E3G

Chinese Challenge or Low Carbon Opportunity?

The implications of China's 12th Five-Year -Plan for Europe.

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March 2011 (Updated to reflect official 12th Five-Year-Plan adopted on March 15, 2011)

About E3G

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Foreword

The Chinese 12th Five-Year-Plan was formally approved by China's National People's Congress and Chinese People's Political Consultative Conference on 15 March 2011. E3G's original analysis based on the draft release of the FYP culminated in our briefing paper "*Chinese Challenge or Low Carbon Opportunity? The implications of China's 12th Five-Year-Plan for Europe." (available on www.e3g.org).* We have subsequently updated this briefing paper to reflect the final approved targets; the table below updates the targets as outlined in our previous paper and the formal, approved FYP:

Target	Draft FYP	Approved FYP
GDP by 2015	$7.5 trillion	$8.5 trillion
Carbon intensity reduction target	16 percent	17 percent
Energy intensity reduction target	16 percent	unchanged
Pollutants reduction targets	10 percent	8 percent to 10 percent
Share of non-fossil fuel in primary energy consumption	11.4 percent	unchanged
Percentage of research and development spending as part of GDP	2-2.5 percent	2.2 percent

Sectoral specific targets are derived from draft decisions and extensive analysis of media reports, and have not changed pending the release of sectoral plans. Although some details may change, the main elements of the package reported here are unlikely to change.

Chinese Challenge or Low Carbon Opportunity?

E3G Briefing, March 2011[1]

Summary

> The Chinese leadership has recently endorsed the core national objectives for the 12th Five-Year-Plan (FYP), which runs from 2011-2015. By 2015, the Chinese economy is expected to grow by 40 percent to $8.5 trillion (slightly more than half of EU GDP at current exchange rates) but its working population will also peak in 2015-17. The 12th FYP responds to this context by shifting from a focus on the quantity of growth to the *quality* of development. Its main economic objectives are to expand China's domestic market and move the economy towards higher value-added sectors; aiming to increase productivity and help its companies to become global players.

> Five-Year-Plans are more than mere political intent. Delivering the FYP targets is a crucial source of political legitimacy for the Chinese leadership. China's 11th FYP (2006-2010) was the first to put the green agenda on the table and despite difficulties in implementation strong top-down action has meant that most of these goals were achieved by 2010. For example, 70 GW of inefficient power plants have been closed down, which is equivalent to closing all power plants in the UK.

> The 12th FYP represents a radical shift from administrative to market-based instruments and innovation. Low carbon and clean energy industries have been,placed at the heart of China's forward strategy for growth, exports and industrial modernisation. China's new strategic sectors are expected to grow to up to 15 percent of GDP by 2020, and will be supported by increased Chinese public innovation spending of 2.2 percent of GDP by 2015. Although its absolute CO_2 emissions will continue to rise in the foreseeable future, China's increased carbon and energy intensity targets could save between 0.5-2.5 Gt of CO_2 emissions in 2020; providing a strong domestic market in low carbon industries. To put this in context, EU emissions reductions will be 0.5 Gt in 2020 under the 20 percent target or up to 1.1 Gt if that is increased to 30 percent.

> The Chinese government is backing these goals with large-scale public investments in clean energy and infrastructure. Renewable energy capacity will match growth in the EU with installed capacity increasing by 64 percent to 427 GW by 2015, compared to 322 GW in the EU by 2015. China will decisively out invest the EU in grid infrastructure with 500 billion yuan (€57 billion) allocated to ultra high voltage (UHV) transmission lines by 2015, and more than 4 trillion yuan (€460 billion) on "smart grids" in the next decade. The EU has identified investment needs for transmission lines of €23-€28 billion by 2015

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[1] E3G is an international non-profit organisation dedicated to accelerating the transition to sustainable development. E3G works in the EU, US and China. More details can be found at www.e3g.org.

and on smart grids of €100 billion by 2020. However, it has yet to identify clear financing sources for this investment.

> China will introduce innovative governance structures to help deliver these targets. Firstly, its aim of integrating the economic, energy and climate agendas should help provide a stronger strategic impetus to deliver these outcomes, especially at the provincial level. The 12th FYP is likely to launch pilots in emissions trading and introduce a national resource tax. China will also experiment with new governance approaches in 'low carbon zones' which were recently announced in 8 cities and 5 provinces, covering over 300 million people.

> The 12th FYP presents both risks and opportunities for European business. Europe's current leadership in low carbon technologies means it will benefit from the growth in China's clean energy and green markets. For example, European companies are already very active in meeting high Chinese demand for modern grid infrastructure. China's energy saving and environmental protection sector is expected to be worth 4.5 trillion yuan (€520 billion) by 2015. The rise of global Chinese companies in these sectors, however, means that Europe will face stronger competition for market share, albeit in the context of overall global growth in these sectors.

> Europe has a strong interest in maximising the benefits and minimising the risks of China's green industrial policy. This can only be achieved by reversing the current fragmentation being seen between Europe's growth, energy and environmental agendas. Progress on three policy areas will be key:

- Ensuring strong EU domestic demand for low carbon goods and services by raising EU emissions reduction targets to 30 percent by 2020.
- Driving innovation by promoting large scale investments in the Strategic Energy Technology plan and modernisation of Europe's electricity grid.
- Developing a robust and reciprocal EU-China relationship in the areas of low carbon cooperation, co-development of technology, investment and service access, government procurement and IPR protection.

