

Executive Summary  
March 2011

THE CLIMATE GROUP

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**THE CLEAN REVOLUTION**

# DELIVERING LOW CARBON GROWTH

A Guide to China's 12th  
Five Year Plan

THIS REPORT HAS BEEN PREPARED BY

## THE °CLIMATE GROUP

AND COMMISSIONED BY  
HSBC CLIMATE CHANGE CENTRE OF EXCELLENCE



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FRONT COVER IMAGE:  
[LED LIGHTS ALONG THE NAMING RIVER IN CENTRAL GUIYANG, GUIZHOU, CHINA.](#)

## EXECUTIVE SUMMARY

China has plans to continue its 'clean revolution' over the next five years, with significant targets for low-carbon energy, energy efficiency and clean technology (Figure 1). The policy framework, for this as contained in the 12th Five Year Plan (FYP) covering 2011-2015, will be more sophisticated, with phasing in of market mechanisms and 'bottom-up' action in provinces and cities. The report concludes that China's low-carbon ambitions are accelerating and will bend the nation's carbon emissions growth curve in the next five years. At the same time the country's energy supply is incorporating more non-fossil fuel sources and low-carbon technologies will continue to develop rapidly. The Chinese market for low-carbon technology is gradually opening to foreign owned enterprises, but competition is intensifying. Finally, China's approach to energy management is evolving to include market mechanisms, but challenges remain.

	11TH FYP (2006-2010) (TARGET)	11TH FYP (ACTUAL)	12TH FYP (2011-2015) (TARGET)	13TH FYP (2016-2020) (TARGET)
<b>INDICATORS</b>				
ENERGY INTENSITY (% REDUCTION IN FIVE YEARS)	20%	19.1%	<b>16%</b>	NOT SET
CARBON INTENSITY (% REDUCTION IN FIVE YEARS)	NOT SET		<b>17%</b>	40-45% VS 2005
NEW ENERGY (% OF GENERATING CAPACITY)	10%	9.6% <sup>1</sup>	—	15%
<b>GROWTH RATES</b>				
PRIMARY ENERGY CONSUMPTION (ANNUAL GROWTH)	4%	6.3%	<b>3.75-5%*</b>	—
ELECTRICITY ENERGY CONSUMPTION (ANNUAL GROWTH)	—	11%	<b>8.5%*</b>	(5.5%)*
ELECTRICITY GENERATING CAPACITY (ANNUAL GROWTH)	8.4% <sup>2,3</sup>	13.2% <sup>4</sup>	<b>8.5%*</b>	(5.6%)*
GDP (ANNUAL GROWTH)	7.5%	10.6%	<b>7%</b>	—

\*ASTERISKED NUMBERS INDICATE ESTIMATES MADE BY GOVERNMENT THAT ARE NOT FORMAL TARGETS. BOLD NUMBERS ARE NEW TARGETS.

