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China's Low Carbon Finance and Investment Pathway

E3G Policy Paper

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Glossary

BAU	Business As Usual
CBRC	China Banking Regulatory Commission
CDM	Clean Development Mechanism
CER	Certification Emission Reduction
CIB	China Industrial Bank
CIRC	China Insurance Regulatory Commission
CSRC	China Securities Regulatory Commission
EIA	Environmental Impact Assessment
ETS	Emission Trading Scheme
FITs	Feed-In Tariffs
FYP	Five-Year Plan
GDP	Gross Domestic Product
GCG	Green Credit Guidelines
GIB	Green Investment Bank
ICBC	Industrial and Commerce Bank of China
IFC	International Finance Corporation
IPCC	Intergovernmental Panel on Climate Change
KPI	Key Performance Indicators
MER	Ministry of Environment Protection
MOF	Ministry of Finance
MOHURD	Ministry of Housing and Urban-Rural Development
MOST	Ministry of Science and Technology
NDRC	National Development and Reform Commission
PBOC	People's Bank of China
SME	Small and Medium-Sized Enterprises
SOE	State Owned Enterprises
WGII	Working Group II

Executive Summary

Following decades of rapid economic growth, China is in the process of restructuring its economy to make future growth more sustainable in social, economic and environmental ways. Broadly this is leading China to prioritise the following three priorities for:

- > Increasing scale and pace of investments to sustain economic growth;
- > Greater economic efficiency in allocation of public funding and a greater role for the private sector;
- > Investments in cleaner and low carbon technologies required to urgently tackle local pollution as well as a lower carbon development path.

Reconciling and balancing these three objectives presents a complex policy agenda for Chinese decision-makers, referred to here as China's investment trilemma. Tackling such a trilemma involves integrated thinking across a range of currently unrelated policy agendas and for building synergies between policies and financing of clean and low carbon infrastructure and services and the financial reform processes.

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Generally the move towards cleaner and low carbon infrastructure requires investors to move away from more traditional financing approaches towards new business models requiring significant upfront capital investment. As the private sector prices such risks into the cost of capital this could, if not managed effectively, run counter to the government's objective for greater economic efficiency of the economy. This underscores the importance for the government to reduce risks that lie within its remit to do so, notably policy and market-related risks, which can be reduced by measures to increase transparency and certainty of incentives and/or constraints on investors.

Achieving the level of investment at the pace and efficiency that is required to reduce pollution and decarbonise the Chinese economy will involve continued integration of cleaner and low carbon investment choices across the economy, including within cross-departmental policy making and investment decision-making processes. Similarly, policy incentives and regulatory incentives for creating a level playing field for cleaner and low carbon investments, may need to be combined with targeted use of public finance through public-private partnerships that share risk and attract capital at scale.

When specifically considering China's financial reform agenda alongside this investment trilemma, attention will also need to be paid towards avoiding a potential

financing gap for delivering on a low carbon investment pathway to 2030 and beyond. This paper identifies several areas that can help build synergies between differing policy agendas that will help tackle the identified investment trilemma, notably for:

1. Building understanding of how risks are framed within the financial reform agenda. This will focus attention on the policy and market related risks. This underscores the importance for ensuring appropriate policy and regulatory frameworks are in place to stimulate green and low carbon investment in key sectors, including the power sector. Creating greater transparency of financial regulation and aligning green and low carbon objectives with drivers for commercial investment decision making will also be important to reduce market related investment risks;
2. Using public finance strategically through low carbon finance institution champions such as the China Industrial Bank and the Shanghai Pudong Bank. The recent success of the CDM Fund could be expanded upon and further public finance or levies allocated towards this;
3. Testing innovative financing strategies in low carbon zone pilots – this could include creating local green or climate funds to use public finance for greatest catalytic impact. Building on the successful model of the CDM Fund, such funds could be sourced through revenues generated by auctioning of emissions trading permits. Continuing to allow privately owned small and medium sized banks can also be an important in driving innovative financing models at the local level, particularly for small and medium sized enterprises that can provide local business clean energy and energy efficiency services.
4. Building on the success of the green credit policy and guidelines that applies to all banks and their borrowers (including the SOEs) to extend these to other financial products (e.g. equity, bonds). Progress work for including green financial incentives within the Green Credit Guidelines (GCG) and increasing measures for monitoring and evaluation and for compliance to the guidelines is underway;
5. Strengthening coherency and integration between green finance with the emerging climate finance and carbon markets agendas. This should build on the achievements in defining green finance through the development of green finance criteria across 12 sectors as well as the public availability of relevant data and statistics;
6. Encouraging green domestic savings by providing incentives and confidence for individual savers to put money into credible ‘green saving’ schemes. The existing green credit guidelines could be extended to create transparency of what constitutes a green investment. A ‘Super Agency’ that coordinates China’s monetary and

financial supervisory policies and regulates new financial products would help to protect consumers as well as create a healthy market for green saving products;

7. Strengthening dialogue across policy agendas and with international experts and leading thinkers on low carbon finance and investment. The success of the evolving Sustainable Banking Network clearly demonstrates how valuable Chinese leadership on green finance is to other emerging economies. Such lessons would also benefit other economies, including Central Bankers and financial regulators of OECD countries.¹

Given the complexity and cross-cutting nature of these policy agendas and recommendations, it is proposed here to establish a new **Chinese Platform for dialogue on Low Carbon Finance and Investment**. The Platform could bring together Chinese governmental and non-governmental actors, including commercial financial institutions, investment banks and the insurance sector, along with international experts to focus on the above recommendations and identify if and how they could be taken forward.

The Platform would facilitate an on-going and semi-structured dialogue on existing and emerging priorities for delivering green and low carbon financing and investments. It would also allow for sharing of lessons and peer-to-peer learning, for example to help replicate the good practise being demonstrated by CBRC, MEF and PBoC on development and implementation of the GCG, and the leadership roles by Banks such as the China Industrial Bank, private investors such as the Hong Kong based China Light and Power Company, and the CDM Fund, in financing of low carbon investment.

The Platform would also help share learning and foster peer-to-peer engagement with leading international low carbon public policy and financing experts. Cross-fertilisation of ideas and experiences through the Platform would help identify ways for financing a smooth transition towards green and sustainable economies whilst increasing economic efficiency of the pathway to 2030 and beyond.

¹ The Sustainable Banking Network (SBN) is an informal and exclusive group of regulators, central banks and associations that are interested in sustainable banking policies, guidelines and practices. It was set up in 2012. "IFC Launches Sustainable Banking Network for Regulators to Share Green-Credit Expertise", International Finance Corporation (IFC). Available: http://www.ifc.org/wps/wcm/connect/industry_ext_content/ifc_external_corporate_site/industries/financial+markets/news/ifc+launches+sustainable+banking+network+for+regulators+to+share+green-credit+expertise

1. Introduction

1.1 China's investment needs and low carbon agenda

China is carrying out a major restructuring of its economy as it prepares itself for the transition to a high-income country built on higher quality growth. This includes a financial reform process for improving the efficiency of investments and the allocation of capital, notably through greater participation of the private sector. At the same time, environmental concerns, especially air pollution, are at the top of the government's agenda.

Research suggests that China faces a potentially huge investment gap in decarbonising its economy. According to the modelling of the Energy Research Institute (ERI), China's total financing need for decarbonising its energy industry and for energy efficiency (for industry, building and transportation) under a 2-degree scenario reaches 2.8251 trillion RMB (\$453 billion) per annum in 2030.² As the annual average climate finance from 2008-2012 in China was only 546 billion RMB (\$87.6 billion), the gap could potentially reach 2.3 trillion RMB (\$370 billion) by 2030.³

To achieve this scale of investment at the pace required to tackle pollution and decarbonise the Chinese economy by 2030, it is critical that China's government integrates cleaner and low carbon investment choices across the economy, rather than treating these in isolation. China has started to experiment with innovative measures within low carbon financing, particularly those related to China's Green Credit Policy and Guidelines (GCG) and the experience of China's CDM Fund. China is also rolling out a number of pilot emissions trading schemes. These are potentially important vehicles for 'greening' China's investment. However, they are unlikely to be sufficient on their own in light of existing and emerging challenges of financing China's low carbon transition alongside a financial reform process that is targeted towards greater economic efficiency. By incorporating cleaner and low carbon objectives into cross-departmental policy making and where feasible into processes that influence investment decisions, China will be able to create an effective ecosystem for cleaner and low carbon investment required for sustainable growth.

