

China & Eco-cities: Myth or Reality?

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China has some worst polluted cities

WORST POLLUTED

- **Sumgayit**, Azerbaijan; Potentially 275,000 affected
 - **Linfen**, China; Potentially 3m affected
 - **Tianying**, China; Potentially 140,000 affected
 - **Sukinda**, India; Potentially 2.6m affected
 - **Vapi**, India; Potentially 71,000 affected
 - **La Oroya**, Peru; Potentially 35,000 affected
 - **Dzerzhinsk**, Russia; Potentially 300,000 affected
 - **Norilsk**, Russia; Potentially 134,000 affected
 - **Chernobyl**, Ukraine; Potentially 5.5m affected
 - **Kabwe**, Zambia; Potentially 255,000 affected
 - *Data: Blacksmith Institute*
- Tianying in China, lead poisoning from a massive lead production complex.
 - In Sukinda 12 mines operating without environmental controls, leaching dangerous chemicals into water supplies.
 - Sumgayit the former Soviet industrial base pollutes the area with industrial chemicals and heavy metals. Cancer rates 51% higher than the national average, genetic mutations and birth defects commonplace.



But Zhuzhou Technical park is clean where the city was polluted



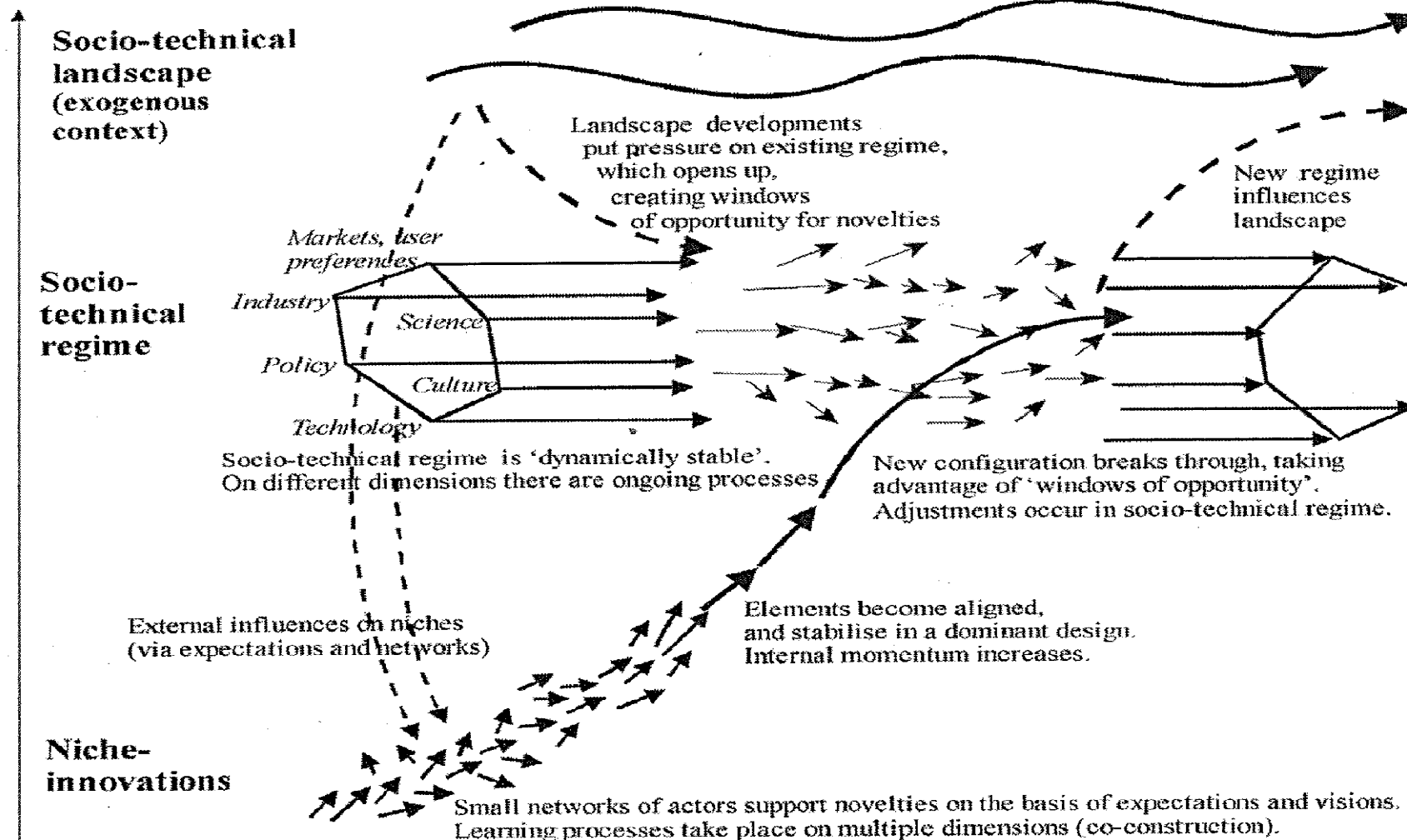
But it prioritises high-tech

- Zhuzhou HTP has one core district (state-level high-tech park),
- three special parks (Hexi high-tech industrial park, Tianxin high-tech industrial park and Dongjiaduan high-tech industrial park)