Summary of final information for China's 12th FYP and provisional sectoral targets

Sector/Area	Specifics
New energy industry	5 trillion yuan (€570 billion) government investment in new energy sector by 2020. *Source: Draft New Energy Industry Development Plan 2011-2020 (Jan 2011)*
Energy saving and environmental protection industry	3 trillion yuan (€340 billion) investment in environmental protection sector by 2015. Energy saving and environmental protection sector to worth 4.5 trillion yuan (€520 billion) by 2015. *Sources: Draft Energy Saving and Environmental Protection Industry Development Plan (Jan 2011); news report of interview with China Environment Service Industry Association (December 2010)*
Alternative vehicles industry	100 billion yuan (€11.5 billion) government investment in alternative-energy vehicles industry by 2020. Annual sales of 1 million units of new energy vehicles by 2015. *Source: Draft Energy-Saving and New Energy Vehicle Industry Development Plan 2011-2020 (August 2010)*
Carbon and energy intensity targets	17 percent of carbon intensity reduction target by 2015. 16 percent of energy intensity reduction target by 2015. 8-10 percent of pollutants reduction targets by 2015. *Source: Premier Wen Jiabao's Report on the Work of the Government (March 2011)*
Carbon tax	Introduction of carbon tax by 2012. Tax rate to start from 10 yuan and increase to 40 yuan by 2020. *Source: Report of government joint expert group from NDRC and Ministry of Finance (May 2010)*
Carbon market	Voluntary carbon trading system under 12th FYP. *Source: Open informal discussions within NDRC (December 2010)*
Power sector decarbonisation	New thermal power plants capped at 260-270 GW next five years. Coal production capped at 3.8 billion tonnes next five years. *Sources: Announcement by the National Energy Agency Secretary (Zhang Guobao) (January 2011); announcement by Land and Natural Resources Consultation Research Centre personnel (December 2010)*
Sectoral performance standards	10 percent energy intensity and pollution reduction target for oil and chemical industries by 2015. *Source: Official joint recommendation by China National Petroleum Corporation and China Chemical Industry Association (October 2010)*

Vehicles fuel efficiency	30 percent reduction of fuel consumption and CO_2 emissions by 2015 compared to BAU. *Source: China Association of Automobile Manufacturers comments on 12th FYP for automobiles (September 2010)*
Non-fossil fuel in primary energy consumption	11.4 percent by 2015 *Source: Premier Wen Jiabao's Report on the Work of the Government (March 2011)*
Power generation capacity	Breakdown of power generation capacity by 2015. Non-fossil fuel power generation capacity: 474 GW by 2015. Annual saving of coal and CO_2 emissions in the power sector by 2015. *Source: Power Industry 12th FYP Study Report by China Electricity Council (December 2010)*
Investment in renewable energy	2-3 trillion yuan (€230-€340 billion) in renewable energy over the next 10 years: 1.5 trillion (€170 billion) for wind and 200-300 billion yuan (€23-€34 billion) for solar. *Source: Draft New Energy Industry Development Plan 2011-2020 (Jan 2011)*
Investment in power sector	Total investment in power sector to reach 5.3 trillion yuan (€610 billion) by 2015: 2.75 trillion yuan (€320 billion) on power generation and 2.55 trillion yuan (€290 billion) on grids. *Source: Power Industry 12th FYP Study Report by China Electricity Council (December 2010)*
Grids	500 billion yuan (€57 billion) investment on ultra high voltage (UHV) lines by 2015. 4 trillion yuan (€460 billion) investment on "smart grids" by 2020. *Sources: Announcement by State Grid Corporation (January 2011); grid industry experts analysis (December 2010)*
High speed rail	3-4 trillion yuan (€340-€460 billion) investment in high speed rail by 2015. *Source: News report of China's draft 12th FYP on railway (December 2010)*
Innovation	R&D spending to reach 2.2 percent of GDP by 2015. R&D spending to reach 2.5 percent of GDP by 2020. Intensified overseas merger and acquisition (M&A) by Chinese companies to acquire technology. *Sources: Premier Wen Jiabao's Report on the Work of the Government (March 2011); National Medium- and Long-Term Science and Technology Development Programme (2006); industry expert analysis (January 2011)*

1. Introduction

China's green agenda

China has recently introduced its 12th Five-Year-Plan (FYP) after the twin sessions of The National People's Congress and The Chinese People's Political Consultative Conference. Five-year-plans are series of economic development initiatives adopted by the Chinese government, which not only set out the country's overall development objectives and roadmap but also detailed economic development guidelines for all its regions. Much more than declarations of political intent, the FYPs are self-defined benchmarks of the Chinese Government. Their achievements are a cornerstone of legitimacy for the Communist Party leadership.

China's 11th FYP (2006-2010) marked the beginning of a new era for sustainable development in China where the pursuit of environmental goals such as pollution reduction and energy efficiency begun in earnest. In the past two years, 'low carbon development' has also featured highly on the Chinese official agenda. The new FYP will increase this drive towards low(er) carbon development. China, which is already the world's second largest market for, and investor in clean energy (after the EU), will become an even stronger player in the field.

EU – internal indecision is undermining leadership

The EU has been a leader on climate change for the past two decades and one of the staunchest supporters of the Kyoto Protocol. Its Climate and Energy Package, adopted in 2008, was the world's first comprehensive and ambitious climate change policy framework. EU's climate change ambition has acted as a catalyst for the development of a strong domestic clean technology sector, and spurred low carbon innovation in its public and private sectors. As a result, the EU not only has the world's largest market for but also provider and exporter of clean technology and services. It also has the world's largest and most comprehensive CO_2 emissions trading system and carbon market.

