



**CHATHAM HOUSE**



**E3G**

# **Low Carbon Zones**

**A transformational agenda for China and Europe**

**Chatham House and E3G**

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# Low Carbon Zones: A transformational agenda for China and Europe

## Executive Summary

**The EU and China need to work together to deliver global energy and climate security**

To prevent climate change from breaching dangerous tipping points, global GHG emissions will need to peak by around 2020 and fall rapidly thereafter to at least 50% below 1990 levels by 2050, if not more.

Developed countries must lead the way with sharp emissions reductions by 2020 from 1990 levels. The EU's domestic "climate and energy" package aims to deliver 20-30% reductions by 2020. The International Panel on Climate Change projects that to maintain a realistic prospect of limiting global warming below 2 degrees C developing country emissions will need to deviate substantially below "business as usual" and begin to fall in absolute terms starting in the next two decades. This is a huge challenge for rapidly industrializing countries such as China and will not be possible without a step change in international support.

The EU has a strategic interest in helping China to decarbonise; without a low carbon China, Europe cannot deliver climate security for its citizens in the future. The EU will also save billions of Euros on its own decarbonisation if China increases its production of low carbon goods, services and technologies and drives down their costs.

**China is serious about climate change but faces unique challenges**

China understands the imperative of tackling climate change. In June 2008 President Hu spoke of the need for China to "...accelerate the shift of economic development mode, enhance the conservation and high-efficiency use of energy, actively develop circular economy and low-carbon economy..." This statement is a very positive signal of Chinese intent.

China's seriousness about climate and energy security is backed by a range of ambitious policies and measures. Its 11th Five-Year Plan includes a target to reduce energy intensity by 20% in the five years to 2010. This would translate to a saving of emissions around four times larger than the EU-15's current commitment under the Kyoto Protocol.

Yet despite these ambitious measures China's total GHG emissions are already on a par with those of the US, and rising fast. This is driven by the imperative of economic growth for its 1.3 billion people. China's economy is energy intensive and a uniquely large share of its energy (70%) comes from coal.

This presents the Chinese leadership with a challenge that is qualitatively different from the one that faces the EU: combining rapid urbanisation, industrialization and poverty reduction with the transition to a low carbon economy. No country has ever done this before at this stage of development.

#### **Closer EU-China cooperation is in the interests of both sides**

However, China's recent history also shows that it is capable of extraordinary acts of internal transformation. This dynamic could repeat itself if the shift to a low carbon economy brings strategic and economic benefits to China. Helping to make rapid decarbonisation consistent with China's broader development goals will require closer EU-China cooperation in three main areas: technology, finance and market access.

##### **1. Technology**

Access to advanced low carbon technology is seen as key to effective climate change action as well as an integral part of China's "scientific development" strategy. There is strong interest in joint R&D on low carbon technologies with the EU, not just technology transfer of existing techniques.

##### **2. Finance**

China has substantial financial resources of its own but it also has huge investment needs. Over the next two decades China will need to invest around \$50-70 billion per year in its power sector. Enhanced international support could help ease domestic concerns around the incremental cost of "greening" this investment.

##### **3. Market access**

China is already a world leader in some low carbon industries and increasingly views global low carbon technology markets as an economic opportunity that

will meet its modernisation needs. If China and the EU aligned their standards for energy efficiency and carbon intensity they would *de facto* become global standards.

#### **Cooperation is growing but does not meet the scale of the challenge**

The EU and China recently launched a High Level Trade and Economic Dialogue; by 2010 they plan to negotiate a new Partnership and Cooperation Agreement. However, these instruments will not generate real progress unless they are backed by a new political understanding of the strategic common interests of the EU and China, driven by the growing interdependence of our economies and our climate. Chinese stakeholders will need to be convinced that the long-term benefits of decarbonisation outweigh the short-term costs; the European public will need tangible evidence that investing in China's low carbon transition can deliver results.

At present the political conditions for a step change in EU-China cooperation do not exist on either side. China feels it is already doing a great deal and stresses the need for stronger leadership from developed countries, notably the United States. The EU feels it is already providing its fair share of support for low carbon initiatives in China. But while individually useful these initiatives remain too small and dispersed to have a transformative impact on China's strategic direction. What is needed is concrete demonstration of low carbon development on a scale large enough to catalyse change at the national level and to transform external perceptions of China.

#### **Low Carbon Zones could give a focus for transformational cooperation**

In the early 1980s China embarked on an extraordinary journey towards greater economic openness. Special Economic Zones (SEZs) – geographical regions with more liberal economic laws than the rest of the country – played a vital role. Building on this successful model, a consortium of European and Chinese research institutes has developed the concept of “low carbon zones” (LCZs).

LCZs would aim to stimulate transformational regional political leadership, endorsed at the national level, to create an enabling environment for large-scale innovative low carbon private and public investment. Just as SEZs provided China with a laboratory to shape its participation in the global market economy, the LCZs could pioneer approaches to decarbonisation compatible with Chinese institutions and development approaches.

Though leadership on LCZs would need to come from China, the EU (Commission and Member States) could foster their initial development by agreeing an enhanced and coordinated package of support for these zones. The EU-China Summit in December 2008 could begin the process by recognising the need for new models of low carbon development and the potentially valuable role of LCZs in this regard. China could develop the LCZs concept in more detail and draw up plans for piloting it in a representative selection of regions. The EU could agree to step up its overall support for low carbon cooperation with China and to focus a growing share of this support on LCZs.

China is a vast country with a highly diverse economy and will need a range of low carbon development models to reflect this. Municipal leaders in several provinces have already expressed interest in exploring the LCZ concept. The aim could be to launch the first pilot LCZs in 2009 and agree an ambitious goal for mobilising public and private low carbon investment in each LCZ within the first five years of operation.

#### **Special Economic Zones have a track record of success in China**

LCZs present an innovative vehicle for accelerating EU-China cooperation on climate change and energy in the short term, and one which is based on a track record of success in driving change in China.

China's first SEZs were established in 1980 in four cities in the provinces of Guangdong and Fujian, most famously in Shenzhen. By the early 1990s a wide range of economic zones had sprung up throughout China. Many SEZ policy innovations have now been mainstreamed at national level but they continue to experiment and set the pace in new areas.