In addition to mainstreaming low carbon investment choices, the Chinese government needs to create an investment environment attractive to private investors, mainly by providing incentives or higher regulated rate of returns on infrastructure investment. The scale of investment required implies the need for deploying public sources of green or climate finance in a smart⁴ and targeted way to mobilise private sector investors. The

2 Jiang Kejun, China's Investment Pathway to 2030, Energy Research Institute (ERI), Annex A

3 Chen Bo et al., China's Climate Finance and Investment Gap, Central University of Finance and Economy (CUFE), Annex B

4 Amal-Lee Amin et al., Designing smart green incentive schemes: role of development finance institutions, E3G, March 2014. Available: http://www.e3g.org/docs/E3G_Designing_smart_green_finance_incentive_schemes_FINAL.pdf

on-going financial reform process presents an opportunity for aligning China's green and low carbon policy and financing initiatives with broader economic governance.

The main objective of this paper is to consider how China can finance its medium and long term low carbon investment pathway to 2030. China's low carbon policy objectives therefore need to be considered within the particular context of the financial agenda that is also underway within China. The study identifies some key issues that China will need to address in order to avoid potentially conflicting investment challenges and maximises synergies between differing policy agendas. The analysis raises concerns over treating the green and low carbon agendas separately to that for financial reform. Recommendations for meeting the investment trilemma are put forward for further discussion, with a new platform for facilitating dialogue proposed.

1.2 Background

E3G has been focusing on the challenges of financing low carbon transitions in the context of Europe and Latin American countries for the past few years, and last year set out to understand how these three challenges might play out in China. In 2013, E3G had several meetings and workshops with various stakeholders from Chinese financial institutions and government agencies. These discussions focused on identifying issues impacting on China's low carbon financing agenda. The main overall finding was the importance of joining up different discussions across the green and low carbon, including climate finance agendas with those underway within the context of the financial reform agenda.

To obtain more comprehensive background information, E3G commissioned three separate analysis to be undertaken by Chinese partners in the following three areas, which are included as Annexes A, B and C:

- a. **Annex A: China's Investment pathways to 2030** – prepared by Jiang Kejun, Energy Research Institute (ERI).

ERI's annex prepares different decarbonisation scenarios for China until 2050 through modelling. This provides investment profiles against which differing financing requirements (both amount of investment and type of investment) can be identified, net increase and decrease at sectoral level, and a shift of investment from high to low carbon – both from the supply and demand side.

- b. **Annex B: China's climate finance and investment gap** – prepared by Chen Bo and Wang Yao, Central University of Finance and Economics (CUFE).

CUFE's annex provides a mapping analysis of the sources of climate finance, including both public and non-public sources, in related sectors. Building on ERI's

analysis, it also looks at the investment gap in 2030 and challenges in getting the financing requirements.

c. Annex C: China’s financial reform and implications for low carbon investment – prepared by Wang Guoqian.

Wang Guoqian’s annex explains the current financial reform process in China and provides a useful overview of the key elements included in this reform process. It also outlines the opportunity of the new financial model in meeting the challenges for increasing private capital in supporting a cleaner and low carbon growth path.

1.2.1 Identifying future financing challenges

When considering future financing challenges and opportunities, it is valuable to understand historic investment patterns as well as the current low carbon financing landscape. Ideally we had hoped to identify detailed information on how the power supply and demand sectors have been financed in the past, i.e. a breakdown of volume and type of capital from different sources, including the level and type of investment from State-Owned-Enterprises (SOEs), private utilities, merchant investors, municipalities, national government and the State Grid. Such historical data is useful in considering the potential capacity of different capital providers for financing future investments, particularly those required for transitioning on to a low carbon pathway. It has, however, proven impossible to gather such information for China at this level of granularity due to the lack of publicly available data. Nevertheless, the study did manage to gather data on overall levels of investment in low carbon sectors (e.g. clean energy and energy efficiency) and provide a general breakdown of climate finance, especially between public and private finance.

The lack of detailed historical data limits the ability for accurately assessing the financial capacity of existing capital providers, making it more challenging to assess a potential financing gap and whether and/or how different capital providers may be in a position to close any such gap. The analysis and general assumptions of China’s low carbon financing pathway therefore needs to be considered within the context of available data and information.

For the purpose of this paper, the terms ‘green finance’ or ‘green investment’ refer to all investments in improving and protecting the environment in China, including water pollution, air pollution, greenhouse gas reduction, improving biodiversity and so on. The term ‘climate finance’ or ‘low carbon investment’ refers to financing specifically for climate change in China, including investment in decarbonising the power sector, energy efficiency, green buildings and alternative energy transport. Critically, it also includes investment in infrastructure that promotes or facilitates a lower carbon footprint across the economy such as electricity grids to connect and transport renewable energy, railways and metro lines.

Climate finance is also wider than and encompasses more than the carbon market in China, which has seen a shift from international market through the Clean Development Mechanism (CDM) to domestic emission trading schemes (ETS). Whilst Annex B and this paper focuses mainly on climate finance, it is very useful to refer to the green finance agenda which has progressed considerably through the work of the China's Banking Regulatory Commission (CBRC), the People's Bank of China (PBoC) and the Ministry of Environment (MEP) in developing and implementing Green Credit Policy and Guidelines, that now cover the top 21 Banks in China that account for around 80% of all lending. As of December 2013, over 9% of the portfolios of major 21 Chinese banks were invested in green industries, amounting to almost USD 1 trillion.⁵

The power sector faces the most urgent need for transformation as China tries to wean itself off coal, which is the biggest contributor to China's CO₂ emissions and air pollution problem. In addition, decarbonising the power sector can have a positive 'ripple' effect across other key sectors of the economy. A low carbon power sector can power electric cars and trains as well as electric heating, which will hugely reduce China's CO₂ emissions. This paper will therefore pay particular attention to investment in decarbonising China's power sector.

5 IFC briefing note: China Pioneers Sustainable Banking and Shares Experience with Other Emerging Markets, IFC.

2. Moving onto a low carbon growth path

2.1 China needs to decarbonise (faster)

Severe environmental problems caused by its uncontrolled growth have prompted the Chinese government to rethink their objectives and pathways for long-term growth. At the same time, public concern over pollution is at an all time high. In 2010 air pollution was estimated to have resulted in around 1.2 million premature deaths⁶, and some 8%-20% of China's arable land may now be contaminated with heavy metal.⁷ A recent disclosure made by the Land and Resources Ministry showed that nearly 60% of China's underground water is polluted; a previous study also showed that only 3% of urban underground water could be considered clean and 70% of groundwater in the north China plain was unfit for human touch.⁸ Like land grab issues, environmental concerns have resulted in civil unrest and mass protests that unsettles the Communist Party.⁹ Damage to the environment now tops the concern of the people, with 85% saying it is a major problem.¹⁰ Environmental problems also impose economic cost on China – a World Bank report estimated that the health effects of pollution in some Chinese cities cost the equivalent of 5% of GDP.¹¹

The impacts of climate change pose additional challenges to China's development path. The recent report by WGII of the IPCC shows that climate change impacts will be widespread and significant, with Asia being one of the worst hit regions. Climate risk poses concerns over food insecurity, sea level rise, the vulnerability of many Asian cities and the premature deaths from floods, floods and extreme heat. China increasingly recognises the threats posed by climate change to its future prosperity, and issued its first draft of a national adaptation plan at the end of 2013. It pointed out that climate change has cost China 200 billion RMB (\$32.9 billion) since 1990, and called for more support to be directed to farmers, highlighting rising levels of soil erosion, poor water management and a lack of access to drought-tolerant crops.¹² However, it also admitted that China is ill-prepared to deal with the consequences of climate change.

6 Jeff Blagdon, "China's Air Pollution Led To 1.2 Million Premature Deaths In 2010", The Verge, 3 April 2013.

Available: <http://www.theverge.com/2013/4/3/4177568/china-air-pollution-causes-1-2-million-premature-deaths>

7 Josh Chin and Brain Spegele, "China's Bad Earth", The Wall Street Journal, 27 July 2013. Available:

<http://online.wsj.com/article/SB10001424127887323829104578624010648228142.html>

8 Jonathan Kaiman, China Says More Than Half Of Its Groundwater Is Polluted, The Guardian, 23 April 2014.

Available: <http://www.theguardian.com/environment/2014/apr/23/china-half-groundwater-polluted>

9 The latest protest is taking place in Guangdong province where residents object to the construction of a chemical plant – the PX incident, Luna Lin, "Residents In Maoming Protest Against PX Production", Chinadialogue, 3 April 2014.

Available: <https://www.chinadialogue.net/blog/6878-Residents-in-Maoming-protest-against-PX-production/en>

10 The Power and The Potential Of The Chinese Dream, WPP, 2014. Available: http://www.wpp.com/~media/Reading-Room/BrandZ/chinese-dream_feb14.pdf

11 World Bank, A Global Urban Risk Index, 2013.

Available: <http://elibrary.worldbank.org/doi/pdf/10.1596/1813-9450-6506>

12 "Chinese Government Releases First Draft of National Adaptation Plan", Climate Policy Watcher, 9 December 2013.