- and two state-level bases (national new material achievement transformation and industrialization base and national sensor technology base in the China torch program).

1. Co-evolutionary (Aspatial) Transition Model:

Niche>Regime>Landscape (Source: Geels, 2006)

Increasing structuration
of activities in local practices



- 
- Economic Activities
 - Green Technology Park
 - Maintain Existing Businesses
 - Creative Industry Zone
 - Energy Efficiency
 - District Heating
 - Illumination (LED)
 - Water purification
 - Water Use
 - Recreation
 - Sports
 - Transport
 - Riverside 'Paseo' (7km)

Wales' 'Green' Parliament



- Renewable energy systems reduce running costs by up to half.
- Earth used as a heat source
- Wood chips or pellets for the boiler
- Rainwater is also collected via the steel columns supporting the roof
- Supplies water for services and to wash the windows.

Austin's Green Building Programme



- *Austin, TX is home to some 692,000 residents*
- *Austin has devised a successful Green Building programme*
- *Austin Energy is confident of reaching its target of generating 20% of all power from renewables by 2020*
- *Its population is set to double in the next 20 years.*
- *Trains builders and designers in how to build and develop sustainable buildings*
- *25% of new homes in Austin go through the Green Building Programme*

Austin, Texas - CoolHouse



- Solar electric (PV)
- Climate responsive design, for comfort and energy efficiency
- Green building materials and concepts
- Pleasing landscapes that save water
- Rainwater collection systems