By supporting the development of LCZs the EU would be assisting in a potentially transformational process for reshaping the future of Chinese development. The past example of SEZs shows the power of local leadership to drive change; the question is how China and the EU could work together to catalyse and support these processes.

#### **The EU could provide valuable incentives to support the growth of LCZs**

For the EU, support for LCZs would not be about development aid or philanthropy, but a long term investment in its security and prosperity. China has many domestic resources which it could decide to deploy in LCZs, but the

EU also has unique assets it could contribute in terms of know-how, economic partnership, market strength and focused financial support.

The wide range of potential incentives can be grouped in four key areas: institutions and governance; high tech foreign direct investment; carbon finance; and facilitating trade through harmonisation of standards. The following text contains examples in each area. More detail and a wider range of opportunities are presented in the last section of the full paper.

### **Institutions and governance**

Designated regions could experiment with low carbon policy in similar fashion to SEZs. To qualify for LCZ status local leaders would commit to low carbon standards beyond existing benchmarks at the national level.

Effective governance, monitoring and evaluation systems in the LCZ would be an important undertaking to ensure continuous improvement within the zone and to build confidence more widely. Key metrics would include energy efficiency and GHG emissions. As in the case of the energy intensity targets for the 11<sup>th</sup> Five Year Plan, China could require the LCZs to monitor and report a wider range of indicators than other parts of the country and to experiment with third party verification.

The EU could help LCZs establish “Low Carbon Technology Innovation and Diffusion Centres”, along the lines proposed recently by the UK Carbon Trust, and world class GHG inventories. It could provide funding through Framework Programme 7 (FP7) for an EU–China Ultra-Efficiency Building Research Platform focused on LCZs. Between now and 2020 China is expected to build as much new housing as currently exists in the EU-15

### **High tech foreign direct investment**

LCZs could encourage FDI in low carbon technology through measures such as strong IPR protection, tax incentives and targeted recruitment of skilled labour.

LCZs could commit to accelerated targets for upgrading or retiring inefficient coal plants and a timeline for new coal power plants to become “near zero carbon” as the technology matures. One of the LCZs could become the location for the Carbon Capture and Storage demonstration plant which China and the EU have been discussing since 2005. LCZs could also commit to enhanced renewables and industrial energy efficiency targets.

The EU could invite Chinese companies from LCZs to participate in EU industry working groups focusing on energy efficiency and industry platforms linked to the EU's Strategic Energy Technology Plan. To address the concerns of European companies the EU could provide additional targeted support for IPR protection in LCZs, building on the existing EU-China Project on Protection of Intellectual Property Rights (IPR II).

### **Carbon finance**

China is already the world's second largest recipient of sustainable energy investment, with approximately \$12 billion invested in 2007. Over the next decade it will need to attract up to \$40 billion per year to meet its renewables target and even more for investment in energy efficiency and clean coal.

LCZs could attract new types of carbon finance. For example, LCZs could begin to develop the institutional capacity required to support local emissions trading schemes, drawing on international experience including the EU ETS. Such efforts would be underpinned by strong monitoring and reporting systems established through the LCZ's Strategic Plan.

The EU - both through Community funds and Member State budgets - could agree to provide additional support to China on energy and climate, and to concentrate a majority of its support in the LCZs. The EU could aim to have at least half of its growing discretionary assistance to China focused in LCZs by 2012. LCZs would also be well placed to attract support from the World Bank's Climate Investment Funds.

### **Facilitating trade through harmonisation of standards**

China could allow LCZs to pilot harmonisation of standards with the EU in key low carbon sectors, for instance on vehicles emissions, energy using products and construction. This would facilitate Chinese exports to the EU and stimulate high tech European FDI in China. Focused work on enhanced facilitation of trade and investment flows in LCZs would support these activities.

The EU could invite Chinese firms from the LCZ to participate in EU working groups on implementation of the Eco-Design Directive, which sets high standards for major energy-using goods such as electric motors and air conditioners. It could also offer technical assistance in developing carbon labelling schemes for products exported from LCZs.

Broader market access issues are a sensitive topic in EU-China trade relations. Any incentives offered in this area would be subject to WTO compatibility. Options are being explored by the WTO's Trade and Environment Committee as well as through bilateral mechanisms. Rapid progress is unlikely but could be further explored.

#### **Summary of recommendations for the EU-China Summit in December**

- > The EU and China could recognise the need for new models of low carbon development and the potentially valuable role of LCZs in this regard.
- > China could agree to develop the LCZs concept in more detail and draw up plans for piloting it in a representative selection of regions.
- > The EU could agree to step up its overall support for low carbon cooperation with China and to focus a growing share of this support on LCZs. EU support could include institution building, joint R&D, co-funding of demonstration projects, carbon finance and potentially harmonisation of standards.
- > Early deliverables could include EU co-funding for "Low Carbon Technology Innovation and Diffusion Centres" in LCZs, along the lines proposed recently by the UK Carbon Trust; prioritising LCZs for early support from the World Bank's Climate Investment Funds; funding through Framework Programme 7 (FP7) for an EU-China Ultra-Efficiency Building Research Platform.
- > The aim could be to launch the first pilot LCZs in 2009 and set an ambitious goal for mobilising public and private low carbon investment in each LCZ within the first five years of operation.
- > Potential sources of public sector funding for LCZs include the new EU-China Environmental Governance Programme; Global Energy Efficiency and Renewable Energy fund; European Investment Bank; as well as bilateral assistance from EU Member States.
- > The EU could aim to have at least half of its growing discretionary assistance to China focused in LCZs by 2012.

# The EU and China need to work together to deliver global energy and climate security

We are on the cusp of a new industrial revolution driven by energy and climate security concerns. The tightening global supply of oil and natural gas combined with growing international consensus on the need to reduce greenhouse gas (GHG) emissions is accelerating investment in energy saving and low carbon technologies. This will have a profound impact on all sectors of our economy and society, from power generation to industrial policy to urban planning and transportation. There is a compelling scientific, economic and strategic case for low carbon development and the first movers have much to gain: worldwide investment in renewable energy has grown by 65% per year since 2004 and is projected to reach \$600 billion per year in 2020.<sup>1</sup> However designing and implementing effective policies to drive the transition and share the costs equitably is a major political challenge for governments throughout the world.