Available: <http://www.climate-policy-watcher.org/?q=node/582>

It is hence not surprising that Premier Li Keqiang has recently vowed to combat environmental issues in the same spirit as China combats poverty. Tackling environmental problems is now one of the top priorities of the current government, recently calling for a 'War on Pollution'.¹³ This, however, will not be an easy task given the problems of: corruption, a weak legal system, insufficient resourcing to ensure enforcement of the environmental regulation in place¹⁴ and lack of accountability. Against the backdrop of a rapid pace of industrialisation and urbanisation, greater efforts and resources will need to be focused on enhancing China's environmental governance. Large-scale infrastructure building, energy demand, waste treatment and so on will be met by critical resource and environmental constraints moving forward.

2.2 China is carrying out economy-wide reforms

After decades of extensive growth, China is in the process of restructuring its economy to make growth more sustainable for economic, environmental and social reasons. Broadly speaking, this involves a shift from the export-led growth to domestic consumption-led growth and a move towards the tertiary industry. In essence, China now wants its growth to focus not only on quantity but also quality. The declining demographic dividends, domestic environmental problems, resource constraints and the more challenging international economic situation are the main factors prompting this change of direction. In addition, many economists believe that a debt crisis is looming in China¹⁵ – between 2009-2013, China increased its debt to \$15 trillion, much of which went to SOEs. Chinese listed firms have the largest short-term debt ratio in the world with 78% of debt in tenors of one year or under, compared to 28% for US firms.¹⁶ Given all this, concerns over continuing with this development model are mounting.

Although rapid growth is still expected, the 12th Five-Year Plan (FYP) aims for an annual GDP growth of 7% to 2015, much lower than the two-digit growth China has experienced over the past decade. In particular, urbanisation, together with continuous industrialisation and globalisation, will be the key driver for economic transformation, with an estimated investment of 42 trillion RMB (\$6.7 trillion) from

13 Chinese Premier Li Keqiang 'declared war' on pollution during the opening of the National People's Congress in March this year, "China to 'Declare War' on Pollution, Premier Says" Reuters, 4 May 2014. Available:

<http://www.reuters.com/article/2014/03/05/us-china-parliament-pollution-idUSBREA2405W20140305>

14 "Beijing's Smog Police Outgunned in China's War on Pollution", The Guardian, 14 May 2014. Available:

<http://www.theguardian.com/environment/2014/may/14/beijings-smog-police-chinas-war-pollution>

15 Harry Wilson, "The \$15 Trillion Shadow Over Chinese Banks", The Telegraph, 1 February 2014. Available:

<http://www.telegraph.co.uk/finance/newsbysector/banksandfinance/10611931/The-15-trillion-shadow-over-Chinese-banks.html>;

Olivia Goldhill, "China Needs To Solve Its Debt Crisis, Says Former Treasury Minister", The Telegraph, 12 March 2014 Available: <http://www.telegraph.co.uk/finance/china-business/10692583/China-needs-to-solve-its-debt-crisis-says-former-Treasury-minister.html>. However, other analysts think that China is not headed for a debt crisis, at least not imminently, Michael Arnold, "Is China At Risk Of A Debt Crisis? No Really, Bank Says", The Wall Street Journal, 19 February 2014. Available: <http://blogs.wsj.com/economics/2014/02/19/is-china-at-risk-of-a-debt-crisis-not-really-economists-say/>

16 Greening China's Financial Markets, International Institute for Sustainable Development (IISD), 2014. Available:

http://www.iisd.org/pdf/2014/growing_green_bonds_en.pdf

now to 2020. This economic transition is both difficult and challenging for the government – a slower growth needs to be ‘calibrated’ carefully to avoid major upheavals in its society that will undo the development secured so far. As a result, the target of an average annual GDP growth of 7.5% during the 11th FYP was overshoot as China grew at 11% on average every year during that period. Similarly, as GDP growth fell to 7.7% (\$9.4 trillion) in 2013, the Chinese government introduced a mini stimulus programme at the beginning of 2014 to ensure that growth will reach the targeted 7.5% this year. This indicates that the Chinese government is not yet ready to move to the growth rate of 7%, and is only likely to accept a lower growth rate if it is combined with an increase in the quality of that growth.

The hesitancy and indecisiveness of the government are warranted. The economic restructuring facing China is a herculean task that requires a multitude of differing reform processes, including fiscal, health and welfare, energy, political and so on. The essence of the reforms introduced by the government are for increasing the role of the market and moving up the value chain (i.e. innovation-driven as opposed to low-cost driven growth): increasing the role of the private sector (reducing the role of SOEs correspondingly) in key strategic sectors such as energy, banking, telecommunications, medical and so on; introducing more market-based instruments; and reducing administrative intervention while relying more on price signals.

Unlike a ‘pure’ privatisation drive, China is currently trying to increase the role of private sector actors and investors in key sectors by opening up the market whilst also retaining the role of SOEs. This will require deregulation to a certain extent and the creation of a fairer and more level playing field for private actors to compete. At the moment, SOEs are still in a dominant position and the government struggles to attract private investment in key sectors, such as the power sector, due to many reasons such as unfavourable market condition and rigid control over resource price. For example the NDRC has had to step in, to require grid companies to pay outstanding subsidies owed to wind power developers. The success of this has been variable with many provinces gaining surplus of funds while others becoming increasingly in deficit. In 2012 it was thought that developers were owed around 23 billion RMB (\$3.7bn) in outstanding subsidies according to Beijing-based consultancy Azure International. A key challenge for the Chinese government will be finding an effective balance between creating viable low carbon investment opportunities for the private sector alongside the on-going role of SOEs. Notably State Grid remains in a highly dominant position, although options for market restructuring are being considered in preparation for the 13th Five Year Plan.

17 Linda Yueh, “China’s New Mini-Stimulus Offers Signs of Worry and Progress”, BBC News, 3 April 2014. Available: <http://www.bbc.co.uk/news/business-26864453>

18 Charlie Zhu and Judy Hua, “China’s energy investment push only for the brave”, Reuters, 27 May 2012. Available: <http://www.reuters.com/article/2012/05/28/us-china-energy-idUSBRE84R01R20120528>

19 “China to pay US\$3.7 bn in Overdue Renewable Power Subsidies”, Cleanbiz.Asia, 6 December 2012. Available: <http://www.cleanbiz.asia/news/china-pay-us37-bln-overdue-renewable-power-subsidies#.U5db1JRdVFA>

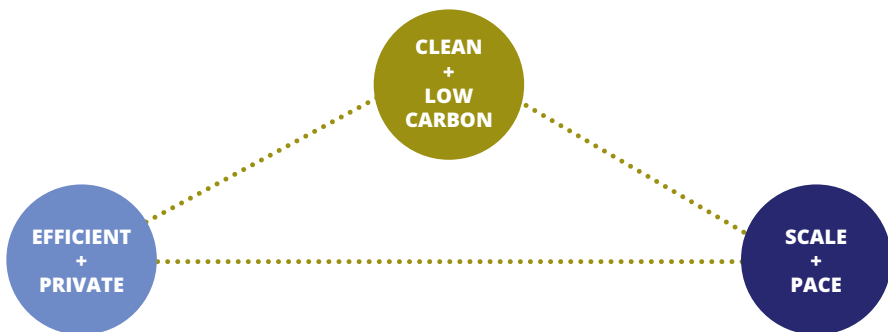
Whilst restructuring of SOEs, including the power sector, may not be on the top of the agenda in the foreseeable future, financial reform is a more immediate priority. As a critical part of China's economic transition, the financial sector can act as a catalyst for China's economic transformation whilst also being shaped by processes involved in such economic transformation. Notably, the Chinese government is reviewing how it allocates public finance to facilitate the various reforms²⁰ – it recognises the need to be smarter and more targeted with respect to focusing on achieving outcomes. This not only involves reducing easy access to money for SOEs and other government outfits, but also making sure that money is used efficiently and that there is greater accountability for how money is spent. One interesting aspect will be how the government balances any future fiscal stimulus packages alongside the focus on ensuring greater efficiency in the use of public money.

2.3 China's investment trilemma: scale, efficiency and cleaner

The need to transform its economy to make growth more sustainable underlies the investment challenges facing China moving forward. Figure 1 below shows the investment "trilemma" confronting China in the next two decades as it restructures its economy. The trilemma denotes the need for:

- > sustaining economic growth (at a rate acceptable to the Chinese government, i.e. 7% or above) through maintaining investments and encouraging greater domestic consumption;
- > increased efficiency in the allocation of public funding and increasing the role of private capital in driving investment; and
- > increasing scale and pace of investment in cleaner and low carbon investments.