California Green Buildings

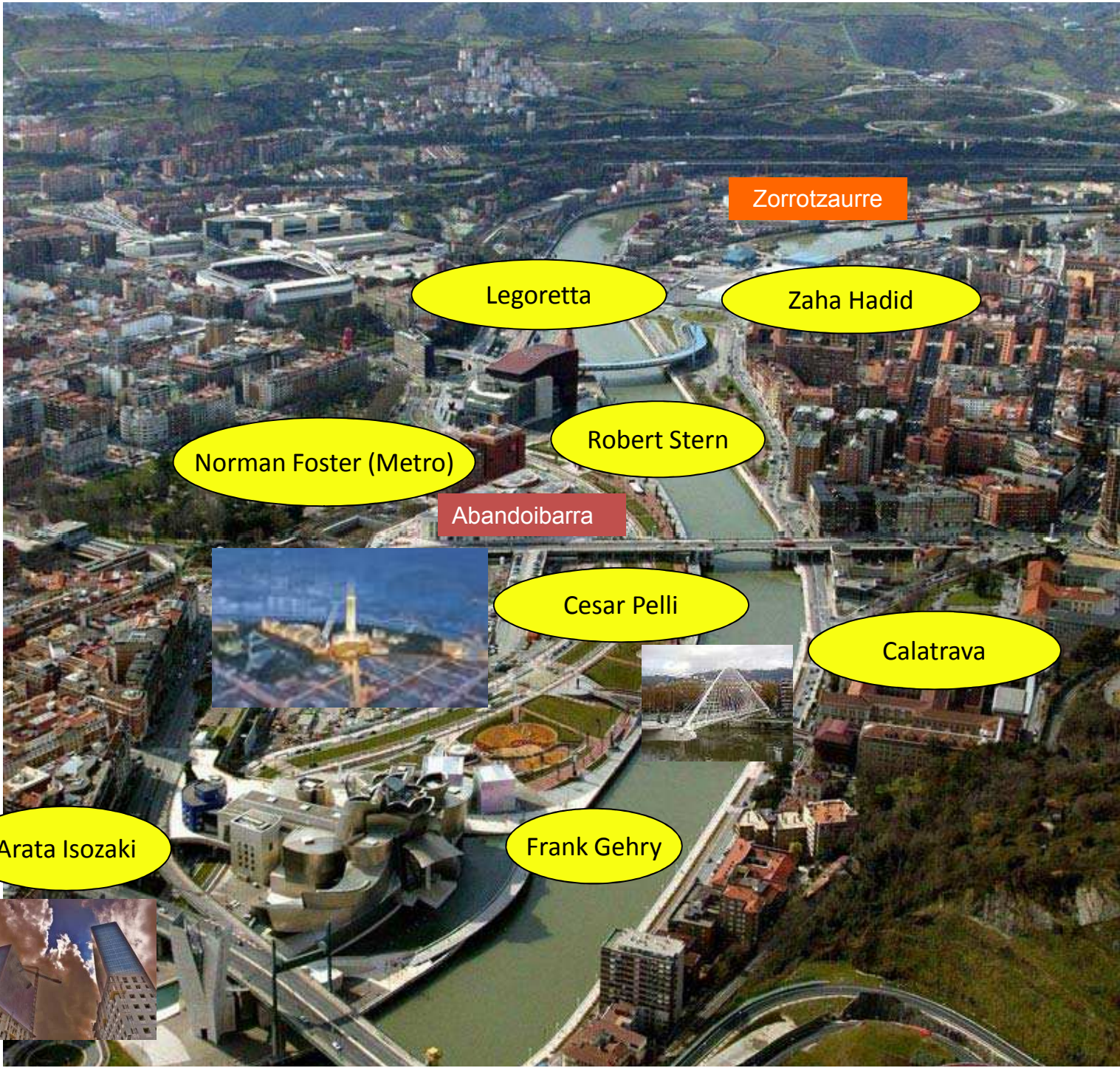


- *The new home of the San Francisco Public Utilities Commission*
- *It will feature corkscrew-shaped wind turbines*
- *Also building-integrated PV panels*

- *San Diego's new downtown main library*
- *It is expected to earn a LEED Silver rating from the U.S. Green Building Council*

- ***90% of Solara's (San Diego) electricity is generated onsite***
- ***141 kilowatts of rooftop solar panels***

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Thisted, a 'Green Economy' Exemplar

Local 'Green' Production Companies

- Bach – supplier to Vestas Wind Turbines
- Cimbria SKET- Manufactures oilseed presses
- TVT – biogas power plant builder
- Ideal Combi – energy-efficient windows
- *Flexenergie* Renewable Energy Design Project

Strategy for 'Green' Consumption

- 150 MW land-based wind power by 2011
- 400 MW sea-based wind power by 2012
- Increased remuneration for sale of wind energy and biogas to grid
- Subsidies for solar and wave energy generation
- Reduction in energy consumption in newer buildings
- Tax free hydrogen and electric cars