China is rapidly emerging as a major player in the green sectors and poses a real challenge to Europe's leadership. The next 5-10 years will be critical for both players to strengthen their positions. To match China's ambitious green growth plans, driving domestic demand for low carbon goods and services by adopting an EU 30 percent greenhouse gas emissions reduction target will be key. This is, however, where the EU is currently split on whether to make this move.

China, at the same time, is focused on realising its 'green' potential by unleashing a host of green initiatives and investments in its current Five-Year-Plan. Specifically, China will launch a set of 'green-focused' new strategic industries that will be central to its economic growth and transition in the next decade.

China's 'green' plans will provide both opportunities and challenges to the EU in terms of clean technology markets and competition. How well prepared the EU is to handle the

impact of China's clean energy industrial strategy will depend on decisions it made in the coming year over the scope and ambition of its climate, energy and growth agendas.

2. The 11th Five Year Plan (2006-2010) – establishing a green agenda

Under the 11th FYP, the Chinese government introduced hard environmental targets, including a 20 percent energy intensity target (by 2010) and a 15 percent renewable energy target (by 2020)[2]. This was mostly driven by the need to enhance China's energy efficiency and energy security. To achieve these targets, the Chinese government has adopted drastic, top-down measures including closing down thousands of outdated and inefficient plants in its power and heavy industry sectors. Small plants were also consolidated to improve efficiency and restrictions were introduced to discourage the production and export of energy intensive products such as steel and cement.

By the end of 2010, the Chinese government has closed down more than 70 GW of small thermal power plants and cut down hundreds of millions of tonnes of production capacity in its heavy industry including steel and cement.[3] The cumulative generation capacity of non-fossil fuel over the past 5 years would have saved 1.5 billion tonnes of coal and reduced CO_2 emissions by nearly 3 Gt.[4] In addition, China has also managed to exceed its 10 percent (compared to 2005 level) pollution reduction target under the 11th FYP.[5] And if its 20 percent energy intensity reduction target had been achieved, it would reduce CO_2 emissions by 1.5 Gt.[6] (In comparison, total EU-27 GHG emissions cut between 1990-2009 was nearly 957 Mt).[7]

Because of its aggressive green policy, China has now become the world's second largest market for and investor in clean energy (after the EU). The market size of its clean technology sector is estimated to be worth more than $100 billion (€76 billion) by 2020.[8] China is currently one of the world's largest producers of wind turbines and solar panels, and is leading the world in supercritical and ultra-supercritical coal technology.

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[2] Although the 15 percent target does not seem as ambitious as the EU's 20 percent target, it has to be seen in the context of China's overall power generation: China's installed power generation capacity is estimated to be nearly 1.5 billion KW by 2015; comparatively, EU's installed capacity is estimated to fall short of 1 billion KW by 2015.

[3] Wu Jingjing, "11th FYP pollution reduction mission accomplished" (*"shi yi wu" wuran jianpai renwu chaoe wancheng*), *Xinhuanet*, 16 January 2011

[4] Wang Youling, Lei Min, "China will reasonably control energy consumption during 12th FYP" (*"shi er wu" qijian zhongguo jiang heli kongzhi nengyuan xiaofei zongliang*), *Xinhuanet*, 7 January 2011

[5] Wu Jingjing, op.cit., 16 January 2011

[6] "NDRC: Completion of 11th FYP will reduce 1.5 billion tonnes of CO_2 emissions" (*fagaiwei: shiyiwu guihua jiang wancheng jianpai 15 yidun eryanghuatan*), *Zhongguo qingnianbao*, 18 September 2010

[7] "*Tracking progress towards Kyoto and 2020 targets in Europe*", EEA Report No 7/2010

[8] Li Mu, "China solidifying its lead in clean tech market", *People's Daily*, 23 December 2010

However, given the scale and stage of its development, China still faces huge challenges: energy intensity of China's heavy industry is still above the global average and fossil fuel still accounts for more than 90 percent of its energy consumption. In addition, China still relies overwhelmingly, and will be for some time, on foreign technology and investment.[9]

China's continuous rapid economic growth also presents a huge stumbling block to its environmental ambition. This is clearly illustrated in its struggle to achieve its 20 percent energy intensity reduction target laid down in 2006.

Despite a difficult start, energy intensity has come down by around 15 percent (reducing CO_2 emissions by more than 1 Gt) by the end of 2009.[10] At the beginning of 2010, however, energy intensity and consumption started to c limb up again as a result of the 4 trillion yuan stimulus package that hugely increased industrial output. Faced with a potential crisis, the central government increased its pressure on provincial governments to do more. Many local government officials, whose political career became dependent on achieving the energy intensity targets, started to take desperate measures including randomly closing down power plants and stopping electricity supply to all customers, including households and hospitals. These practices were severely criticised by the central government amidst a public outcry. The central government has recently announced that its energy intensity reduction rate over the past five years was 19.1 percent, slightly below the 20 percent target.[11] Despite this, there are serious concerns that local governments might have fabricated information and data, or met their targets temporarily by adopting drastic short-term energy saving measures out of desperation. A high GDP growth forecast for the next 5 years has also cast a long shadow on China's future carbon and energy intensity targets.[12]

3. China's 12th FYP: Acceleration of China's low(er) carbon transition

The 11th FYP, however, was merely the launch pad for China's environmental ambition; as China started to deliver on its potential, the new 12th FYP (2011-2015) will further intensify China's 'green transition'. The new FYP is also a critical step towards implementing China's 40-45 percent carbon intensity reduction (compared to 2005) target by 2020. Over that