Figure 1 China's Investment Trilemma



20 Zhang Monan, "Chinese Reform Goes Local", Project-Syndicate, 6 August 2013. Available: <http://www.project-syndicate.org/commentary/fiscal-and-financial-decentralization-to-revitalize-china-s-capital-stock-by-zhang-monan>

2.4 Maximising synergies and increasing efficiency of investments

Each of these elements poses specific challenges to the Chinese government, but if they are tackled at the same time in a way that overcomes potential conflicts and ensures synergies are achieved it could make solving the trilemma much easier. By providing an investor-friendly environment (including the necessary policy and regulatory framework) and mainstreaming low carbon/environmental concerns into decisions about capital investment, China will be able to achieve a more predictable flow of large scale investment at a pace that will help secure a more prosperous and sustainable future.

Modelling by ERI indicates that having a more carbon and energy efficient economy is cheaper than Business-As-Usual (BAU) for China in the long term.²¹ This is due to increased energy efficiency (and a corresponding reduction in energy demand). There will also be additional cost savings due to assumptions of falling costs of technology.²² China's economic transformation also provides a good opportunity to resolve environmental concerns, including for addressing climate change. Moving towards a low carbon economy is compatible with, and even conducive to, a shift towards a consumption- and service-based economy. By creating innovative and smart 'climate friendly' solutions to its energy system, transport, buildings, industries and so on, China will be able to solve some of its biggest environmental problems such as air and water pollution. It will also help to address other overriding concerns for China's future growth such as energy security and resource constraints. Studies have shown that it is possible for carbon emissions in China to peak as early as 2025 as China's industrialisation and urbanisation processes mature, and demand for energy intensive products decline as a consequence.

21 Jiang Kejun (2014), Op. cit.

22 For example, in Europe, solar cost fell by 50% between 2001 and 2011; on demand side LED fell by 98% during the same period. Rebecca Lawson et al, Shale Gas: Four myth and a truth, E3G, March 2014.

3. Current investment pathway and potential financing gap

3.1 Low carbon financing in China

Historically, China has been able to rapidly invest in huge infrastructure projects such as thousands of kilometres of high-speed rails and electricity grids.²³ This is particularly impressive compared to what is happening in Europe – for example, between 2008 and 2013, 10,000 kilometres of high-speed tracks have been put in service in China, more than in the whole of Europe.²⁴

China's low carbon investment has also intensified over the past few years. It now has the world's largest investment in clean energy and also energy efficiency. China managed to attract \$54.2 billion, \$65.1 billion and \$54.1 billion investment in the clean energy sector in 2013, 2012 and 2011 respectively.²⁵ It now has a total installed renewable capacity of 191 GW, the highest in the world (29% of G20 total). Considering that China was a relative latecomer in the global clean energy race, its ability to scale up and become a main player in the production of low carbon technology in less than a decade is evidence of the determination of the government towards the agenda. Large-scale investment in the Chinese clean energy sector began when the government introduced a 4 trillion RMB (\$586 billion) stimulus package in the aftermath of the financial crisis in 2008. Out of this, \$46 billion was set aside for the clean energy sector.²⁶ The government has recently announced the goal for investment of 1.7 trillion RMB (\$273 billion) for tackling air pollution, which can also be seen as some kind of stimulus package for scaling up within the environmental sectors. Similar packages may soon be introduced to treat water and soil pollution.²⁷

This money will be spent on a range of activities including energy efficiency, technology upgrades for clean energy and production processes, and environmental

23 Over the last few years 4,633 kilometres of ultra high-voltage (UHV) lines have been built and another 6,400 kilometres was now being built. By 2017, the State Grid aims to have nearly 20,000 kilometres of UHV lines built, with an estimated cost of 620 billion RMB (\$100 billion. David Stanway, Benjamin Kang Lim, "China Grid Says Half Of \$100 bn High-voltage Network Underway", Reuters, 21 August 2013.

Available: <http://uk.reuters.com/article/2013/08/21/china-power-grid-idUKL4NoGH1Y420130821>

24 "Faster Than A Speeding Bullet", The Economist, Nov 2013.

Available: <http://www.economist.com/news/china/21589447-chinas-new-rail-network-already-worlds-longest-will-soon-stretch-considerably-farther-faster>.

25 Report: 2013 Who's Winning The Clean Energy Race?, The Pew Charitable Trusts, 2013

Available: <http://www.pewenvironment.org/uploadedFiles/PEG/Publications/Report/clen-whos-winning-the-clean-energy-race-2013.pdf>

26 Ibid.

27 Luna Lin, "Is China Underfunding Its 'War On Pollution'?", Chinadialogue, 17 March 2014.

Available: <https://www.chinadialogue.net/article/show/single/en/6821-Is-China-underfunding-its-war-on-pollution->

rehabilitation. In addition, the environmental sector is also seen as one of the new strategic pillars for growth, which is to account for 15% of GDP by 2015.²⁸

3.1.1 The role of public finance

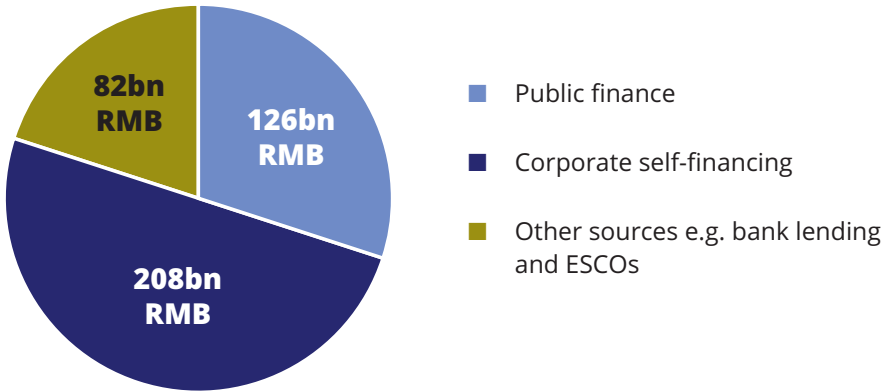
In China, public finance has played an indispensable role in promoting rapid and large-scale low carbon investment. In addition to direct public sector investment (i.e. through the stimulus package), the government has sought to attract, and sometimes “mandate”, investment through direct administrative and policy interventions. The government set targets for energy intensity reduction for its 11th FYP (2006-2010) and 12th FYP (2011-2015) – 20% and 16% respectively. It has also set a carbon intensity reduction target of 17% under the 12th FYP and increased the share of non-fossil fuel in primary energy consumption to 15% by 2020. These are ‘hard’ targets that the government expects to achieve through various means, including using its administrative influence in SOEs and state-owned banks, mainly to determine which mega-projects are undertaken or financed.

Energy efficiency represents a good example of the pervasive role of public finance in China. China has invested large sums of money into improving energy efficiency, especially in the industry sector through the “1000 Enterprises” scheme. In 2011, China invested nearly 416 billion RMB (\$66 billion) in energy efficiency, the largest investment in energy efficiency in the world.²⁹ These investments were achieved via two main instruments: using large amounts of public money to leverage private investment; and implementing an ambitious and mandatory energy efficiency obligation system. Public finance contributes to more than 30% (126 billion RMB) of the total investment while nearly 50% has come from corporate (which includes SOEs) self-financing. Other financing sources, including bank lending and ESCOs, contributed only 20%. Almost 93% of all corporate self-financing went to industrial energy efficiency.³⁰ However, the biggest potential for industrial energy efficiency is as yet untapped in China: small and medium-sized enterprises (SMEs), which consume 2.5 times the energy that big enterprises use, currently struggle to attract private capital. Lenders tend to prefer, or are directed, to lend their money to local government agencies via investment vehicles and larger companies, where transaction costs are lower and credit worthiness is easier to assess.

28 Du Juan, “New Green Policy Gives Industry A Big Boost”, China Daily, 13 August 2013. Available: <http://en.ccchina.gov.cn/Detail.aspx?newsId=41051&Tid=96>

29 Tsinghua University Climate Policy Institute, Annual Review Of Low-Carbon Development In China 2014, Tsinghua University, 2014. Available: <http://www.ccchina.gov.cn/Detail.aspx?newsId=43345&Tid=57>

30 Ibid.

Figure 2 Funding sources for energy efficiency in 2011

In contrast to energy efficiency, financing sources for the clean energy sector are more diversified. Whilst it has not been possible to identify specific levels of investment by source, public finance constituted around 5.1% of the total in 2011³¹, with investment coming from a range of financial sources, including bank loans, stocks and debt markets, venture capital/private equity and so on. The government provides incentives through feed-in tariffs, especially for wind and solar energy.