To prevent climate change from breaching dangerous tipping points, global GHG emissions will need to peak by around 2020 and fall rapidly thereafter to at least 50% below 1990 levels by 2050, if not more.<sup>2</sup> Developed countries must lead the way: they are responsible for around 70% of historical emissions, their per capita emissions remain well above the global average,<sup>3</sup> and they have the technological and institutional capacity to reduce their emissions sharply by 2020. The European Union (EU) is committed to reducing its emissions 20-30% below 1990 levels by 2020 as part of a wider international strategy to limit global warming below 2 degrees C.

The EU is debating detailed legislative proposals – “the climate and energy package” – to implement its 2020 targets. There are difficult and immediate choices. For example it is unlikely that the EU can cut its emissions sharply if some EU Member States go ahead with plans to build new conventional coal-fire power stations. However EU leaders have invested significant political capital in building public support for action on climate change. President Sarkozy has made it a top priority of France’s EU Presidency to agree the climate and energy package by the end of 2008.

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<sup>1</sup> UNEP Sustainable Energy Finance Initiative / New Energy Finance, *Global Trends in Sustainable Energy Finance 2008 Report*, <http://www.sefi.unep.org/>

<sup>2</sup> <http://unfccc.int/resource/docs/2007/smsn/ngo/026d.pdf>

<sup>3</sup> Per capita annual emissions range from around 10 tonnes CO<sub>2</sub>-equivalent in the EU to 20 tonnes in the US. By comparison China’s per capita emissions are around 5 tonnes. See Nicholas Stern, *Key Elements of a Global Deal on Climate Change*, April 2008

Implementing the 2020 package is vital not only to accelerate the EU's own transition to a low carbon economy but also to mobilise parallel action in other parts of the world. If global GHG emissions are to peak by 2020, the United States and other developed countries will need to take binding emissions reduction targets comparable to those of the EU. The International Panel on Climate Change projects that to maintain a realistic prospect of limiting global warming below 2 degrees C developing country emissions will need to deviate substantially below "business as usual" and begin to fall in absolute terms starting in the next two decades.<sup>4</sup> This is a huge challenge for rapidly industrializing countries such as China and will not be possible without a step change in international support (technology, finance, capacity building).

## China is serious about climate change but faces unique challenges

China recognises the imperative of tackling climate change. In July 2007 it published a detailed National Climate Change Programme (the first of its kind for a developing country) and established a "Climate Change Leading Group" in the State Council chaired by Premier Wen. At the Leading Group's first meeting Premier Wen said: "We must understand in full that carrying out the work of energy conservation and emission reduction and coping with climate change is a requirement of the scientific development concept.....it is a test of the Government's ability to govern and the extent of public trust in it, and it is a responsibility to the international community which China must shoulder".<sup>5</sup>

China also recognises that its current economic development model needs to evolve. The concept of "scientific development" – adopted at the 17<sup>th</sup> National Congress of the Communist Party of China in October 2007 -- refers to a shift away from low end manufacturing towards higher value added production and greater reliance on innovation. In June 2008 President Hu spoke of the need for China to "...accelerate the shift of economic development mode, enhance the conservation and high-efficiency use of energy, actively develop circular economy and low-carbon economy..."<sup>6</sup> This statement is a very strong signal of Chinese intent.

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<sup>4</sup> <http://www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-chapter3.pdf>

<sup>5</sup> Cited in Ash and Bursi, *China and Climate Change: Impacts and Policy Responses*, October 2007

<sup>6</sup> [http://frankhaugwitz.com/doks/cdm/2008\\_06\\_29\\_China\\_CC\\_Hu\\_Jintao\\_collective\\_study.pdf](http://frankhaugwitz.com/doks/cdm/2008_06_29_China_CC_Hu_Jintao_collective_study.pdf)

China's seriousness about climate and energy security is backed by a range of ambitious policies and measures. Its 11<sup>th</sup> Five-Year Plan (2006-2010) includes a target to reduce energy intensity (energy consumption per unit GDP) by 20% in the five years to 2010. If achieved this would translate to a saving of over 1.5 billion tonnes CO<sub>2</sub>-equivalent<sup>7</sup> – around four times more than the EU-15 is required to mitigate under its collective Kyoto Protocol target.<sup>8</sup> China also has ambitious domestic goals in other areas such as renewables (15% of total energy supply by 2020), forestry cover (20% of land area by 2020), vehicle fuel consumption standards, energy efficient buildings and cleaner coal technology.

Yet despite these ambitious measures China's total GHG emissions are already on a par with those of the US, and rising fast.<sup>9</sup> This is driven by imperative of generating economic growth for its 1.3 billion people.<sup>10</sup> Driven by infrastructural needs, China's economy is energy intensive, producing in 2007 48% of the world's cement, 35% of its steel and 28% of its aluminium.<sup>11</sup> And a uniquely large share of its energy (70%) comes from coal. This presents the Chinese leadership with a challenge that is qualitatively different from the one that faces the EU: combining rapid urbanisation, industrialization and poverty reduction with the transition to a low carbon economy. No country has ever done this before at this stage of development.

The Chinese government has yet to be convinced it can decarbonise the economy rapidly while it is developing and still preserve social stability. Its own analysis indicates that without new low carbon power sources it is unlikely to halt the growth in coal use – or carbon emissions – before 2030 or 2040.<sup>12</sup> The central government is actively encouraging provincial authorities and industrial sectors to meet their energy efficiency targets but progress is uneven. The Chinese economic miracle has been based on progressive decentralisation of economic decision making; Beijing now has far fewer levers to drive change.

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<sup>7</sup> <http://www.efchina.org/FPubInfo.do?abb=Guidelines&sabb=21>

<sup>8</sup> The EU-15 is expected to reduce 340 million tonnes CO<sub>2</sub> equivalent.

<http://www.europaworld.org/week167/background5304.htm>

<sup>9</sup> Netherlands Environmental Assessment Agency,

<http://www.mnp.nl/en/service/pressreleases/2007/20070619Chinanowno1inCO2emissionsUSAinsecondposition.html>

<sup>10</sup> In 2007 China's per capita income was around \$2,500 in Nominal GDP terms or \$5,300 on a Purchasing Power Parity basis (World Bank, IMF). This places China around 100<sup>th</sup> place in the global ranking. China aims to quadruple GDP per capita by 2020 from 2000 levels.