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[9] According to a UNDP report, China currently lacks 43 around (70 percent) of the 62 core technologies that it needs to achieve a low carbon future. UNDP, "*China and a Sustainable Future: Towards a Low Carbon Economy and Society*", China Human Development Report 2009/2010

[10] Han Wenke, "*The challenges and response to energy conservation and emissions reduction in China's 12th FYP*", Energy Research Institute, 12 November 2010

[11] Premier Wen Jiabao, "Report on the work of the government", *People's Daily*, 15 March 2011

[12] Indeed, in anticipation of high economic growth in the next five years, most provincial governments are unwilling to subscribe to a carbon intensity reduction target that is more ambitious than the national 40 percent-45 percent target, "Carbon targets missing in local government plans, carbon targets allocation difficult" (*gedi lianghui shaojian tanzhibiao, defang fenjie nandu jiada*), *21cbh*, 19 January 2011. .

time, China's economy is expected to grow by 40 percent to $8.5 trillion[13] (slightly more than half of EU GDP at current exchange rates). The 12th FYP is also meant to cover a critical shift in China's development model: the economy will move towards higher value-added sectors and create Chinese companies that are global players. In particular, the green and low carbon sectors have been identified as the core part of a new industrial strategy and an important pillar for growth. However, it is important to note that China's absolute CO_2 emissions will continue to rise over the 12th FYP period.

Compared to the 11th FYP, there are both quantitative and qualitative changes under the new FYP. A significant difference is the role of the market. While the 11th FYP was based mostly on top-down measures, the Chinese government has decided to create new markets and encourage market mechanisms including carbon pricing and emissions trading under its 12th FYP. This is a necessity rather than a choice: as China has exhausted its low hanging fruit (closing down plants) under the 11th FYP, it now has to rely on comprehensive economic restructuring and innovation to achieve its environmental ambition. The 12th FYP also extends China's environmental ambition from solving local pollution problems to increasing its share in the global clean technology and energy markets.

Major drivers behind the 12th FYP:

> At the top of the list is the need for China to **rebalance and restructure** its economy. China not only needs to stimulate its domestic market but also to steer its economy towards higher added-value sectors in order to benefit from all stages of the value chain. Other than its low cost labour, China also aims to compete globally with its highly educated pool of human resources. China's ageing population – with a workforce peak estimated for 2015-17 – has also added a sense of urgency to its need to climb up the value chain. China's future competitiveness lies not on low labour cost but on innovation and higher productivity.

> China must reconcile both its needs to develop and to protect its environment by promoting a **green or low carbon economy**. The government is attempting to leapfrog into 21st century production by systematically developing a low carbon industrial policy/strategy. China recognises the domestic threat of climate change to its future development and aims to be seen as an active and responsible Party to the UN Framework Convention on Climate Change; while avoiding what it sees as unfair restrictions on its development path.

> China also faces an urgent need to tackle **energy security**. Currently China already imports more than 50 percent of its oil and 20 percent of gas which makes the Chinese industry vulnerable to price shocks.[14] In addition, China has recently become a net coal

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[13] Premier Wen Jiabao, op. cit., 15 March 2011

[14] By comparison, the EU imports 85 percent of oil, over 60 percent of gas and 45 percent of coal. European Commission, "Staff working document: *State of Play in the EU Energy Policy*" (Luxembourg: Publications Office of the European Union, 2010)

importer – a huge concern for China because coal currently makes up over 70 percent of its primary energy consumption. China will focus on better use of domestic resources and on developing domestic technology over the next five years.

Green industrial strategy and low carbon pilots

Central to the 12th FYP is China's new 'green' industrial strategy, where the development of seven new strategic industries will be prioritised: alternative energy, biotechnology, new-generation information technology, high-end equipment manufacturing, advanced materials, alternative-fuel cars, and energy saving and environmental protection. The total value-added output of the new industries is expected to account for 8 percent of China's GDP in 2015 and 15 percent by 2020.[15] The central government will place substantial amounts of public investment in these sectors over the next five years, a measure which is expected to leverage hundreds of billions Euros of extra investments from both the private sector and local governments. To successfully implement its new industrial strategy, which would dramatically increase the capacity and competitiveness of Chinese businesses in the green sector, the Chinese government will issue strategic national guidelines on key industries:

> Under the draft '**New Energy Industry Development Plan 2011-2020**', the Chinese government plans to invest 5 trillion yuan (€570 billion) in the new energy sector over the next 10 years.[16]

> Under the draft '**Energy Saving and Environmental Protection Industry Development Plan**', China's environmental protection investment is expected to top 3 trillion yuan (€340 billion) by 2015, and the energy-saving and environmental protection sector to be worth 4.5 trillion yuan (€520 billion) by 2015.[17]

> The Chinese government plans to invest 100 billion yuan (€11.5 billion) in the alternative-energy vehicles industry during the next 10 years under the draft '**Energy-Saving and New Energy Vehicle Industry Development Plan 2011-2020**'.[18]

Another potentially transformative tool that the Chinese government will use is dedicated '**low carbon zones**'. China has recently established low carbon pilots in 8 cities and 5 provinces, covering over 300 million people.[19] These low carbon zones will not only provide China with large-scale low carbon demonstration sites across the country but also allow it to