However, the picture is not as straightforward as it seems: most of the leading companies investing in solar and wind energy are SOEs, which have developed 90% of the country's wind farms and all of its solar power plants³², and state-owned banks, which, led by China Development Bank, provide the bulk of the finance. The speed and scale of investment in the clean energy sector over the last few years is a direct result of the government's administrative influence to ensure that policy targets are achieved. This has enabled China to build up a strong manufacturing base for clean energy, and also to develop clean energy projects domestically. Intensive investment in this sector has resulted in production overcapacity and a vicious boom and bust cycle for the wind and solar power industries.

In addition to public finance, China also benefited from the carbon market under the UNFCCC's CDM. China was the largest recipient of funding raised under the CDM, which accounted for 59.9% of all Certification Emission Reduction (CER) units issued.³³ By the end of 2012, China had 2,915 CDM projects registered by the United Nations, and the total of CERs issued for China hit 703 million tonnes.

³¹ Ibid. Available: http://www.china-esi.com/Industry/45118_2.html

³² The China Greentech Report 2011 - China's Emergence as a Global Greentech Market Leader. China Greentech Initiative, 2011. Available: www.china-greentech.com/report

³³ CDM Project Activities Data, UNFCCC (2014). Available: <http://cdm.unfccc.int/Statistics/Issuance/CERsIssuedByHostPartyPieChart.html>

Box 1: China Clean Development Mechanism (CDM) Fund

Established upon governmental approval in 2007, the China CDM Fund is a policy fund that aims to support investments required under China's climate change and sustainable development agenda.

The CDM Fund is governed by a board that includes representatives from the National Development and Reform Commission (NDRC), the Ministry of Finance (MOF), the Ministry of Agriculture (MOA), the Ministry of Science and Technology (MOST), the Ministry of Environmental Protection (MEP) and the China Meteorological Administration. The board is in charge of reviewing the CDM Fund's management rules, applications for grants and large-scale investments over a certain amount, and annual budgeting and accounting.

The CDM Fund provides loans, grants and direct investments to contribute to activities that tackle climate change, including by raising public awareness of climate change and for managing the impacts of climate change. The fund operates a specific account for the collection of the government's part of revenues from Chinese CDM projects, with cumulative revenue reaching 12.15 billion RMB (\$1.9 billion) at the end of 2012 in the account.

Participating in and benefiting from the CDM has helped to kick-start China's interest in investing in climate-related projects and created the foundation for China's emerging carbon market.

3.1.2 China's reforms and the role of public finance

As part of the economic reform agenda, China has realised that spending large volumes of public funding without due oversight is unsustainable given the huge forward investment needs. In addition, given the high local government debts³⁴ and the determination of the Chinese government to stop local governments from being overly dependent on raising revenue from land sales, it has become unrealistic for China to rely heavily on fiscal spending for infrastructure going forward.

China's financial reform agenda is focused on introducing greater economic efficiency based on commercial decision-making processes within the finance and investment sectors. This requires close attention to the risks with respect to the level of return that may be expected. By introducing greater transparency of policy and financial incen-

34 Leslie Shaffer, "China's Local Government Debt Burden Varies Widely: Moody's", CNBC, 25 March 2014. Available: <http://www.cnbc.com/id/101521833>

tives, public finance may be used in a targeted way to deliver high-value investments. China therefore needs to consider how to use a range of policy and financing instruments to ensure most effective use of public policy and finance to mobilise and scale up private investment in cleaner and low carbon infrastructure and services.³⁵

There is no rigorous system of project screening for investments because of a relatively weak notion of what investing in commercial terms really means. All of the major banks are still primarily state-owned, i.e. the state is the largest shareholder, and what the term 'commercial' means is subject to debate. Some use it to mean decisions that reflect the underlying creditworthiness of borrowers without government support. Others have a 'looser' understanding of the term as implying the need to maximise the bank's profitability, including taking into account implicit and explicit government support for borrowers.³⁶ Instead of an empirical process of pricing risk into the cost of capital and therefore having minimum financial return requirements on investments that reflect the risks taken, banks are in most cases instructed to direct money to priority sectors regardless of the financial viability of undertaking such investments. These practices need to shift if China is to resolve the investment trilemma, particularly to increase the role of private capital to promote change.

China's economic reform agenda will require significant shifts in other fiscal measures if it wishes to deliver high levels of low carbon investment. There are risks associated with shifting from the range of relatively familiar high carbon infrastructure and business models to newer, less familiar low carbon infrastructure and relatively untested business models in the national context. Such increased risk profiles has cost implications particularly for the private sector. With such higher risk is the expectation of higher returns, which in turn increases the cost of capital for low carbon investments. The reform agenda and aspiration for higher levels of private sector investment would have to take this trade-off into account. The government can reduce policy and market risk through various policy reform measures. Use of targeted public (green or climate) finance can be used to help mitigate the range of other financial, technology and other risks associated with low carbon investment.

3.1.3 Comparison with other countries

To address the imbalance between policy imperatives for increasing investment in unproven and riskier low carbon technologies, governments elsewhere have used incentives (such as feed-in tariffs) or higher regulated rates of returns on infrastructure investment to increase financial rewards and 'level the playing field.' But increasingly, governments are finding that there is a need to combine this with public financing instruments for sharing risk with the private sector in order to attract capital at scale.³⁷

35 Xiao Gang, "Infrastructure Financing Need", China Daily, 18 January 2013.

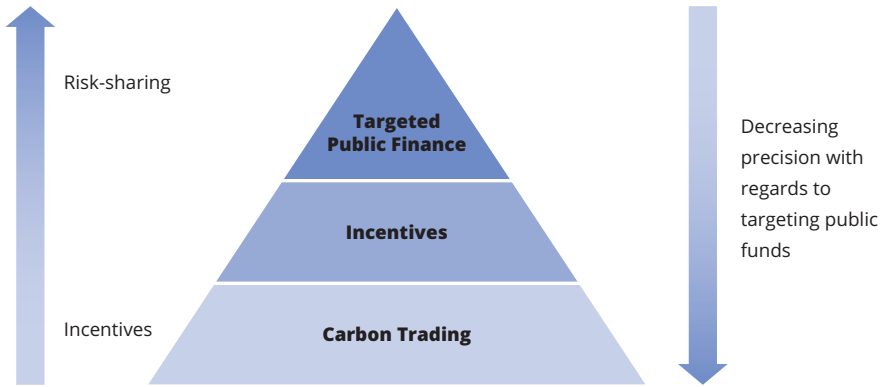
Available: http://usa.chinadaily.com.cn/opinion/2013-01/18/content_16136027.htm

36 Douglas J. Elliot and Kai Yan, *The Chinese Financial System: An Introduction and Overview*, Brookings, July 2013.

Available: http://www.iberglobal.com/Archivos/china_sf_brookings.pdf

37 Amal-Lee Amin (2014) Op. cit.

Figure 3 Combining mechanisms to mobilise low carbon investment



These ideas are encapsulated in Figure 3. In terms of incentives, carbon trading, which is technology-neutral, is a relatively blunt instrument using carbon price signals to incentivise least-cost carbon abatement. If auctioning is used, the cost can be passed on to polluters. Those that are most able to achieve cost-effective emissions reductions can trade permits to companies that are less able to achieve these. The price of carbon will influence the extent to which such trading will impact on players within the market. However, experience from Europe has shown that a relatively high price of carbon is required to stimulate uptake of new technologies.³⁸

Incentives such as production-based incentives (e.g. feed-in tariffs and quota systems) and investment-based incentives (e.g. tax exemptions and loan guarantees) are generally used by governments to provide technology-specific price signals to the market. They have been successfully used to scale up investment in renewables such as wind, solar and biomass on large and small scales.³⁹ The cost of providing these incentives is either covered by the state (from general taxation) or by electricity consumers (as an additional charge). In providing a more focused incentive they can be combined with the blunter carbon market approach.

Finally there is targeted public financing – such finance is carefully designed to overcome specific types of risks to investments. It is important to understand the policy and market context, as well as other risks, when deploying such finance. These are generally used in combination with other policy incentives to specifically lower the costs of financing first-of-a-kind investments and/or for overcoming financial

³⁸ Richard Cowart, Prices and Policies: Carbon Caps and Efficiency Programmes for Europe's Low-Carbon Future, Regulatory Assistance Project, 2011. Available: file:///C:/Users/shinwei.ng/Downloads/RAP_Cowart_ECEEE_CarbonCapsandEffPrograms_2011_04.pdf

³⁹ Who is winning the clean energy race: Growth, competition and opportunity in the world's largest economies, The Pew Charitable Trusts, 2010. Available: <http://e360.yale.edu/images/digest/pew-clean-energy-investment.pdf>

constraints, for example to facilitate refinancing of assets where the market may be unwilling to do so without such targeted support.