<sup>11</sup> Rosen and Houser, *China Energy: A Guide for the Perplexed*, May 2007,

<http://www.petersoninstitute.org/publications/papers/rosen0507.pdf>

<sup>12</sup> Research into EU-China Energy and Climate Relations: China's View of Energy and Climate Security (Liu Zhiyan et al. 2007); Energy and Climate Scenarios for China: Some Considerations (Wang Tao and Jim Watson 2007)

## Closer EU-China cooperation is in the interests of both sides

However, China's recent history also shows that it is capable of extraordinary acts of internal transformation with far-reaching implications for the rest of the world. This dynamic could repeat itself if the shift to a low carbon economy brings strategic and economic benefits to China. The EU can support this in two ways: firstly, changing the political dynamics by delivering on its own commitments to low carbon development and by continuing to urge other developed countries, notably the United States, to do likewise; secondly, supporting China to ensure rapid decarbonisation is consistent with its development goals. Achieving the second condition will require closer EU-China cooperation in three main areas: technology, finance and market access.

### 1. Technology

Access to advanced low carbon technology is seen as key to effective climate change action as well as an integral part of China's "scientific development" strategy. China is already deploying some state-of-the-art technologies such as Integrated Gas Combined Cycle (IGCC) coal plants but needs support in other areas such as off-shore wind turbines – both the technology itself and the soft "know how" required to use it commercially.

China is dependent on foreign technology in many of its "core" economic sectors (e.g. energy, transport, IT, communications etc), an innovation dependency which it is investing heavily to reduce.<sup>13</sup> This means China is looking for joint R&D on low carbon technologies with the EU, not just technology transfer of existing techniques. It also gives China a growing interest in strong IPR protection – in 2006 China registered 128,850 patents, the fifth highest in the world and almost level with Germany (130,806).<sup>14</sup>

### 2. Finance

China has substantial financial resources of its own but it also has huge investment needs. Over the next two decades China will need to invest around \$50-70 billion per year in its power sector.<sup>15</sup> Most of the finance for this

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<sup>13</sup> [http://news.xinhuanet.com/english/2008-01/25/content\\_7494732.htm](http://news.xinhuanet.com/english/2008-01/25/content_7494732.htm)

<sup>14</sup> WIPO World Patent Report 2008

<sup>15</sup> IEA 2006, <http://www.iea.org/textbase/nppdf/free/2006/chinapower.pdf> IEA

investment will come from Chinese sources but foreign direct investment can be an important incentive for regional and local governments. International support can help ease domestic concerns about the incremental cost of “greening” infrastructure investment (e.g. fitting coal-fire power stations with carbon capture and storage).

### **3. Market access**

China is already a world leader in some low carbon industries and increasingly sees global low carbon technology markets as an economic opportunity that will meet its modernisation needs. Suntech, for example, is a leading exporter of solar panels and is investing in the United States and the EU.<sup>16</sup> This trend needs to continue if China is to have a strategic and commercial interest in a growing global “low carbon economic pie”. If China and the EU aligned their standards for energy efficiency and carbon intensity they would *de facto* become global standards, resulting in economic advantage for both sides.

In each of these areas there are opportunities for cooperation which deliver benefits to both the EU and China. The critical question is how to turn these potential gains into reality and overcome the political obstacles involved.

## **Cooperation is growing but does not meet the scale of the challenge**

The EU has a strategic interest in helping China to decarbonise; without a low carbon China, Europe cannot deliver climate security for its citizens in the future. The EU will also save billions of Euros on its own decarbonisation if China increases its production of low carbon goods, services and technologies and drives down their costs.

However public support in Europe for closer cooperation with China is limited at best. European business fears competition from Chinese exporters and feels it is excluded from Chinese markets. China also believes it is being treated unfairly – a prime example being the recent EU anti-dumping action against Chinese exports of energy efficient light bulbs.

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<sup>16</sup> The Climate Group, *China's Clean Revolution*, July 2008

In 2005 the EU and China launched a Partnership on Climate Change. In 2007 they agreed to establish a High Level Trade and Economic Dialogue; by 2010 they plan to negotiate a new Partnership and Cooperation Agreement. However, these instruments will not generate real progress unless they are backed by a new political understanding of the strategic common interests of the EU and China, driven by the growing interdependence of our economies and our climate. This will require give and take on both sides to build confidence and to resolve the tension between climate security objectives and commercial interests. China will need to see the long-term benefits of decarbonisation outweigh the short-term costs; the European public will need tangible evidence that investing in China's low carbon transition can deliver results.

At present the political conditions for a step change in EU-China cooperation do not exist on either side. China feels it is already doing a great deal and stresses the need for stronger leadership from developed countries, notably the United States. The EU feels it is already doing its fair share -- it is China's largest source (44%) of government loans to China and the main buyer (77%) of "Certified Emissions Reduction" credits from China through the Kyoto Protocol's "Clean Development Mechanism". Europeans want China to put in place the right policies (e.g. energy pricing reform) and create stronger incentives for high tech foreign direct investment.

It is true that the EU is supporting a wide range of energy-related programmes throughout China. This includes direct bilateral funding (Commission and Member States) and indirect support for the work of multilateral institutions such as the World Bank. But while individually useful these initiatives remain too small and dispersed to have a transformative impact on China's strategic direction or on the priorities of Europe's private investors. What is needed is concrete and politically visible demonstration of low carbon development on a scale large enough to catalyse change at the national level and to transform external perceptions of China.

## Low Carbon Zones could give a focus for transformational cooperation

In the early 1980s China embarked on an extraordinary journey towards greater economic openness. Special Economic Zones (SEZs) – geographical regions with more liberal economic laws than the rest of the country – played a vital role. Building on this successful model, a consortium of European and Chinese research institutes has developed the concept of “low carbon zones” (LCZs)<sup>17</sup>. These would aim to stimulate transformational regional political leadership, endorsed at the national level, to create an enabling environment for large-scale innovative low carbon private and public investment. Just as SEZs provided China with a laboratory to shape its participation in the global market economy, so LCZs would pioneer approaches to decarbonisation compatible with Chinese institutions and development approaches.

