself — finance and media as priorities.
- *Switzerland of Asia*, offering *Swiss-like confidentiality*. Near airport sits *FreePort*, where the wealthy can *store, buy and sell* artworks and other precious items tax-free, no questions asked.
- *Mediapolis*, a "media ecosystem," e.g. digital production and broadcast facilities and sound stages for content creators, *animation-industry cluster, Fusionopolis, Biopolis* - hubs for *engineering and biomedical clusters*. Attracted companies like *Procter & Gamble*, building a \$250 million *innovation centre*
- "*Smart apps*," for commuters, water conservation - innovative Singapore-based companies doing business in China and the Middle East — Singapore's expertise in urban mobility, exporting the apps to traffic-crippled cities like Bangkok, Mumbai and New York.
- The city that banned chewing gum has become *more liberal in its approach to art and culture* and has allowed *two multibillion-dollar gambling resorts to be built*. Just don't expect Las Vegas — style decadence.
- *Talent retention and development* – compensation, meritocracy, training, development and staff engagement



# China's eco-city drive

- In 2000, State Council issued directives to promote "eco-provinces, eco-cities, eco-counties and eco-townships." In 2002, *The Cleaner Production Promotion Law* and the *Environment Impact Assessment Law* were passed. In 2008, an amendment to *China's Energy Conservation Law* held local government officials accountable for managing environmental standards.
- *The Economist* dated 22 February, 2012 - **as of 2009, China had 40 eco-cities in development**, including "4 smart-grid pilot cities, 21 LED-street-light cities, and 13 electric-vehicle cities".
- Near Shanghai, *Dongtan* eco-city designed by Arup was proclaimed as China's first, originally thought to be ready for the Beijing Olympics. It has since stalled. Another, the planned *Sino-Singapore Tianjin Eco-City in collaboration with the World Bank*, appears more promising. After some delay, now expected to be completed by 2020.
- Chinese Academy of Social Science (CASS) - 2013 *Ecological City Green Book*. > 200 eco-city projects > 80% prefecture level cities- Tianjin Eco-city (SSTE) - JV with Singapore for a socially harmonious, environmentally friendly and resource-conserving city – challenges - **Growth, Technology, Grassroots**



# Suzhou

- ADB – *Urban Development Experience and Visions*, 2008
- **Pingjiang Historic Block Development Project** - 116 hectares in oldest parts of the city. (i) modern urban infrastructure and services (ii) restoration of traditional houses with modern facilities; (iii) demolition of dangerous and dilapidated houses; (iv) construction of new houses in traditional architectural styles using indigenous materials and construction techniques; (v) relocation of households to new apartments located in suburban areas; (vi) dredging and cleaning of a canal network as the “Venice of the East”; and (vii) gondola-like boats in tourist sites with local boatmen singing traditional folk songs
- **Local hotels and bed-and-breakfast homes for tourists**, an art gallery, arts and crafts stores, restaurants and cafes, and offices rented out to foreign and domestic companies. Landscaping and maintenance of the natural environment in the whole historic area
- **Five economic development zones**: the ultramodern Suzhou Industrial Park (SIP), the Suzhou New and High Tech District, the Kunshan Economic and Technological Development Zone, Zhangjiagang Bonded Zone, and Suzhou Taihu Lake National Tourism and Vacation Zone
- Plan for **middle-income city by 2025**. Required investment in infrastructure and services of about \$3 billion per year . **“If you build it, investors will come”**. Public land as economic resource through long-term leases and monetization at full market value
- **Suzhou City Construction, Investment and Development Co., Ltd. (SCCIDC)** in August 2001. Five subsidiaries: Suzhou Gas Group, Suzhou Port Development Group, Suzhou Sports Investment Development Company, Suzhou Convention Centre, and Suzhou Water Affairs Development Company. Suzhou Public Utility Bureau (SPUB) with a One-Stop Service Hall. Dialing 12345, citizens can directly ask questions, air complaints, request emergency repairs, or share ideas on public issues. 34 active channels + 60 telephone lines open 24/7
- **Suzhou Industrial Park (SIP)** - joint venture between the governments and Singapore Park management vested with a great authority and power. SIP can approve foreign-funded projects within 3 days within national policy. Foreign Affairs Office empowered to immediately approve official visits, issue visa notification letters and official duty passports, and apply for visas from foreign embassies in the PRC. An independent customs office and a bonded logistics centre. Authorized to independently carry out customs clearance. Workers enjoy one of the best social security systems in the PRC, modelled on Singapore’s Central Provident Fund covering housing, medical benefits, retirement benefits, and social assistance.