In shifting to a commercial mode of financing, the Chinese government and commercial banks need to understand the potential role of different policy measures and financial instruments that can be utilised. It is important to understand where different measures maybe most effective and how these can be combined for delivering a portfolio of investments in the most cost efficient way. Specifically, the government needs to know what the actual potential (and limitations) of carbon trading is as it rolls out a nationwide emission trading scheme next year. More importantly, it is necessary to have clarity of the role of incentives such as feed-in tariffs (FITs) in directing commercial capital flow to desired investment outcomes versus other policy, regulatory and financing incentives. This can help build understanding of how to target the use of public finance (whether green or climate) most effectively. Such (likely scarce) public finance can then be used to overcome specific risks and barriers that other policy incentives are less efficient at doing, for example technology risks associated with unproven first-of-a-kind investment, or for overcoming financial risks that may be related to immature domestic markets.

3.2 Lack of an effective ecosystem for financing the low carbon pathway

3.2.1 Transparency and predictability of climate finance

The Chinese ecosystem for climate finance is relatively undeveloped and has yet to evolve. This is common to most countries as a result of the lack of international agreement over the definition of climate finance and relatively low levels of transparency of flows of climate finance. For China several other factors also need to be considered. Firstly, there is an evolving governance system for public green finance, yet climate finance is treated separately to this. Green finance is under the remit of the Ministry of Environment Protection (MEP) while climate finance sits under the remit of the National Development and Reform Commission (NDRC). Furthermore, other departments such as the Ministry of Industry and Information Technology, the Ministry of Transport and the Ministry of Housing and Urban-Rural Development (MOHURD) also provide public finance for low carbon investment. The separation may reduce potential synergies between investment in environmental protection, such as technologies to address air pollution, and investment in solutions that can also reduce greenhouse gas emissions. At the same time lack of clarity over the relationship between 'green' and 'climate finance' may lead to inefficient use of these resources and may also create unnecessary confusion and so risks for potential investors and project developers.

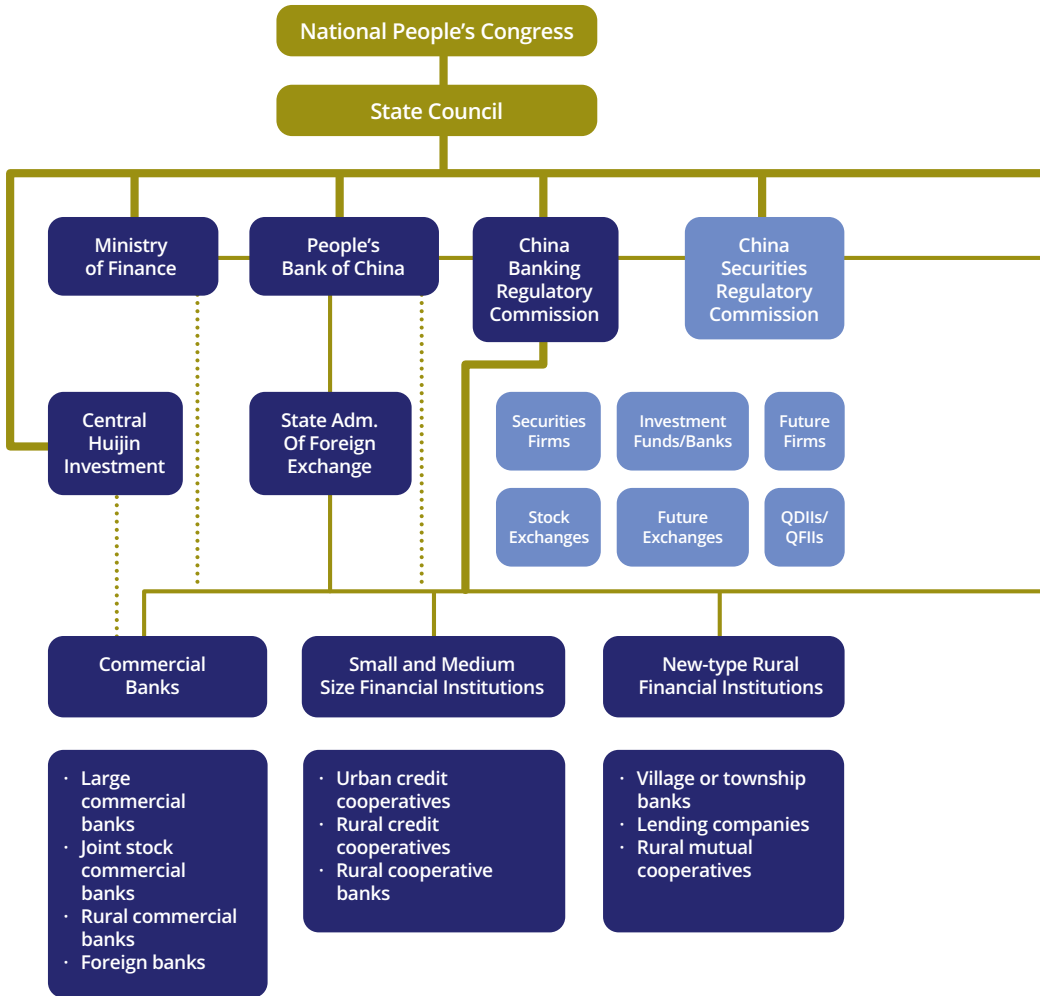
In addition, the governance structure within the financial system itself is also fragmented. China has a set of regulatory bodies that govern its financial system i.e.

China Banking Regulatory Commission (CBRC), China Securities Regulatory Commission (CSRC), China Insurance Regulatory Commission (CIRC) and the People's Bank of China (PBoC), China's central bank. In addition, the State Council sets the exchange rate and interest rate limits while the Ministry of Finance (MOF) also touches on financial regulations through direct and indirect share ownership in major commercial banks. In 2013, the State Council approved a proposal by the PBoC to create a 'Super Agency' to coordinate financial regulators.⁴⁰ The move is aimed at bolstering financial stability and strengthening the safeguards against risk. It is also aimed at regulating new financial products. The new Agency will report directly to the cabinet and its creation is not expected to affect the role of current supervisors as it would not be a policy maker. Whilst the aim of such a Super Agency is to enhance coordination between the different regulators, and to create greater transparency of the regulatory framework, it is currently uncertain how it will help reduce bureaucratic infighting and quicken reforms.⁴¹

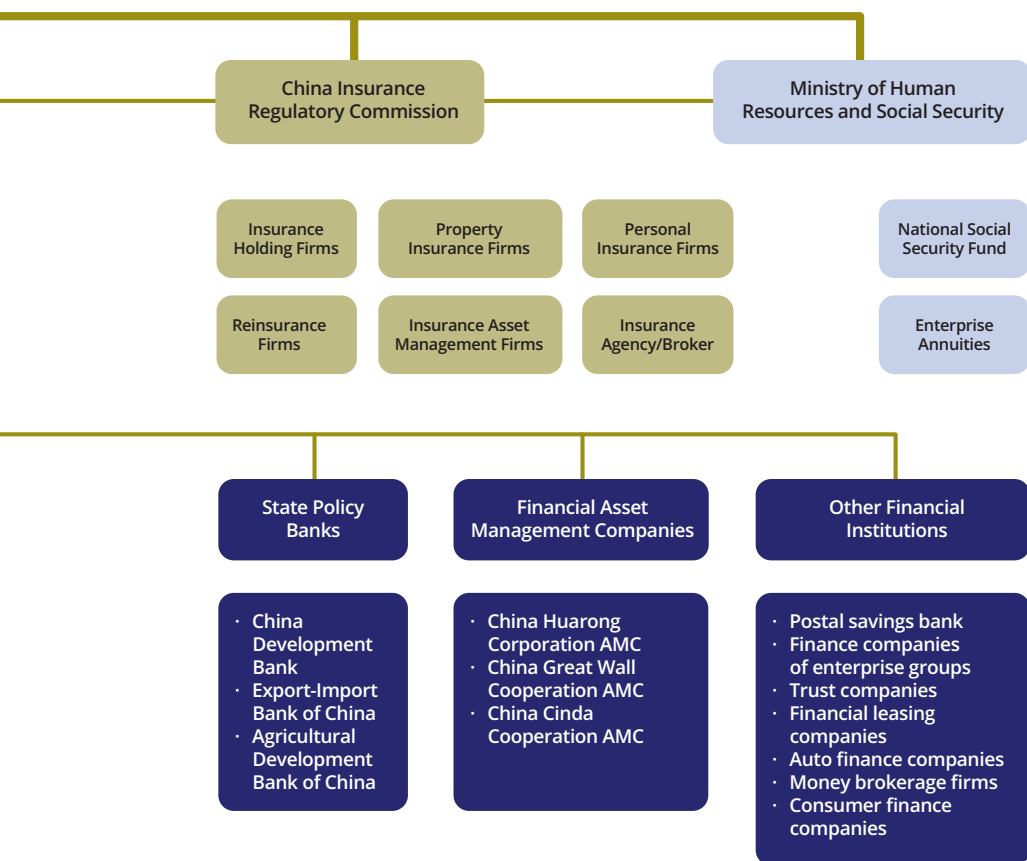
40 "China to create agency to align financial supervision", Reuters, 20 August 2013. Available: <http://www.reuters.com/article/2013/08/20/us-china-financial-regulator-idUSBRE97J02T20130820>