The Municipality of Thisted

46.000 inhabitants

Approx. 1700 businesses

245 m2 of national park

Samsø: public subsidy of collective entrepreneurship

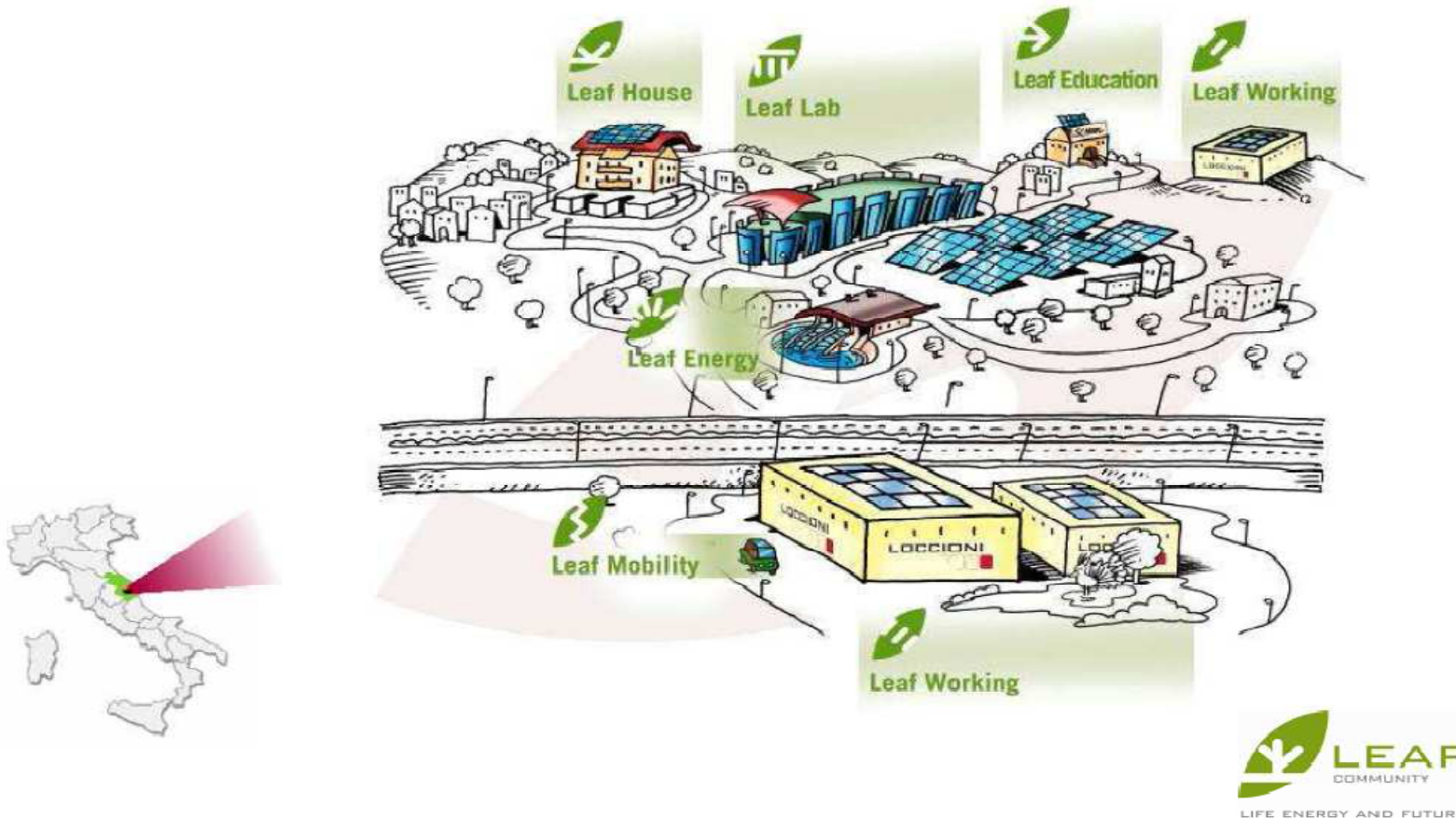
- 1997 Samsø took opportunity of Denmark Energy Ministry policy to support energy self-sufficiency
- Danish law obliges energy suppliers to buy wind energy at prices higher than costs of production
- Samsø has 21 wind turbines – 10 constructed at sea (half council-owned)
- Samsø's 22 villages are served by a district heating power plant fired by woodchips and straw with solar back-up
- Skills conversion: plumbers & carpenters do home conversion and insulation
- Hot water comes from wind-powered pumps accessing geothermal supplies

LEAF Community, Marche, Italy

Leaf Community

The first eco-sustainable community in Italy

LOCCIONI



LEAF
COMMUNITY
LIFE ENERGY AND FUTURE

3a. Advanced Aggregator (Transition) Regions

North Jutland, Denmark



- **'Innovative Region: Flexible District Heating' Platform**
- **Biogas, Biomass, Solar Thermal, Wind - 'plug-ins'**
- **'Social Network' >100 'system' & 'solution' firms**
- **Aalborg U, Municipalities, DTI, VæxtForum Fund (40 mn.DK bid).**
- **'Aggregators' or 'system integrators' include:**
- **Arcon Solar (Velux VHK), Exergi, Logstor (Pipework), Baracon (Biogas), Grundfos**
- **Humvel, NIRAS, EnergiPlan (consultants)**