# Tianjin Eco-City

- ***Tianjin Eco-City***, about 150 kilometres (95 miles) east of Beijing, began in 2008, to be completed by 2020
- ***Usual mix*** of well-insulated housing, 60% household waste recycled, solar-powered water heaters, renewable energy sources from wind, solar and geothermal power, with hybrid vehicles.
- Designed by ***Surbana Urban Planning Group***, the city is being built just 10 minutes away by high-speed light rail from ***Tianjin Economic-Development Area***.
- 350,000 residents expected to choose different landscapes from sun-powered “***solarscape***” to greenery-clad “***earthscape***”.
- “***Three Harmonies***” - social harmony; economic vibrancy; environmental sustainability
- “***Three Abilities***” - affordable and commercially viable technologies; replicable models for other cities in China and even for other countries; scalable principles and models



# Copenhagen – European Green Capital 2014



***To become carbon neutral by 2025.*** Lauded for urban planning and design. To have 50 % cycling to work or education by 2015 (35 % in 2010). Citizen involvement very effective

***Most sustainable European City – Siemens European Green City Index***

***Energy*** – Each district has centralized heating system using waste heat from power generation

***Non-automobile transportation*** – subway, bus, and rail network – all within 400 meters; 388 kilometres of bicycle tracks – half of commuting trips, Green Wave initiative – no bike trip to/from work without any red light; electric car charging infrastructure

***Water*** – Water leakage only 5% v European norm of 20-25%; rainwater storage and purification

***Waste*** – Regulation, incentives and information; separation into organic and inorganic to produce biomass and bioethanol



***Carbon-neutral neighbourhoods*** promoted

# Stockholm – European Green Capital 2010

- ***Hammarby Sjostad sports village*** – one of world's most successful eco-villages.
- Powering buses with ***biogas***, recycling ***rainwater*** for irrigation and ***organic waste*** as fertilizer
- City's water so clean that fishermen on bridges ***in CBD catch fresh salmon and trout.***
- ***Smart grid*** turn homes and offices into "green houses" that not only use but also store green energy and then feed it back into the grid.
- ***Ships to plug in and charge up*** on onshore electric grid, eliminating engine noise and creating harbour-side habitat.



# EIU Global Liveability Report 2013

Five main criteria – Stability, Healthcare, Culture and environment, Education, and Infrastructure



1. **Melbourne** – Full marks for Healthcare, education and infrastructure



2. **Vienna** – Same as for Melbourne. Inspiring music (including nightlife), museums, good food and wines, architecture, festivals, excellent universities, local transport system, low crime, stable democracy and international city.

# EIU Global Liveability Report 2013



**3. Vancouver** – Healthcare, culture, environment, education



**4. Toronto** – Stability. Healthcare and education

# EIU Global Liveability Report 2013



5/6. **Calgary** – Stability, healthcare, education



5/6. **Adelaide** – Neck-to-neck. Healthcare, education, grid-connected solar systems and rainwater tanks

# EIU Global Liveability Report 2013



7. **Sydney** – Healthcare, education, infrastructure



8.. **Helsinki** – Stability, healthcare. Combined heat and power generation (CHP), District Heating and Cooling (DH, DC).

# EIU Global Liveability Report 2013



9. **Perth** – Healthcare, education, infrastructure



10. **Auckland** – Education

# How to make a city great?

## *McKinsey Cities Special Initiative 2013*

### **Achieve smart growth –**

- *Adopt a strategic approach*
- *Plan for change*
- *Integrate environmental thinking*
- *Insist on opportunity for all*

### **Do more with less**

- *Assess and manage expenses vigorously*
- *Explore partnerships*
- *Introduce investment accountability*
- *Embrace technology*

### **Win support for change**

- *Craft a personal vision*
- *Build a high-performance team*
- *Create a culture of accountability*
- *Forge stakeholder consensus*

- Tianjin Eco-City (pop. 350,000) - all competed except \*

### **District green technologies**

#### **Energy**

- *Transport-oriented dev'pment – mixed use*
- *Combined heat and power \**
- *Renewable energy*

#### **Waste**

- *Shared waste sorting*
- *Pneumatic waste collection*
- *Anaerobic digestion \**

#### **Water**

- *Rainwater management*
- *Graywater systems*

#### **Green space**

# Ethos or Spirit of a City

- *The Spirit of Cities*, Princeton University Press, 2011, Daniel Bell and Avner de-Shalit - a city expresses its own distinctive ethos or value in political, cultural, and economic life. In ancient Greece, Athens stood for democracy and Spartan for military discipline.
- Modern cities exude their own ethos e.g. Jerusalem (religion), Montreal (language), Singapore (nation building), Hong Kong (materialism), *Beijing (political power)*, Oxford (learning), Berlin (tolerance and intolerance), *Paris (romance)*, and New York (ambition).
- Varied histories of each city, as well as novels, poems, biographies, tourist guides, architectural landmarks, and the authors' own personal reflections and insights show how pride in a city's ethos can *oppose the homogenizing tendencies of globalization* and curb the excesses of nationalism.



**Thank you**

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