41 Ibid.

Figure 4 China’s financial sector regulatory framework



Notes: The thickest connecting lines correspond to the highest levels of authority in financial policy making. The NPC promulgates all financial sector laws and the State Council executes financial regulation and issues mandatory policy directives to all the financial regulatory and supervisory agencies. The dotted connecting lines indicate the three primary functions of PBC—formulating monetary policy, maintaining financial stability, and providing financial services—and the triple role of the MOF as tax administrator, treasurer, and owner of several commercial banks. The thinner connecting lines emerging from CBRC, CSRC, CIRC, and MHRSS reflect that these entities are mostly responsible for regulating and conducting super-



vision and oversight of their respective financial sectors Additional notes: The SAFE is responsible for foreign exchange operations of securities and insurance companies. The China Development Bank and the Postal Savings Bank are in the process of reforming into commercial banks. Central Huijin exercise rights and obligations as an investor in major state-owned financial enterprises on behalf of the State. The National Social Security Fun has also a dual role as an institutional investor and a stakeholder in some of the largest commercial banks.

Source: The IMF: “The People’s Republic of China: Financial Stability Assessment Report”, page 40

The Communist Party also has influence over financial decisions made within banks through appointment of key executives within state-owned banks and most other financial institutions. This complex regulatory framework and disjointed approach to governance has the effect of reducing transparency and certainty over regulatory measures. This will further exacerbate the already fragmented ecosystem for green and climate finance, including that flows via carbon markets. Addressing such fragmentation and increasing transparency is therefore a key issue for increasing the scale and pace of clean and low carbon investments within China.

3.2.2 Overreliance on public finance and excessive capacity in some sectors

Low carbon investment in China has largely been due to the directing of public finance into priority projects. Given the scale and speed with which public finance has been deployed, it is not surprising that it has led to inefficient use of such resources. Despite early success in incentivising industrial energy efficiency measures under the “1000 Enterprises” scheme, the subsequent “10,000 Enterprises” scheme has not gathered as much momentum under the 12th FYP. This is due to the fact most of the ‘low-hanging fruit’ has already been picked as well as that the targeted businesses are mostly medium-sized enterprises that have less capital to invest in energy efficiency measures and so require greater levels of support than their bigger counterparts. It has been found that the average leverage ratio of public finance (against social/market capital) in energy efficiency in 2011 was only 1:2.3, significantly lower than the 1:4.23 during the 11th FYP.⁴²

The rapid large-scale deployment of public finance has also led to overproduction in certain sectors. Over the past two years, especially when the export market started to face more challenging conditions, the problem of over-production of solar panels and wind turbines has become more and more serious, and threatens China’s nascent industry in the clean energy sector. Suntech Power, for example, which was once a major manufacturer of solar panels and China’s first solar panel manufacturer to go public in the US, recently defaulted on \$541 million of bonds and subsequently went into bankruptcy. As a result, large scale restructuring in the sector has started to take place, with many wind and solar companies going bust. To ameliorate the situation, the Chinese government increased its domestic target for solar and wind in a bid to salvage the sector through stimulating domestic investment.

In addition, the flux of public finance and government-directed investment – facilitated by easy access to bank loans by SOEs – have resulted in low quality projects that have lacked rigorous project screening and sufficient levels of due diligence. For example, many wind farms were approved and completed without being properly integrated into the grid system. Last year, it was estimated that as many as 20%-30%

42 Tsinghua University Climate Policy Institute (2014), Op. cit. Available: http://www.china-esi.com/Industry/45118_2.html

43 David Rovella, “Bankrupt Solar-Panel Maker Suntech Seeks Court Protection”, Bloomberg News, 22 February 2014. Available: <http://www.bloomberg.com/news/2014-02-22/bankrupt-solar-panel-maker-suntech-seeks-protection-in-u-s-1-.html>

of turbines across China were left idle at certain times.⁴⁴ Whilst this may be attributed to the challenges of enforcing grid companies to pay premiums required, it will be exacerbated by the lack of incentive to assess risks, including policy risk, when making investment decisions. Greater scrutiny of the financial viability, including the policy context, will characterise a more commercially driven investment process.

The Common Commitment of Chinese Banking on Green Credit represents a promising step towards managing credit for industries with “seriously excessive capacities.” A total of 29 financial institutions in the banking industry including Industrial and Commercial Bank of China (ICBC) and the China Industrial Bank signed up to this commitment to actively practice green credit and for improving self environmental and social performance.⁴⁵ Delivering the scale of investment required for decarbonising the Chinese economy in the most economically efficient manner will require similar commitments towards use of smart green incentives⁴⁶ and use of green or climate financial resources in way that is targeted to deliver greatest catalytic impact.

3.2.3 Limited scope of low carbon finance

Generally, low carbon financing in China, led by public finance, is fairly limited and selective. So far the bulk of low carbon financing has gone into the clean energy sector and industrial energy efficiency because of considerable public backing. Other areas such as green/low carbon buildings, building energy efficiency and low carbon transportation have received much lower levels of public and private investment. Despite ambitious targets (the recent urbanisation plan requires at least 50% of new buildings, compared to the current 2%, and all public buildings to be “green” by 2020), the government has not yet introduced a viable policy and investment environment for scaled up private investment. Similarly, the government has also targeted the ‘new energy cars’ sector but so far has not seen transformative investment in this sector by the private sector. Tackling the investment trilemma for these sectors will be necessary to support China’s urbanisation agenda as it intensifies in the coming 10-15 years.

Currently all government revenues go into the central coffer before being distributed according to the government’s priorities, which may change from year to year. This highlights the relative uncertainty of public finance available for allocation by the central government. Despite the strong rhetoric on the “war on pollution”, spending for energy conservation and environmental protection (which includes some climate finance such as energy efficiency) fell in 2013 (\$30 billion) compared to 2012 (£33 billion), and was \$4.9 billion less than had actually been budgeted for the sector. The amount budgeted for 2014 (\$34 billion) is similar. These figures fall far short of the

44 David Shukman, “China On World’s ‘Biggest Push’ For Wind Power”, BBC News, 1 January 2014. Available: <http://www.bbc.co.uk/news/science-environment-25623400>

45 “Signing the Common Commitment on Green Credit, 29 Banks Jointly Push Settling the Problem of Excessive Capacities”, Industrial Bank of China, 08 November 2013. Available: http://www.cib.com.cn/en/About_IB/whats_new/20131108.html

46 Amal-Lee Amin (2014) Op. cit.

annual spending of 2%-3% of GDP estimated as necessary by Chinese scholar Professor Shi Lei.⁴⁷ According to a report issued by the China Academy of Sciences, investment in environmental protection alone over the next ten years requires 10 trillion RMB.⁴⁸ With central and local government contributing only a fraction of this the rest will need to come from other sources, including green credit and non-bank sources such as private equity and/or corporate or project bonds⁴⁹.

3.2.4 Uncertain future for new and innovative financing mechanisms

China's CDM Fund represents an innovative financing mechanism for catalysing low carbon and resilient investment. Currently funded by the sale of CERs, which will end as a source of revenue in 2015, China's new domestic carbon market could provide similar sources of revenue for re-capitalising the CDM Fund.

As China rolls out its emissions trading schemes, revenues from auctioning of emission trading permits could be channelled directly into the existing CDM Fund, or set aside for other climate change related investments. This would provide greater certainty of income to be used through public financing instruments to mobilise private investors. Such an approach could also increase the motivation of the relevant central and, if funds were devolved, local government departments for ensuring the effective functioning of the carbon market.