The concept of LCZs is attracting growing interest in China. In a recent article<sup>18</sup> a leading Chinese economist Professor Hu Angang stated:

“China is in the process of defining specialised functional zones in order to optimise production structures. I believe optimisation of energy consumption is the most crucial factor. The Low Carbon Special Economic Zone should not be limited to attracting investment on research and high-end production. It should also have an optimal energy consumption structure and conserve energy. The Low Carbon Special Economic Zone could be implemented in one of the current functional zones. It would be required to meet strict environmental standards. The zone could become a powerful model for the promotion of energy conservation and emissions reductions across China.”

Though leadership on LCZs would need to come from China, the EU (Commission and Member States) could foster their initial development by agreeing an enhanced and coordinated package of support for each zone – including technical assistance, joint R&D, co-funding of demonstration projects, carbon finance and potentially harmonisation of standards. The EU-China Summit in December 2008 could begin the process by recognising the need for new models of low carbon development and the potentially valuable role of LCZs in this regard. China could agree to develop the LCZs concept in more

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<sup>17</sup> <http://www.eu-china-energy-climate.net/>

<sup>18</sup> <http://www.chinadialogue.net/article/show/single/en/1836-Strengthening-Sino-European-cooperation>

detail and to draw up plans for piloting it in a representative selection of regions. The EU could agree to step up its overall support for low carbon cooperation with China and to focus a growing share of this support on LCZs.

China is a vast country with a highly diverse economy and will need a range of low carbon development models to reflect this. Initially three LCZs could be established, one in each of the following regions:

- > **Eastern coastal provinces:** home to China's existing SEZs; relatively high value economic activity; skilled work-force; good infrastructure; lower reliance on coal-based energy; ready for economic transformation.
- > **Western provinces:** poorest; rural communities with limited access to energy, offering opportunities for development of "smart grids" and expanded use of renewables including biomass; key to China's vision of a "New Socialist Rural Economy".
- > **Northern/Central provinces:** home to China's highly emitting industries; facing toughest domestic efficiency targets; opportunities for clean coal and sectoral efficiency standards.

The nature of the EU's support would vary from region to region. At first the focus would likely be on planning and institution building – e.g. EU co-funding for "Low Carbon Technology Innovation and Diffusion Centres" along the lines proposed recently by the UK Carbon Trust.<sup>19</sup> In time the focus could shift to mobilising high tech foreign direct investment, including public-private financing for demonstration projects in LCZs.

The aim could be to launch the first pilot LCZs in 2009 and set an ambitious goal for mobilising public and private low carbon investment in each LCZ within the first five years of operation.

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<sup>19</sup><http://www.wiltonpark.org.uk/documents/Carbon%20Trust%20Publication%20-%20Low%20Carbon%20Technology%20Innovation%20and%20Diffusion%20Centres%20july%202008.pdf>

## Special Economic Zones have a track record of success in China

LCZs present an innovative vehicle for accelerating EU-China cooperation on climate change and energy in the short term, and one which is based on a track record of success in driving change in China. Special Economic Zones enabled China to initiate reforms which paved the way for two decades of spectacular economic growth.

The pace and scale of China's development has no precedent in history. In less than a generation it has pulled 300 million people out of poverty and the economy has expanded by ten times. This was not achieved through a single blueprint for development drawn up in Beijing. It was the result of experimentation and learning by doing – what Deng Xiaoping called “crossing the river by feeling the stones”.

China's first SEZs were established in 1980 in four cities in the provinces of Guangdong and Fujian, most famously in Shenzhen which was transformed over the next 20 years from a rural fishing village to a city with 8 million residents. They were later expanded to larger geographical areas. By the early 1990s a wide range of economic zones had sprung up throughout China, including Free Trade Zones, Export Processing Zones, Industrial Estates, Free Ports, Urban Enterprise Zones and High Technology Development Zones. Many of their policy innovations (e.g. fiscal incentives) have now been mainstreamed at national level but they continue to experiment and set the pace in new areas.

SEZs have performed at least four valuable roles:

### **1. Laboratories for development**

New approaches could be tested and then replicated more widely if successful. For many years corporation tax in SEZs was 15%, compared to 33% in the rest of China. In 2007 corporation tax was harmonized at 25% for the whole country (20% for foreign firms). SEZs have also been allowed to experiment in other areas such as employment policy, banking and foreign exchange rules.

## **2. Innovators in planning and infrastructure**

SEZs could approve infrastructure development plans as long as they financed them through taxation or international cooperation. They could decide on specific investment projects up to certain limits. To expedite decisions SEZs have established “one-stop shop” administrative arrangements and high quality online services.

## **3. Magnets for foreign direct investment**

In the period 1979-1987 the province of Guangdong attracted 60% of all FDI into China. Much of this was located in SEZs. Initially the bulk came from Hong Kong, Macao and Taiwan but later Japan and the US became more significant. Incentives for FDI included new types of ownership structure - including wholly foreign-owned enterprises after 1986 - waiver of requirement for import licenses, zero export tariffs and separate customs areas.

## **4. High technology pioneers**

This has become an increasingly important objective. High technology projects accounted for 40% of Shenzhen’s industrial output in 1999, for example. This was achieved through a range of innovative policies including a strong focus on protection of Intellectual Property Rights (IPR).

SEZs were established as “windows” on to an existing global economy. LCZ would be pursuing standards of planning and innovation which have not been achieved on a large scale anywhere to date. This would be a very significant commitment. Nonetheless there are positive signs. Premier Wen has called on provincial leaders to exercise “independent thought, critical thinking and innovation capabilities”. Municipal leaders in several provinces have expressed interest in piloting the LCZ concept.

By supporting the development of LCZs the EU would be engaging in a potentially transformational process of reshaping and reforming the forces of Chinese development. This could make a significant contribution to promoting the EU’s climate goals. The past example of SEZs shows the power of this approach to drive change; the question is how China and the EU could work together to catalyse and support these processes.

# The EU could provide valuable incentives to support the growth of LCZs

LCZs are interesting to Europe because of their strategic and potentially transformational impact in China. Support for LCZs would not be about development aid or philanthropy, but a long term investment in the EU's security and prosperity. China has many domestic resources which it could decide to deploy in LCZs, but the EU also has unique assets it could contribute in terms of know-how, economic partnership, market strength and focused financial support. EU engagement with LCZs would be based on the principle of partnership and the expectation that benefits would flow to both China and the EU.