[15] "China sets growth goal for new strategic industries", *Xinhua*, 19 October 2010
[16] Chen Wei, Shi Zhiliang, "New idea to energy adjustment: suppress coal energy and new energy" (*nengyuan tiaozheng xinzhuzhang: yi meitan yang xinnengyuan*), *Jingji cankao bao*, 7 January 2011
[17] Yu Ping, "Fiscal support for energy saving and environmental protection industry will further increase" (*jieneng huanbao chanye caishui zhichi lidu jiang jinyibu jiada*), *Zhongguo zhengquan bao*, 11 January 2011; Wang Yingchun, "12th FYP green construction and operating investment of 5 trillion yuan each" (*"shi er wu" huanbao jianshe yunying touzi ge 5000 yi yuan*), *Zhongguo zhengquan bao*, 16 December 2010
[18] "China may give electric cars, hybrid $15 billion jump start", *Bloomberg News*, 3 August 2010
[19] "China launches low carbon pilot in select cities, provinces", *People's Daily*, 19 August 2010. LCZ pilot studies at http://www.chathamhouse.org.uk/research/eedp/current_projects/china_lcz/.

develop tailor made solutions for China's diverse regions. As testing grounds for regulatory, economic, trade and investment policies promoting the necessary scale of economic transformation for a low carbon future, these zones will be central to China's efforts.

The 12th Five Year Plan in detail

The following provides some details on China's 12th FYP and sectoral ambitions. Although some targets have been finalised in the 12th FYP (see Table in Foreword), details of sectoral targets and market mechanisms (including carbon tax and emissions trading) are yet to be confirmed. For numbers or targets not included in the 12th FYP, information was obtained from various draft proposals taken from official and non-official announcement/publication. Where available, EU targets are also presented for comparison.

1. Decarbonisation

- China has a national target of reducing carbon intensity by 40 percent-45 percent by 2020. The 12th FYP contains a binding **carbon intensity target** of 17 percent compared to 2010 (3.5 percent in 2011), and 8-10 percent emissions reduction target of other pollutants such as sulphur dioxide, chemical oxygen demand and nitrogen oxides[20] Regional and, potentially, sectoral targets are being prepared. Increased carbon and energy intensity targets, which will save between 0.5-2.5 Gt of CO_2 emissions in 2020[21], provide a strong domestic market in low carbon industries. *[To put this in context, EU emissions reductions will be 0.5 Gt in 2020 under the 20 percent target or up to 1.1 Gt if that is increased to 30 percent.[22]]*
- Early last year, the government introduced a pilot resource tax in Xinjiang; this is expected to be adopted nationwide. Also on the table is a plan to introduce a **carbon tax** by 2012 which, according to the current state of discussion, might start from 10 yuan per tonne of CO_2 emitted to gradually rise to 40 yuan per tonne by 2020. (This compares to EU per tonne of CO_2 costs of an equivalent of 200-300 yuan).[23] The possibility of setting up a domestic **carbon market** or emissions trading platform during the 12th FYP is also under discussion.[24]

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[20] Premier Wen Jiabao, op. cit., 15 March 2011

[21] The wide range given is because these savings are highly dependent on estimates of Chinese business-as–usual emissions growth; estimates are based on ranges given in Hallding, K. and M. Olsson (2010), "*Balancing climate concerns and energy security: China searching for a new development pathway*", SEI, Stockholm.

[22] E3G calculations based on: 52 percent - CE Delft, "*Why the EU could and should adopt higher greenhouse gas reduction targets*", Delft, March 2010; 35 percent - European Commission, "Staff working document: *Analysis of Option to Move Beyond 20 percent Greenhouse Gas Emission Reductions and Assessing the Risk of Carbon Leakage*" (Brussels, 26 May 2010)

[23] "China may introduce carbon tax around 2012" *(zhongguo huo zai 2012 nian qianhou kaizheng tanshui*), *Jingji cankao bao*, 11 May 2010

[24] Zhang Yidong, "Three possible formulas for carbon trading pilot scheme under the 12th FYP" (*"shierwu" qijian tanjiaoyi shidian fangan de sanzhong keneng*), *Caijingwang*, 23 December 2010

- China will also focus on **decarbonising its power sector**: building of new thermal power plants will be capped at 260-270 GW. Coal production itself will be capped at 3.8 billion tonnes (currently at 3.2 billion tonnes). These measures will translate into a decrease in the percentage of coal in primary energy consumption from 70 percent to 63 percent.[25]

2. Energy efficiency

- **A mandatory energy intensity target** of 16 percent compared to 2010 (3.5 percent in 2011) will be introduced.[26] *[The EU has a non-binding 20 percent reduction target by 2020 in primary energy consumption compared to a business-as-usual baseline. However it is widely expected that this target will not be met.[27] Based on current policies, the EU is expected to improve its energy intensity by 15percent by 2015 compared to 2005 levels.[28]]*
- **Sectoral performance standards** will also be implemented: energy (per tonne of coal) standard for the cement industry; energy intensity and pollutants reduction of 10 percent compared to 2010 for the oil and chemical industries.[29]
- **A 30 percent reduction target** for fuel consumption and carbon emissions of new vehicles compared to business as usual.[30] *[The EU has a target for the fleet average for new passenger cars from 2012 to 2015 to be no higher than 130g CO_2/km; this is 11 percent lower than the 2009 average.[31]]*

3. Alternative energy

- Non-fossil fuel energy source is planned to account for **11.4 percent of primary energy consumption** by 2015.[32] The EU has a 20 percent target of gross final energy demand to come from renewable sources by 2020.