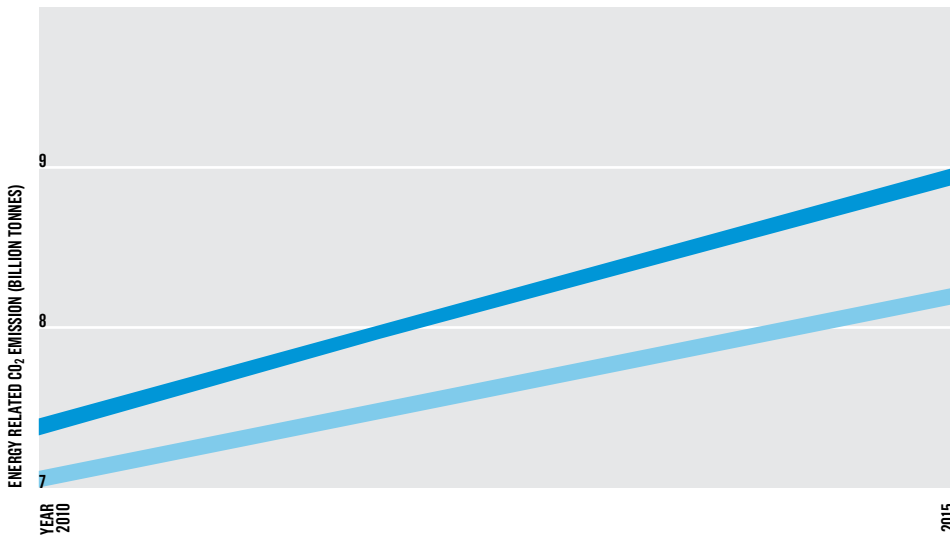
FIGURE 1

KEY ENERGY AND CLIMATE POLICY GOALS AND INDICATORS IN CHINA 2006-2020



## I — CHINA'S LOW-CARBON AMBITION IS ACCELERATING AND PLANS WILL BEND THE NATION'S CARBON EMISSIONS GROWTH CURVE

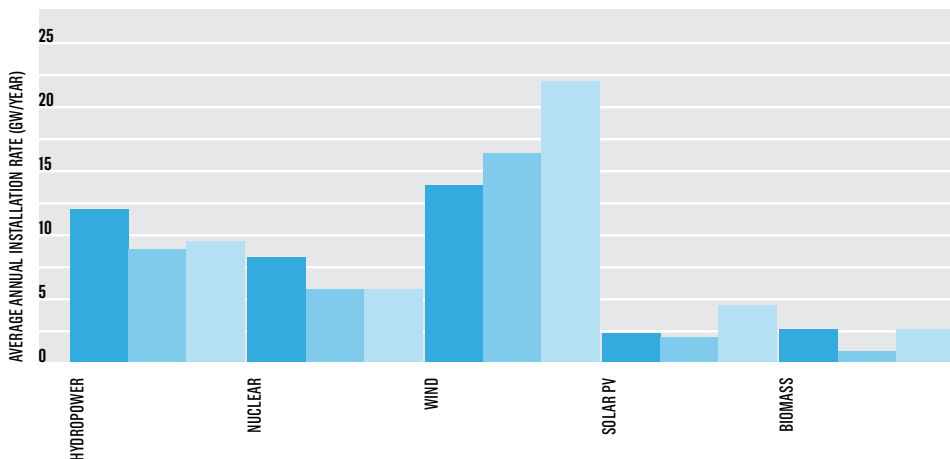
For the first time in a FYP, China has set a carbon-intensity reduction target of 17%<sup>5</sup> and intends by 2015 to reduce energy intensity a further 16%<sup>6</sup>. In real terms, the 12th FYP should see China's CO<sub>2</sub> emissions rise from an estimated 7.02Gt (gigatonne) to 8.17Gt. This will avoid about 0.83Gt against the nation's previous trajectory (Figure 2)<sup>7,8,9</sup>. In real terms, therefore, China is bending its emissions curve downwards: the 1.15Gt planned rise in CO<sub>2</sub> emissions in the next five years compares with 2.2Gt added during each of the 10th and 11th FYPs. This ambition is driven by a need for China to: maintain growth and investment; address real resource limits; be economically and competitive and technologically advanced; and 'keep its house in order' to be a trusted voice on climate and energy. We believe that this will lay the foundation for emissions to peak before 2030<sup>10</sup>.



**FIGURE 2**  
ESTIMATED EMISSIONS AVOIDED IF CARBON INTENSITY TARGET OF 17% FOR 12TH FYP IS REACHED, AGAINST IEA CURRENT POLICIES SCENARIO REFERENCE<sup>11,12</sup>

■ REFERENCE SCENARIO  
■ 17% REDUCTION

China's low-carbon-energy technology targets also compare favourably with the International Energy Agency's (IEA) World Energy Outlook 2010 scenario for containing climate change by stabilizing atmospheric concentrations of CO<sub>2</sub> at 450ppm (parts per million) by 2100, suggesting that China is 'pulling its weight' in this regard (Figure 3) and it is believed that low-carbon energy deployment will be on or ahead of target.