Over the longer-term the success of LCZs will depend on their ability to mobilise resources from the private sector, including European investors. In the meantime European governments could help China pilot the concept through support in four key areas: institutions and governance; high tech foreign direct investment; carbon finance; and facilitating trade through harmonisation of standards.

## **1. Institutions and governance**

China's Five-Year Plans contain detailed economic development guidelines for all of its regions including infrastructure investment. Provincial authorities produce their own separate but related Five-Year Plans and a range of supporting strategies. For example Shenzhen SEZ follows a "strategy of science and technology development" and now claims to host 30,000 firms involved in R&D for high-tech products.

Designated LCZs could experiment with low carbon policy in similar fashion to SEZs. To qualify for LCZ status local leaders would commit to low carbon standards beyond existing benchmarks at the national level. For example an LCZ could commit to a certain percentage of its new buildings being low or zero carbon by 2015 and to establish strong, transparent systems for monitoring progress towards this target. LCZ plans would also promote climate resilience – ensuring that planning decisions reflect the risks and opportunities posed by future climate change.

Effective governance, monitoring and evaluation systems in the LCZ would be an important undertaking to ensure continuous improvement within the zone and to build confidence more widely. Key metrics would include energy

efficiency and GHG emissions. As in the case of the energy intensity targets for the 11<sup>th</sup> Five Year Plan, China could require the LCZ to monitor and report a wider range of indicators than other parts of the country and to experiment with third party verification.

Strong local political leadership combined with ambitious decarbonisation objectives would be the critical factor in the success of LCZs. This would need to be supported by investment in administrative capacity and innovation to actually deliver at all levels and across all economic sectors. These governance approaches would then provide models for application across China in the medium term.

### **Opportunities for EU support**

While the EU has never attempted anything directly comparable to LCZs it has valuable experience in discrete areas. World leading examples include energy efficient buildings in Denmark, transportation systems in France, renewables in Germany, waste management in the Netherlands and the emissions inventory and carbon finance sector in the UK. All European countries are developing new ways to manage their carbon budgets and promote innovation in key sectors. Selecting the best examples and expertise, Europe could provide unique input into the development of comprehensive and integrated plans for LCZs.

By involving itself in the design stage the EU would also be well placed to participate in subsequent implementation of LCZ plans. China's infrastructure investment in the next few years will create huge economic opportunities and have profound implications for future trends in energy use and emissions. For example, China added 322,500 miles of roads and 4,225 miles of rail between 2000 and 2005<sup>20</sup>. Between now and 2020 the country is expected to build as much new housing as currently exists in the EU-15.

Specific opportunities could include:

- > Support for “**Low Carbon Technology Innovation and Diffusion Centres**” along the lines proposed by the UK's Carbon Trust.
- > Funding through Framework Programme 7 (FP7) for an EU–China Ultra-Efficiency **Building** Research Platform to drive progress in new materials,

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<sup>20</sup> Hexter, J and Woetzel, J., 2007. “Operation China: from strategy to execution”. Harvard Business School Press

construction techniques, business approaches, supply chain management and standards.

- > Support for **innovative mass transport** systems in the LCZ like the one recently announced by Shanghai. This will focus on a bus rapid transit model that will integrate with the city's existing and planned metro and light rail systems.
- > Establishing world class **GHG inventories** in LCZs to track progress on emissions reduction over time. The EU could also help design management information systems for various programmes, including benchmarks and auditing procedures.
- > Support for **adaptation planning** including design of flood defences in coastal regions and application of state-of-the art satellite monitoring and GIS systems.

## Box 1: EU Framework Programme 7

The Seventh Framework Programme for Research and Technological Development (FP7) runs from 2007 to 2013. It has an R&D budget of €53 billion, compared with €17.5 billion for the preceding five year period. FP7 includes specific programmes for energy (€2.3 billion), environment including climate change (€1.9) and transport (€4.2 billion).

For the first time all research areas and projects under FP7 have been opened to participation of partners from third countries outside the EU. Several topics are specifically designed to promote participation of targeted International Cooperation Partner Countries (ICPC) and there are a number of "Specific International Cooperation Actions".

In the Energy Programme's 2007 call for proposals around 345 proposals featured at least one participant from third countries – around 6% of the total number. This included 45 proposals featuring partners from China – more than any other third country. Priority research areas for international collaboration under the Energy Programme include thin-film photovoltaics and carbon capture and storage.

*Source:* Adapted from [http://cordis.europa.eu/fp7/home\\_en.html](http://cordis.europa.eu/fp7/home_en.html)

## 2. High tech foreign direct investment

Under the IEA's business as usual scenarios, 1,260 GW of new power stations will be built in China by 2030, 70% of which will be coal-fired.<sup>21</sup> Switching to more efficient coal technology is therefore vital. China is making strong progress towards its target of producing 15% of all energy from renewables by 2020. In 2007 China's total investment in renewables was second only to Germany.<sup>22</sup>

Over half of China's energy is consumed by energy intensive industries such as the petrochemical, coal mining, metallurgical, electricity, transportation, iron and steel and construction materials sectors.<sup>23</sup> China's 1,000 largest state-owned enterprises are concentrated in these energy intensive industries. Under the "Top-1000 Enterprises Programme", launched in 2006, they are required to meet global energy efficiency requirements, carry out regular energy audits and report progress to the central government.

LCZs could encompass:

- > Accelerated targets for upgrading or retiring **inefficient coal plant** and a timeline after which any new coal power plants would need to be "near zero carbon" as the technology matures.
- > **Renewable energy** deployment targets significantly beyond China's current national targets. To help achieve these targets LCZs could invest in the energy storage technology and "smart" transmission grids required to make effective use of intermittent energy supplies from renewable sources.
- > Expanding the "Top 1000 Enterprises" concept to a wider range of energy consumers within the LCZ, adopting similarly challenging targets and timescales for the adoption of world leading **industrial efficiency standards**. Guangdong Province has already taken this approach in its "Double 1000 Enterprises Programme".
- > Building the next generation of infrastructure - housing, construction, transportation – to world-class standards for energy and carbon performance.