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[25] Zhu Jianhong, Baodan, "Zhang Guobao: Solar energy will become the pillar of new energy industry under 12th FYP" (*Zhang Guobao: "shi er wu" taiyangneng jiangcheng xinnengyuan zhizhu chanye*), *Renmin ribao*, 12 January 2011; "National plan of 3.8 billion tonnes of coal, a 24.6 percent increase, by end of 12th FYP" ("*shi er wu" mo woguo meitan guihua 38 yidun, zengzhang 24.6 percent*), *Zhongguo xinwen wang*, 22 December 2010; "China's reliance on coal to drop 7 pct by 2015", *Xinhua*, 20 July 2010

[26] Premier Wen Jiabao, op. cit., 15 March 2011

[27] European Commission, "*Energy 2020: A Strategy for Competitive, Sustainable and Secure Energy*" (Luxembourg: Publications Office of the European Union, 2010)

[28] E3G calculations based on: European Commission, "*EU Energy Trends to 2030*" (Luxembourg: Publications Office of the European Union, 2010)

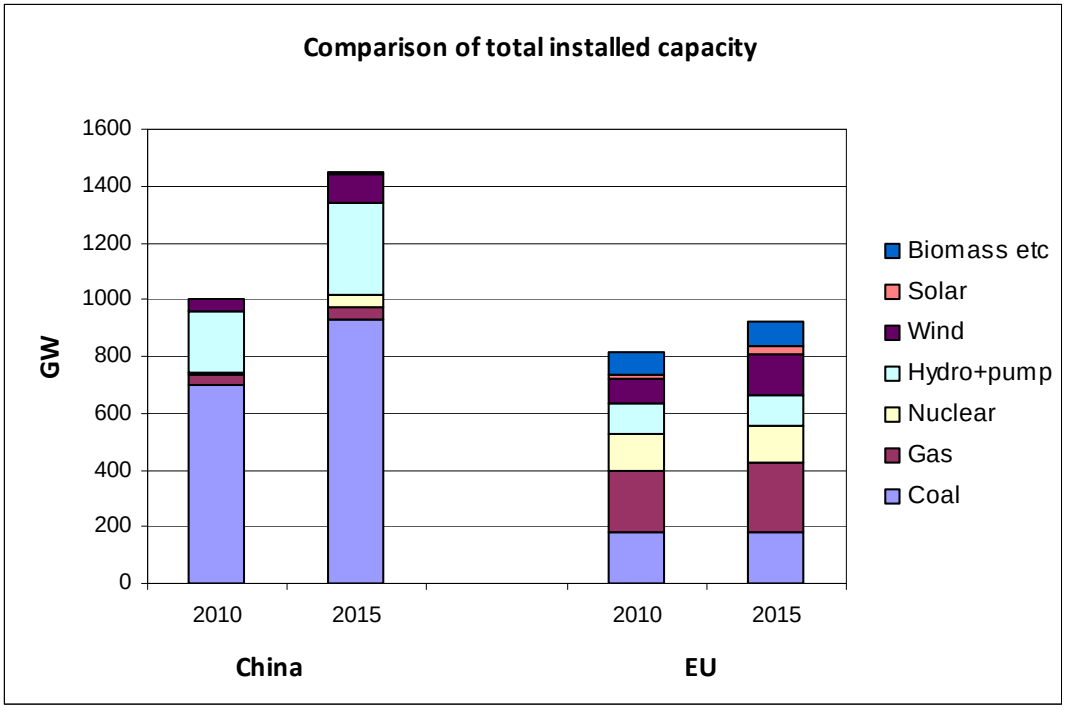
[29] Gu Xin, "Energy intensity of oil and chemical industries needs to be reduced by 10 percent under 12th FYP" (*shiyou he huagong hangye shierwu nenghao yaoqiu xiajiang 10 percent*), *Zhongguo zhengquan bao*, 22 October 2010

[30] Xiao Ming, "12th FYP car carbon intensity determined: 30 percent reduction" (*"shi er wu" qiche tanqiangdu liding: xiajiang 30 percent*), *21cbh*, 21 September 2010

[31] European Commission, "*Progress Report on Implementation of the Community's Integrated Approach to Reduce CO_2 Emissions from Light-Duty Vehicles*". (Luxembourg: Publications Office of the European Union, 2010)

[32] Premier Wen Jiabao, op. cit., 15 March 2011

- China's total power generation capacity is expected to increase **from 960 GW in 2010 to around 1,440 GW** (1,670 GW by 2020) in 2015, an annual increase of 8.5 percent: hydro 284 GW (currently 200 GW), pump storage 41 GW (currently 18 GW), coal 933 GW (currently 702 GW), nuclear 43 GW (currently 10 GW), natural gas 40 GW (currently less than 30 GW), wind power 100 GW (currently 41.8 GW), solar 2 GW (currently around 600 MW), biomass and others 3 GW.[33] *[By 2015, the EU's total power generation capacity is set to increase from 816 GW in 2010 to 920 GW: hydro and pump 111 GW (currently 107 GW), coal 182 GW (currently 183 GW), nuclear 127 GW (currently 127 GW), natural gas 243 GW (currently 216 GW), wind power 144 GW (currently 86 GW), solar 28 GW (currently 15 GW), biomass and others 85 GW (currently 81 GW).[34]]*