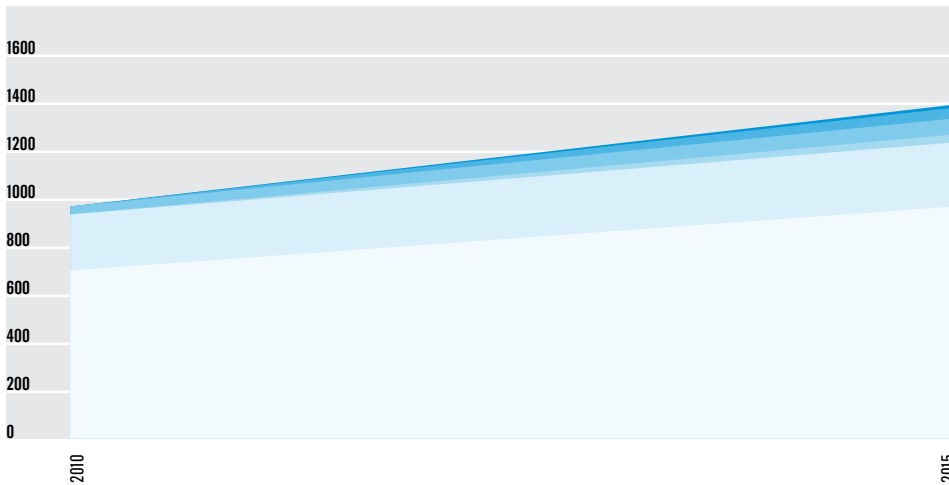


**FIGURE 3**  
CHINA'S LOW-CARBON ENERGY TARGETS COMPARED AGAINST IEA'S 450PPM SCENARIO AND HSBC'S<sup>13</sup> ESTIMATES OF ACTUAL ANNUAL DEPLOYMENT 2010-2020

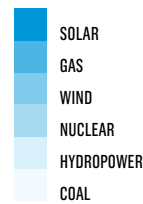
■ CHINA'S TARGETS  
■ IEA'S WORLD ENERGY OUTLOOK 2010 450PPM SCENARIO  
■ HSBC ESTIMATES

## II — GROWTH IN ENERGY SUPPLY WILL INCORPORATE AN INCREASING SHARE OF NON-FOSSIL FUEL SOURCES

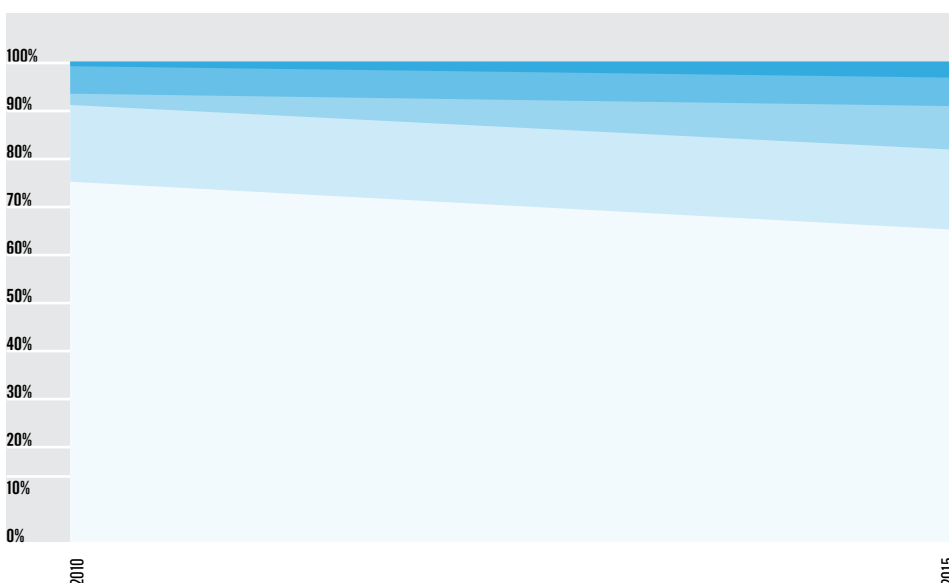
China reached a 9.6% share of primary energy from non-fossil fuel sources in the 11th FYP against the target of 10%<sup>14</sup>. Challenges came from larger than predicted overall energy consumption and from delays in developing hydroelectric and nuclear power over the last five years<sup>15,16</sup>. Current indications are that these technologies will now progress more rapidly with stronger government backing. Progress on low-carbon energy will come from a four-fold growth in nuclear power to 40GW (gigawatts)<sup>17</sup>, 63GW of new hydroelectric capacity, a growth of 22GW in gas-fired generation<sup>18</sup>, 48GW<sup>19</sup> of new wind capacity to more than double the current capacity and solar capacity expected to reach 5GW of by 2015<sup>20</sup>. These figures are against the backdrop of an estimated additional 260GW of coal generation<sup>21</sup> (Figure 4) – although the share of coal in the energy mix is anticipated to fall from 72% to 63% (Figure 5).