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<sup>21</sup> IEA, *World Energy Outlook 2007*

<sup>22</sup> The Climate Group, *China's Clean Revolution*, July 2007

<sup>23</sup> Rosen and Houser, *China Energy: A Guide for the Perplexed*, May 2007

To support these objectives the LCZs could encourage FDI in low carbon technology through measures such as strong IPR protection, tax incentives and targeted recruitment of skilled labour.

The LCZ would create a robust and dynamic institutional and regulatory regime for IPR protection, building on experience in Shenzhen and other SEZs. To facilitate the flow of know-how from experienced European private sector actors, LCZs could have the flexibility to experiment with a range of policies including tax incentives; joint ventures in priority sectors such as high efficiency construction and infrastructure services; enhanced two-way exchange in expert professional services such as energy auditing; and effective dispute settlement arrangements.

### **Opportunities for EU support**

The EU is already China's largest supplier of technologies (50%), foreign direct investment (7.9%) and services (17.5%). This includes substantial EU investment in key low carbon sectors. There are commercial risks attached to these investments including those related to IPR, though these risks are far less pronounced in energy technology than they are in luxury goods, electronic media and pharmaceuticals markets. With China becoming a world leader in low carbon industries such as wind generation, as well as a major consumer of low carbon products, there are also significant risks to staying out of the Chinese markets and failing to capitalise on Chinese engineering and scientific expertise through collaborative R&D.

Specific opportunities could include:

- > Prioritising the LCZ for **joint R&D** on low carbon technologies under FP7.
- > **Protection of IPR.** The EU and China already have a joint project on the Protection of Intellectual Property rights (IPR II), with funding from both sides.<sup>24</sup> To address the concerns of European companies the EU could provide additional support of this kind in the LCZ. The EU and China could agree special approaches to resolving IPR issues in LCZs through government to government arbitration; this could be particularly useful for European SMEs wishing to invest in China.

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<sup>24</sup> [http://www.ipr2.org/index.php?option=com\\_content&view=article&id=44&Itemid=1](http://www.ipr2.org/index.php?option=com_content&view=article&id=44&Itemid=1)

- > Incentives to European companies to share low carbon technologies with China as part of their investment, especially where EU public funding is supporting R&D; e.g. through **preferential licensing arrangements**, parallel market agreements and open licensing arrangements.
- > Inviting Chinese companies from the LCZ to participate in EU industry working groups focusing on energy efficiency and industry platforms linked to the **EU's Strategic Energy Technology Plan**.
- > An initial focus for all of these approaches would be addressing the **efficiency and environmental impact of coal** use in LCZs – from mining to combustion and waste disposal. This could be combined with EU funding for accelerating the next phases of NZEC with the aim of delivering a full scale CCS demonstration plant in China.

## Box 2: Near Zero Emission Coal Project (NZEC)

One current example of technology co-operation between China and the EU is the Near Zero Emissions Coal (NZEC) Project. This was agreed in 2005 as part of the EU-China Climate Change Partnership and has the objective of demonstrating advanced, near zero emissions coal technology through carbon capture and storage (CCS) in China and the EU.

NZEC was conceived as a three-phase project. Phase 1 would explore options for demonstration and build capacity for CCS in China. Phase 2 would carry out further development work on storage and capture options leading to Phase 3, which would construct a demonstration plant by 2014.

Phase 1 is underway with financial support from the UK (£3.5 million) and the European Commission (€1.6 million) and is due to conclude in autumn 2009. Subsequent phases are under discussion and depend in part on the EU's wider financing strategy for the 10-12 CCS demonstration plants agreed by the European Council in March 2007.

*Source: Adapted from <http://www.nzec.info/en/what-is-nzec/>*

### **3. Carbon Finance**

China is already the world's second largest recipient of sustainable energy investment, with approximately \$12 billion invested in 2007. Over the next decade it will need to attract up to \$40 billion per year to meet its renewables target and even more for investment in energy efficiency and clean coal.<sup>25</sup>

China is by far the world's leading beneficiary of international carbon finance through the Clean Development Mechanism (CDM) and has a strong interest in the current discussions of possible changes to CDM beyond 2012. The EU and China are pursuing a range of projects to learn lessons from existing CDM projects and identify future opportunities.<sup>26</sup>

LCZs could experiment with new types of carbon finance. For example LCZs could begin to develop the institutional capacity required to support local emissions trading schemes, drawing on international experience including the EU ETS. Such efforts would be underpinned by strong monitoring and reporting systems established through the LCZ's Strategic Plan. This is a growth area in China: Beijing and Shanghai both launched Environment and Energy Exchanges in August 2008.<sup>27</sup>

#### **Opportunities for EU support**

Through its overarching EU-China Programme for Energy and the Environment the EU will provide €20 million (between 2003-2009) in return for a similar financial commitment from China. A new €15 million EU-China Environmental Governance Programme is due to be launched at the EU-China Summit in December 2008. Many individual EU Member States provide financial support for energy and climate projects. The EU is also a major donor to multilateral initiatives such as the World Bank's Climate Investment Funds.

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<sup>25</sup> New Energy Finance, *Interesting Times 2.0 – Second Focus Report on Clean Energy Investment Opportunities in China*, January 2008

<sup>26</sup> See for example <http://www.euchina-cdm.org/>

<sup>27</sup> <http://wordpress.com/tag/chinese-carbon-exchange/>

### **Box 3: World Bank Climate Investment Funds**

The World Bank launched its Clean Investment Funds (CIF) in July 2008, describing them as a new source of funding through which the Multilateral Development Banks (MDBs) will provide additional support to developing countries to address climate change challenges. They will be disbursed as highly concessional loans, grants and risk mitigation instruments.

CIF are intended to “enable a dynamic partnership between the MDBs and developing countries to undertake investments that achieve a country's development goals through a transition to a climate-resilient economy and a low carbon development path”. The first projects are due to be agreed by the end of 2008.

A Country Investment Plan is required to access CIF funding for low carbon development. LCZs could form part of China's Country Investment Plan. This would make it possible to support a comprehensive approach to low carbon development in a defined geographical area, encouraging a mix of technology investments across a range of key sectors. It would also be consistent with the CIF's focus on learning and innovation.