Flexenergie Knowledge-sharing Network, DK

- 40-50 Renewables Local Power Stations
- 5 Design projects – key one in Thisted
- Geothermal, wave, waste, biogas, biomass, engineering etc. firms
- Vatenfall, (ng), Aalborg U., Exergi, Velux-Arcon (heating & cooling systems)
 - Brøndeslev (Vatenfall + biogas)
 - Jammerbugt (Geothermal + biogas)
 - Markets – Emirates, Spain, Russia, E. Europe

Lower Austria: Cluster Platform



Green Building Cluster of Lower Austria

This cluster is an economic hub and network encompassing the most innovative Lower Austrian firms from all sectors of sustainable building and living – and embracing all types of construction materials and substances. The cluster team is composed of architects, energy experts as well as building and interior design professionals. Main priorities

include refurbishment and upgrading of older buildings to low-energy building standards, construction of new multi-story buildings to passive house standard, interior air systems, and general living quality. Cluster activities are gradually being expanded to encompass the related fields renewable energy and environmental technology.

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Automotive Cluster Vienna Region (ACVR)

The Automotive Cluster Vienna Region was co-founded in 2001 by Vienna and Lower Austria. The ACVR supports companies in the areas of internationalization, qualification and cooperation with research fa-

ctors, high-tech projects and ongoing training and continuing education enhance the competitiveness of ACVR partners. Close cooperation with leading players in the powerful automotive industry in neighboring countries is a main priority for the ACVR.

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Food Cluster of Lower Austria

The Food Cluster of Lower Austria was created as a project platform for the support of the native food industry – from agriculture to processing to food retail. In cooperation with native companies and operations, projects mainly in the areas of food qua-

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Logistics Cluster of Lower Austria

The Logistics Cluster has become the first point of contact and service center for all innovative companies which aim to confront head on the logistic challenges of the future. Sought after are shippers, transporters and logistics service providers who

aim to exploit the full potential of logistics through innovative collaborations. Priority activities in Lower Austria include promotion of the logistic competence of native companies, the bundling of transport, reduction in the number of empty runs, and more efficient transport planning and shifting.

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Plastics Cluster

Cooperation among the provinces Lower Austria, Upper Austria and Salzburg has made the Plastics Cluster the largest network for plastics technology in all of Europe. Lower Austrian cluster partners profit in more ways than one: they are members of a

large, supra-regional network, but enjoy the regional assistance provided by ecoplus. Priority topics specific to Lower Austria include organic plastic and fiber composites. An expansion of the cluster to include medical technology and recycling is planned.

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'Never Built' Dongtan Eco City, China



- None of the buildings is more than eight storeys high.
- Turf and vegetation cover the roofs - natural insulation that also recycles waste water.
- Six times more space for pedestrians than airy Copenhagen
- Pollution-free neighbourhood buses - powered by fuel cells
- An intranet service forecasts travel times and connects car pools
- Traditional motorbikes forbidden, replaced by electric scooters and bicycles
- Roads are laid out so that walking or cycling to work is quicker than driving.

Key Performance Indicators

Quantitative KPIs

- (1) Good Natural Environment
- (2) Healthy Balance in the Man-made Environment
- (3) Good Lifestyle Habits
- (4) Developing a Dynamic and Efficient Economy

Qualitative KPIs

• **Quantitative KPIs**

(1) Good Natural Environment

Ambient Air Quality

Description: 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. The SO₂ and NO_x content in the ambient air should not exceed the limits stipulated for China's National Ambient Air Quality Grade 1 standard for at least 155 days.

Quality of water bodies within the Eco-city

Description: Water bodies in the Eco-city should meet Grade IV of China's latest national standards by 2020.

- **Quality of Water from Taps**
Description: Water from all taps should be potable.

Noise Pollution Levels

Description: Noise levels must fully comply with China's standards for environmental noise in urban areas.

Carbon Emission Per Unit GDP

Description: The carbon emission per unit GDP in the Eco-city should not exceed 150 tonne-C per US\$1 million.

Net Loss of Natural Wetlands

Description: There should be no net loss of natural wetlands in the Eco-city.