[33] Li Xinmin, "CEC released 'Electric Power Industry 12th FYP Study Report'" (*zhongdianlian fabu 'dianli gongye "shi er wu" guihua yanjiu baogao'*), *Jingji cankao bao*, 22 December 2010; Judy Hua, Tom Miles, "China power sector to boom as oil sector goes slow", *Reuters*, 6 January 2011; "Natural gas power generation: rapid development does not mean huge development" (*tianranqi fadian: jiakuai fazhan bu dengyu dafazhan*), *China Economic Herald*, 13 November 2010; "Total installed capacity of China's hydro power reached 200 million KW, the largest in the world" (*woguo shuidian zongzhuangji rongliang tupo 2 yi qianwa ju shijie diyi*), *Zhongguo jingjiwang*, 26 August 2010; "China's total installed power generation capacity reached 962 million kw" (*woguo fadian zhuangji zongrongliang dadao 9.62 yiqianwa*), *Diyi caijing ribao*, 18 January 2011; Xing Baiying, "China will add 63 million KW installed capacity of hydropower by 2015" (*2015 nianqian jiang xinzeng 6300 wanqianwa shuidian zhuangji*), *Zhongguo zhengquan bao*, 4 November 2010; "China's solar power generation capacity may reach 600 MW by 2010, a one-fold increase compared to last year" (*2010 niandi taiyangneng fadian zongzhuangji keda 60 wanqianwa, bishangnian zengzhang yibei)*, *Zhongguo jingjiwang*, 25 October 2010

[34] European Commission, "*EU Energy Trends to 2030*" (Luxembourg: Publications Office of the European Union, 2010)

- By 2015, total power generation capacity from **non-fossil fuel sources is expected to be 474 GW** (currently 260 GW, 27 percent of total capacity), which is 33 percent of the total capacity; and non-fossil fuel energy source will replace 500 million tonnes of coal.[35] *[Power generation capacity from non-fossil fuel in the EU is predicted to increase to roughly 450 GW (48 percent of total capacity) from the current 360 GW by 2015.[36]]*
- By 2015, use of non-fossil fuel sources will deliver an annual saving of 264 million tonnes of standard coal, **655 Mt of CO_2 emissions**, 5.65 Mt of SO2 emissions and 2.48 Mt of nitrogen oxides emissions in the power sector.[37]
- Under the 'New Energy Industry Development Plan 2011-2020', the government plans to **invest 2-3 trillion yuan (€230-€340 billion)** in renewable energy over the next 10 years: 1.5 trillion (€170 billion) for wind and 200-300 billion yuan (€23-€34 billion) for solar.[38] *[The investment needs for low carbon generation in the EU by 2020 is estimated to be between €310-€370 billion.[39]]*

4. Infrastructure

- Total **investment in the power sector** under the 12th FYP is expected to reach 5.3 trillion yuan (€610 billion), an increase of 68 percent compared to 11th FYP. 2.75 trillion yuan (€ 320 billion) (52 percent) will go to power investment, while 2.55 trillion yuan (€290 billion) (48 percent) will go to grids.[40]
- The government plans to invest more than **500 billion yuan (€57 billion) on 40,000 km of UHV transmission lines** by 2015, including the major 'three vertical and three horizontal' UHV AV grids and 11 UHV DC transmission projects.[41] *[The investment needs of electricity transmission in the EU are expected to be between €23-€28 billion for the period of 2010-2014. Grid development projects will encompass roughly 42,100 km of new or refurbished network routes, with 18,700 km being built over the next five years.[42]]*
- Expert assessments show that investment in "smart grids" in China will reach more than **4 trillion yuan (€460 billion)** in the next decade.[43] New smart grids development under 12th FYP include: strategic R&D sector, smart grid industrial coalition, new standards for smart grid technology and equipment production, and

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[35] Li Xinmin, op. cit., 22 December 2010; *Diyi caijing ribao*, op. cit., 18 January 2011
[36] European Commission, op. cit., 2010
[37] Li Xinmin, op. cit., 22 December 2010
[38] Chen Wei, Shi Zhiliang, op. cit., 1 January 2011
[39] European Commission, "*Renewable Energy: Progressing towards the 2020 target*" (Luxembourg: Publications Office of the European Union, 2010)
[40] Li Xinmin, op. cit., 22 December 2010
[41] "Energy investment and construction will speed up under 12th FYP" (*"shi er wu" dianli touzi jianshe datishu*), *Gangzhijia*, 7 January 2011
[42] "*ENTSO-E's Pilot Ten-Year Network Development Plan*" (European Network of Transmission System Operators for Electricity: 2010)
[43] "China kicking off large scale construction of smart grid: Total investment of more than 4 trillion yuan" (*zhongguo yi lakai daguimo jianshe zhineng dianwang xumu, zongtouzi 4 wanyiyuan*), *Zhongguo zhengquanwang zonghe baodao*, 30 December 2010

public investment. *[The EU has a target of having 80 percent of consumers to be covered by intelligent metering systems by 2020, which will require an investment of €40 billion. An additional investment of €40 billion in smart grid technology is needed to make EU networks "intelligent". Under the Strategic Energy Technology plan, the EU plans to spend €2 billion on smart grid technology RD&D over the next 10 years.*[44]*]*

5. Transport

- The 12th FYP makes **new energy vehicles** (one of the 7 new pillar industries) a top priority with China targeting annual sales of one million units by 2015.[45] *[Depending on the uptake rate of electric and hybrid cars in the EU, the number of alternative cars in the EU could range from 2 million to 20 million by 2020.*[46]*]*
- The use of new fuel technologies and greater fuel efficiency in the transport sector could reduce China's imports of crude oil by 676 million barrels a year by 2020.[47]
- An alliance of 16 of the largest state-owned companies is set up to accelerate development of electric vehicles in China, and is gearing up to invest 100 billion yuan (€11.3 billion) on electric vehicles by 2012.[48]
- China plans to invest **3-4 trillion yuan (€340-€460 billion) on its high-speed rail** network between 2011-2015, which is expected to reach more than 16,000 km by 2015.[49]