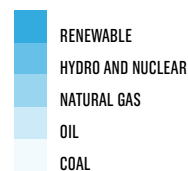
**FIGURE 4**  
TARGETED GROWTH IN INSTALLED GENERATING CAPACITY (GW)  
FOR 2015, COMPARED TO THE CURRENT MIX<sup>22,23,24</sup>



FIGURES TAKEN FROM PUBLICLY AVAILABLE DATA FROM THE NATIONAL ENERGY BOARD AND THE CHINA ELECTRICITY COUNCIL



**FIGURE 5**  
TARGETED CHANGE IN THE COMPOSITION OF CHINA'S PRIMARY  
ENERGY SUPPLY BY SOURCE, 2010-2015<sup>25,26</sup>



FIGURES TAKEN FROM PUBLICLY AVAILABLE DATA FROM THE NATIONAL ENERGY BOARD AND THE CHINA ELECTRICITY COUNCIL

### III — CHINA WILL ACCELERATE THE GROWTH OF LOW-CARBON TECHNOLOGIES

Considering both export and domestic consumption, the 12th FYP sets out aggressive growth plans for strategic emerging industries (SEIs) critical to economic restructuring, including electric vehicles, next generation information technology, energy efficient products and renewable energy. A figure of RMB 10 trillion (\$1.5 trillion) of public and private investment in the next five years across all SEIs has been discussed but a government target may not be set. Fiscal incentives form part of an integrated strategy. Research and development funding is set to increase dramatically, leveraging public and private sources from the current 1.7%<sup>27</sup> to reach 2.2-2.5% of GDP<sup>28</sup>. Technologies including new energy vehicles and LED lighting are set to play a big role in the longer term, as China's large-scale manufacturing will drive down international prices.

### IV — THE PICTURE WILL GRADUALLY OPEN UP FOR FOREIGN-OWNED ENTERPRISES (FOEs) BUT COMPETITION IS INTENSIFYING

Following the trend of state-owned enterprises (SOEs) opening up to foreign equity investment, participation in national R&D programmes will gradually open up to FOEs, but access to direct funding is likely to remain restricted to majority Chinese joint venture partnerships. China recently announced moves to strengthen its intellectual property (IP) regime under the 12th FYP, which is increasingly significant for its own domestically-derived IP. The extent to which this will impact FOEs' experience of operating in China is not clear, however.

### V — CHINA'S APPROACH TO MANAGING ENERGY IS EVOLVING WILL BE MORE MARKET-ORIENTED, BUT CHALLENGES REMAIN

The 12th FYP measures include regulation, technology development, capital investment and market mechanisms. We expect better-planned phase-out of inefficient infrastructure and clearer devolution of central targets by sector and province. Data quality on energy continues to improve<sup>29</sup>, enabling more effective regulation. Market mechanisms, including energy price reform, carbon trading pilots, energy labelling of consumer products and support for energy services companies, will be actively developed and are likely to form a key element for China's energy policy framework by 2015.

On the national agenda since 2002, energy price-reform has become urgent to rationalize investment, and market mechanisms are an experiment for a nation accustomed to administrative regulation. Industrial energy efficiency measures remain critical to success<sup>30</sup>. Some local governments struggle with limited capacity to implement changes and still perceive energy intensity reduction to be at odds with economic growth. Access to capital for energy efficiency projects is a priority, especially for non-SOEs. Nuclear and hydroelectric power will take higher priority in this FYP. Coal-fired generation and heavy manufacturing still make up the lion's share of China's emissions (81%)<sup>31</sup>. There is no provision for carbon capture and storage in the FYP although it remains a development priority in energy R&D. Although absolute coal-generating capacity will increase, outstripping new energy growth in 2015, the share of coal in the energy mix will decline.

The targets are set and the plans are in motion to build on the ambition of the 11th FYP for China's movement towards clean and efficient energy use. The 12th FYP makes it clear that China is determined to capture the economic opportunities that exist from addressing climate change.

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## ABOUT THE REPORT

The report is a guide to the implications of China's 12th Five Year Plan (FYP) for the country's efforts to develop a lower carbon economy, considering related policies and trends in the process. It has been prepared by The Climate Group and commissioned by The HSBC Climate Change Centre of Excellence, building on the five-year HSBC Climate Partnership in which both organizations participate alongside WWF, Earthwatch and the Smithsonian Tropical Research Institute.

Our findings are based on a review of successive drafts of the Plan, the most recent draft of which was presented on 5th March 2011 at the National People's Congress, supplemented by interviews and conversations (some on a non-attributable basis) with experts in the public and private sectors in China. It also builds upon earlier research into China's climate change and energy policy.

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