*Source: Adapted from*

*<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/ENVIRONMENT>*

At the EU-China Summit in 2007 the EU announced a €500 million framework loan for climate change mitigation in China. A broad range of project categories are eligible for EIB financing, including projects using renewable energy sources, energy efficiency enhancement, carbon capture and storage, and afforestation. Proposals are currently being reviewed and prioritised.

The EU - both through Community funds and Member State budgets - could agree to provide additional support to China on energy and climate, and to concentrate the majority of its support in the LCZs. The EU could aim to have at least half of its growing discretionary assistance to China focused in LCZs by 2012. This level of focused support would help the LCZs to achieve a transformational shift towards low carbon development in a way that would not be realistic if resources were spread across China.

Specific opportunities could include:

- > Prioritising LCZs for early support from the World Bank's Climate Investment Funds and other **concessional financing from multilateral development banks.**
- > Using LCZs to develop **innovative approaches to sectoral cooperation.** This could involve the LCZ setting a "no-lose" target for emissions reduction in an entire sector in return for a package of EU support – and the ability to earn additional carbon credits if it beats the target. The LCZ's world class GHG inventory would provide data to monitor this.
- > EU proposals for the EU ETS Phase III (from 2013) indicate that part of the revenue raised by auctioning emissions permits will be allocated to the **Global Energy Efficiency and Renewable Energy Fund (GEEREF)** and for measures to avoid deforestation and facilitate adaptation in developing countries. GEEREF is operational and is seeking to mobilise €1 billion of risk capital for investment projects separate from this future auction revenue stream. This could be focused on LCZs.

#### **4. Facilitating trade through harmonisation of standards**

LCZs could pilot harmonisation of standards with the EU in key low carbon sectors, for instance on vehicles emissions, energy using products and construction. This would have environmental benefits (e.g. improved air quality). It would also facilitate Chinese exports to the EU and stimulate high tech European FDI in China. Focused work on enhanced facilitation of trade and investment flows in LCZs would support these activities.

For energy intensive products such as steel, China could set a deadline after which all companies exporting from LCZs would need to meet high standards of energy efficiency. This would be in return for international assistance in acquiring and deploying state-of-the-art technologies.

Broader market access issues are a sensitive topic in EU-China trade relations. Any incentives offered in this area would be subject to WTO compatibility. Options are being explored by the WTO's Trade and Environment Committee as well as through bilateral mechanisms. Rapid progress is unlikely but could be further explored.

## **Opportunities for EU support**

The new EU-China High Level Economic and Trade Dialogue Mechanism covers climate and energy issues.<sup>28</sup> It could help set the strategic context for detailed work on issues such as facilitation of trade in low carbon goods – in a similar way to the separate US-China “Strategic Economic Dialogue”.<sup>29</sup> There is also an EU-China “Sustainable Trade Task Force” (EC DG Trade / Chinese Ministry of Commerce) which met for the first time in April 2008.

Specific opportunities:

- > The EU could invite Chinese firms from the LCZ to participate in EU working groups on implementation of the Eco-Design Directive which sets high standards for major energy-using goods such as electric motors and air conditioners.
- > The EU could offer similar incentives in return for adoption of the latest (“EU V”) emissions standards for vehicles in the LCZ.
- > The EU could help LCZs improve the energy efficiency and environmental performance of heavy industries such as cement and steel. Many European companies are already involved in initiatives of this kind in various parts of China (e.g. Lafarge for cement).
- > The EU could offer technical assistance to the LCZ in developing a carbon labelling scheme to support exports. The UK’s Carbon Trust is pursuing work in this area with China’s Energy Conservation Investment Corporation.

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<sup>28</sup> <http://www.euractiv.com/en/trade/eu-china-step-work-trade-tensions/article-171982>

<sup>29</sup> “China, US sign 10 year energy, environment framework”, [http://news.xinhuanet.com/english/2008-06/19/content\\_8396248.htm](http://news.xinhuanet.com/english/2008-06/19/content_8396248.htm)

## Box 4: Supply Chain Management

International business is increasingly focused on reducing carbon emissions throughout its supply chains. Walmart's recent partnership with the Carbon Disclosure Project (CDP) is perhaps the most high profile example. A growing number of European retailers have joined CDP's "Supply Chain Leadership Collaboration", including Carrefour and Tesco.

This trend has significant implications for China. Analysis of supply chain emissions suggests that one third of Chinese emissions are associated with exports. The UK Carbon Trust is working with the China Energy Conservation Investment Corporation to measure the carbon footprint in the supply chain of up to ten Chinese manufactured products. The project will use standards developed in the EU to assess the lifecycle greenhouse gas emissions of goods and services with a view to developing a product carbon labelling scheme in China.

Scandinavian companies are also active in this field. Sony Ericsson won the "China Green Company Award" in 2008 partly due to its work on product life cycle assessments and supply chain management.

*Source: Adapted from*

*<http://www.carbontrust.co.uk/News/presscentre/CECIC.htm>*

## Summary of recommendations for the EU-China Summit in December

- > The EU and China could recognise the need for new models of low carbon development and the potentially valuable role of LCZs in this regard.
- > China could agree to develop the LCZs concept in more detail and to draw up plans for piloting it in a representative selection of regions.
- > The EU could agree to step up its overall support for low carbon cooperation with China and to focus a growing share of this support on LCZs. EU support could include institution building, joint R&D, co-funding of demonstration projects, carbon finance and potentially harmonisation of standards.
- > Early deliverables could include EU co-funding for “Low Carbon Technology Innovation and Diffusion Centres” in LCZs, along the lines proposed recently by the UK Carbon Trust; prioritising LCZs for early support from the World Bank’s Climate Investment Funds; funding through Framework Programme 7 (FP7) for an EU–China Ultra-Efficiency Building Research Platform.
- > The aim could be to launch the first pilot LCZs in 2009 and set an ambitious goal for mobilising public and private investment in each LCZ within the first five years of operation.
- > Potential sources of public sector funding for LCZs include the new EU-China Environmental Governance Programme; Global Energy Efficiency and Renewable Energy fund; European Investment Bank; as well as bilateral assistance from EU Member States.
- > The EU could aim to have at least half of its growing discretionary assistance to China focused in LCZs by 2012.