6. Innovation

- As part of the efforts to create an "experimental economy", policy makers intend to increase the current level of R&D spending economy wide from the current level of around 1.8 percent of GDP to **2.2 percent** by 2015[50] (its national medium- and long-term science and technology development programme issued in 2006 has a target of R&D reaching 2.5 percent of GDP by 2020). If growth averages 7 percent during the next 5 years as planned, this would mean that overall R&D spending could top 5

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[44] European Commission, "*The EU Electricity and Gas Markets, Third Legislative Package*" (Brussels, September 2007); European Commission, "Staff working document: *Investing in the Development of Low Carbon Technologies (SET-Plan)*" (Brussels, 7 October 2009); European Commission, "Staff working document: *Energy Infrastructure Priorities for 2020 and Beyond*" (Brussels, 17 November 2010) http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SEC:2010:1395:FIN:EN:PDF

[45] Liao Shumin, "Automobile industry 12th FYP draft plan ready: sale of new energy vehicles to reach a million per year" (*qicheye "shi er wu" guihua chugao yiding, xinnengyuan che yao nianxiao baiwan*), *Diyi caijing*, 25 October 2010

[46] Bettina Kampman et al., "*Green powers for electric cars: development of policy recommendations to harvest the potential of electric vehicles*" (Brussels: CE Delft, January 2010)

[47] "China may lead in electric vehicle race", *China Daily*, 20 January 2011

[48] Wang Zhihong, Li Fangfang, "Alliance drives promotion of electric cars", *China Daily*, 19 August 2010

[49] Ben Blanchard, "China to open Beijing-Shanghai high speed rail in June – Xinhua", *Reuters*, 4 January 2011

[50] Premier Wen Jiabao, op. cit., 15 March 2011

trillion yuan (€540 billion) by 2015.[51] *[The EU adopted a R&D spending target of 3 percent of GDP by 2020 in March 2010[52] but it is unclear whether Member States will meet this in their domestic budgets. At EU level the objectives of the EU's Strategic Energy Technology plan would need an investment of roughly €67-€80 billion by 2020 but as yet these are unfunded from any EU budget line.[53]]*

- As part of its innovation strategy, the Chinese government will accelerate outbound merger and acquisition (M&A) deals, especially by state-owned enterprises, to acquire foreign technologies.[54]

4. Implications for Europe: Opportunities and Challenges

China's low carbon ambition presents both opportunities and risks to Europe. On the one hand, being a global leader in clean technology and energy, Europe is well positioned to take advantage of the increasing demand for green technology on the Chinese market under the 12th FYP. A more energy efficient and decarbonising China will also reduce pressure on oil prices and the pace of global climate change.

China's expensive bet on a global low carbon future is a clear sign of success of Europe's leadership on the climate change agenda. On the other hand, however, China's focus on the new strategic industries poses a direct challenge to Europe, which they see as the largest market for low carbon exports. This new dynamic will help define the EU-China relationship moving forward.

Europe cannot stop or avoid China's rise, but it can prepare itself for the challenges. Unfortunately, the financial crisis has put a damper on EU's confidence: a move to a 30 percent emissions reduction target has become highly contentious. As the debate rumbles on, uncertain policy environment and lack of access to capital have now become the most important obstacles to private investment in clean energy and green technology sectors in the EU.

EU internal discussions seem to be moving away from the strong strategic focus established through the 2007-8 process around the climate and energy packages. There is increasing fragmentation between the growth, energy and climate agendas at both policy and political level. Meanwhile China is increasing its synergy in combating climate change and developing a green economy under its 12th FYP.

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[51] E3G's calculation based on annual average growth rate of R&D spending between 1.8 percent and 2.2 percent of GDP by 2015

[52] See: http://ec.europa.eu/europe2020/targets/eu-targets/index_en.htm

[53] European Council Conclusions, 25/26 March 2010 http://www.consilium.europa.eu/uedocs/cms_Data/docs/pressdata/en/ec/113591.pdf; EC Commission, op. cit., 7 October 2009

[54] "M&A deals rose by 30 percent last year: PwC", *China Daily*, 18 January 2011

Despite opposition from some member states, a higher European ambition on climate change is in fact not only economically desirable but also attainable. Ironically, the financial crisis has made it easier for Europe to achieve its original 20 percent emissions reduction target: Europe's emissions have slumped due to the economic downturn and the costs of achieving the target have halved. A 30 percent target will also help restore EU influence in international climate change regime. Domestically, a more ambitious emissions reduction target will stimulate new investment and innovation, which will help keep the EU to be at the forefront of the 'low carbon' race[55].

To maintain its economic leadership, EU needs to invest strategically in key infrastructure assets such as super and smart grids, and support its clean technology sector by building markets in key areas. In particular, as the future battleground for competitiveness shifts from production to innovation, the EU needs to maintain its competitive edge by investing in ambitious initiatives such as the Strategic Energy Technology plan. Europe should also take advantage of China's new industrial policy by working together with the latter to create an even bigger global market for clean technologies. This will require the EU to set up a strategic partnership with China within a robust and reciprocal framework, which emphasises low carbon cooperation. Areas for cooperation could include joint development of standards, development of an IPR protection framework, co-development of technology, investment and services access and government procurement.

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[55] ***E3G (2010), "*Building a Sustainable and Low-carbon European Recovery: How moving to a 30 percent climate target is in the European interest*", E3G Briefing Paper, June 2010***