• **Healthy Balance in the Man-made Environment**

Proportion of Green Buildings

Description: All buildings in the Eco-city should meet green building standards.

Native Vegetation Index

Description: At least 70% of the plant varieties in the Eco-city should be native plants/vegetation.

Per Capita Public Green Space

Description: The public green space should be at least 12 square metres per person by 2013.

Top Ten Green Cities in the US, 2006, NATIONAL GEOGRAPHIC

'Green Guide', 2006

The Criteria

- **Air Quality:** Exposure to hydrocarbons
- **Electricity Use and Production:** Close to 40 percent of U.S. emissions of the greenhouse gas carbon dioxide (CO₂) comes from electric utilities.
- **Environmental Perspective:** City administrators were asked to rank from 1 (highest) to 9 (lowest) nine issues in order of importance
- **Environmental Policy:** In our survey, we asked city officials whether the city has an environmental policy,
- **Green Design:** The resource-conserving, non-toxic standards of USGBC's Leadership in Energy and Environmental Design (LEED) program have become the basis for many cities' green building projects.
- **Green Space:** Survey respondents were asked to identify the variety of green spaces.
- **Public Health:** Scores were based on rankings of the 125 healthiest U.S. cities as published in the March 2004 *Organic Style*.
- **Recycling:** Survey respondents were asked to indicate which items their city recycles from a list.
- **Socioeconomic Factors:** Having considered affordability in 2005, this year *The Green Guide* expanded the analysis to socioeconomics
- **Transportation:** (reducing greenhouse gases, traffic congestion and smog), we asked survey respondents about the transportation options available,
- **Water Quality:** Using data from the EPA's Safe Drinking Water Information System (SDWIS) and noting violations of the Safe Water Drinking Act, with the greatest weight given to health violations.

- **1. Eugene, OR**
(score 9.0375, pop. 137,893)
- **2. Austin, TX**
(score 8.5325, pop. 656,562)
- **3. Portland, OR**
(score 8.24, pop. 529,121)
- **4. St. Paul, MN**
(score 7.805, pop. 287,151)
- **5. Santa Rosa, CA**
(score 7.785, pop. 147,595)
- **6. Oakland, CA**
(score 7.3675, pop. 399,484)
- **7. Berkeley, CA**
(score 7.285, pop. 102,743)
- **8. Honolulu, HI**
(score 7.055, pop. 371,657)
- **9. Huntsville, AL**
(score 7.035, pop. 158,216)
- **10. Denver, CO**
(score 7.032, pop. 554,636)

European Top Five Green Cities,

GRIST Rankings, July 2007

Reykjavik, Iceland

- Reykjavik has hydrogen-fuelled buses
- Its heat and electricity come entirely from renewable geothermal and hydropower
- Aims to become fossil-fuel-free by 2050. The mayor has pledged to make Reykjavik the cleanest city in Europe

Copenhagen, Denmark

- Large offshore wind farm
- Bikes use high
- Automatic metro system in 2000 to make public
- Won the **European Environmental Management Award** for cleaning up public waterways and long-term environmental planning.

Europe's top five continued

Malmö, Sweden

- Extensive parks and green space,
- Has goal of making Malmö "ekostaden" (an eco-city),
- Neighbourhoods transformed using innovative green design
- Planning yet more social, environmental, and economic policy integration

London's Climate Change Action Plan February 2007

- London to switch to 25% locally generated power & more-efficient sources,
- cut CO2 emissions by 60 percent to 2027
- Incentives to resident domestic energy efficiency
- Congestion taxes on city centre private transport: SUVs taxed heavily; free on hybrid & electric vehicles

Barcelona, Spain

- Pedestrian-friendly (37 percent of all trips)
- solar energy strategy
- innovative parking strategy
- Sustainable urban-regeneration plan

Conclusions

- Important to imagine eco-conscious 'Transition' locales and regions
- China has worst and not so bad polluted cities
- These can be changed (e.g. Zhuzhou) by clear eco-policy thinking. CSR makes turbines quite cheaply but it is hard to discover without visiting the ZTP!
- So, promotion not good – poor website imagery
- Many US & European Cities do much better
- Signature architects now routinely include eco-standards
- China's standards for eco-compliance are weaker than those for ranking US green cities