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So far seven ETS pilots have been set up across China, including in Tianjin, Beijing, Shanghai and Shenzhen. By the end of 2013, trading at Shenzhen ETS was over 13 million RMB (53% of the total trading nationwide) and it also has the highest trading price among the ETS pilots i.e. 60-80 RMB (\$9.6 – 12.8) per tonne of carbon, which is on par with the price traded at the California carbon market. The Chinese government is aiming to set up a nationwide ETS by 2015, incorporating lessons and experiences of the different ETS pilots. China could have the world's largest and most vibrant carbon market given the size of its economy and the potential for decarbonisation.

If revenues from the carbon market are set aside for low carbon purposes, then, depending on the carbon price, China can potentially have access to a large amount of financial resources to invest in decarbonising its economy. So far, however, there is no indication that the government will do this (and currently no ETS pilots have done this). Also, China's carbon market is still faced with a lot of challenges, including the robustness of monitoring, reporting and verification; too many free allowances; lack of an effective registration system and so on. In addition, most trading has been done on a voluntary basis so it is difficult to assess the market's outlook. Industrial players still do not have very high confidence in the robustness of the ETS pilots and glitches are expected for the next few years. It therefore remains to be seen if the

47 Luna Lin (17 March 2014), Op. cit.

48 This is much lower than the estimated total low carbon financing need under the 2-degree scenario, which amounted to 2.75 trillion RMB in 2020, Jiang Kejun (2014), Op. cit.

49 China Sustainable Development Strategy Report 2013, China Academy of Sciences, 2013.

carbon market will play a major role in incentivising large-scale decarbonisation or provide the necessary financing in the short and medium term.

3.3 Evolving financial market

Despite its position as a middle-income country – and the current attention towards promoting competition and greater efficiency – China's financial market is still relatively under-developed. This is partly due to its structure and the role of the government in directing investments as well as the dominance of very large state-owned banks and enterprises.

Banks provided the private sector with credit amounting to 128% of GDP in 2012, compared to 48% in the US. Correspondingly, other financing sources such as bonds, securities, stock markets, insurance, trust funds and so on are far more limited than in Western economies, although they are starting to grow.⁵⁰ The lack of diversification of financing sources is one of the main reasons why the private sector, especially small and medium-sized enterprises, has limited access to finance compared to the SOEs. Also, the role of non-bank lending, including the role of capital markets and other sources of finance, is still relatively immature as a result of China's restrictive and relatively uncertain financial regulatory framework.

Such lack of transparency and certainty creates barriers to all forms of private investment. The government is therefore introducing financial reform to deal with some of these issues. There is an opportunity for this to be designed to positively reinforce the green and low carbon finance and investment agendas. Increasing transparency of criteria and rules for use of climate finance, similar to green finance, and for ensuring green and low carbon policy risks are minimised through “long, loud and legal investment frameworks” will help to crowd in significant new sources of private sector investment into the environmental and low carbon sectors.

3.4 Future investment needs and potential financing gap

Given the relatively new focus on climate finance and the immaturity of its financial sector, China faces multiple challenges in attracting the necessary investment for a low carbon transition. A report by the Climate Group estimated that China's annual climate finance gap will reach 3.4 trillion RMB (\$214 billion) – around 2% of China's projected GDP – in 2015 and will go up to 3.3-3.9 trillion RMB (\$208-\$243) billion per annum by 2020.⁵¹

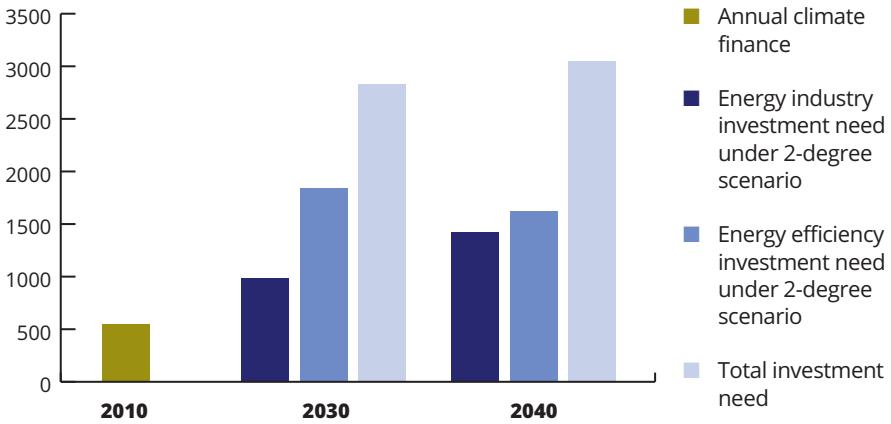
⁵⁰ Chen Bo et al (2014), Op. cit.

⁵¹ According to the report, China's annual climate finance needs estimated for 2015 and 2020 are \$333 billion and \$413 billion respectively. These include financing needs for mitigation, adaptation and R&D, which are different from the ERI modeling used in this paper, which focuses mainly on the financing needs for the energy industry and energy efficiency (for industry, building and transportation). Shaping China's Climate Finance Policy, The Climate Group, March 2013. Available: http://thecleanrevolution.org/_assets/files/Shaping-Chinas-Climate-Finance-Policy.pdf.

As set out in Annex A of this paper, ERI's model suggests that under the baseline scenario annual investment required within the energy industry and energy efficiency (for industry, building and transportation) will be 1.97 trillion RMB (\$305 billion) by 2030. Under a 2-degree scenario, this figure rises to 2.825 trillion RMB (\$449 billion), with the energy industry and energy efficiency (for industry, building and transportation) each requiring 984 billion RMB (\$157 billion) and 1.84 trillion RMB (\$294 billion) respectively.⁵² Annual investment needs will peak at 3.0431 trillion RMB (\$488 billion) in 2040.

Between 2008-2012, the annual average climate finance expenditure in China was 546 billion RMB (\$87.6 billion). Whilst this figure is not directly comparable with the estimated annual investment requirements, they provide useful indication of a potentially considerable annual financing gap by 2030, potentially as high as 2.3 trillion RMB (\$370 billion).

Figure 5 China's investment needs and potential gaps (in billion RMB)



Undoubtedly, China faces huge challenges for ensuring the scale of investment required is delivered at the pace that it required for a cleaner and low carbon transition. Investment and financial support for economy-wide energy efficiency will be crucial. There is significant untapped potential in realising energy efficiency from SMEs and China also needs to promote energy efficiency in the transport and buildings sectors. China needs to introduce more favourable policy and incentives to encourage investment in these two sectors, and these could be incorporated and made mandatory within urbanisation plans across China.

China also needs to scale up investment in the clean energy sector, especially renewables such as solar, wind, waves, geothermal and biomass. Although China has managed to attract an impressive amount of investment in the past few years, clean energy makes up

⁵² Jiang Kejun (2014), Op. cit.

less than 12% of its energy sources. Under the 2-degree scenario, the financing needs for wind and solar power in 2030 will reach 168.3 billion RMB (\$27 billion) and 198.8 billion RMB (\$32 billion) respectively⁵³, and the financing gap for these two technologies will be 107.5 billion RMB (\$17 billion) and 188.9 billion RMB (\$30 billion) respectively.⁵⁴

Transport infrastructure and power grids will also require large amounts of investment – the government already announced the investment of 500 billion RMB (\$80 billion) in ultra-high voltage (UHV) lines during the 12th FYP period and 4 trillion RMB (\$642 billion) in ‘smart grids’ by 2020.

Last but not least, investment in low carbon technology innovation and development also needs to be prioritized as China will need an array of new technologies to help achieve its long term goals and strengthen its green growth agenda.

Financing the low carbon transition will remain challenging if cost differentials mean that it is cheaper in the short term to maintain the status quo, especially at a time when the government is focused on increasing the economic efficiency of growth. Moving forward, the low carbon financing gap in China is likely to be exacerbated by the following factors:

- a. Higher project risk: Mainly due to the need to deploy newer and unproven technologies and untested business models
- b. Scale of investment needed: To meet high upfront capital costs (which also increase the financial risks for commercial investors), this will dwarf any other country due to the size of China’s economy and its heavy reliance on fossil fuels
- c. Policy risks: Despite the Chinese government’s commitment to developing renewable energy through a FITs and measures for promoting energy efficiency, enforcement of these is uncertain
- d. Market risks: Immature financial market for low carbon investors, lack of transparency and barriers to new entrants
- e. Debt crisis: This is a risk factor for stable economic development and may restrict the availability of credit to low carbon projects in the future

All of the above may amplify the challenges of addressing the investment trilemma. Attention therefore needs to be paid towards these if China is to successfully deliver the scale of investment required for a greener and lower carbon path of development, whilst also increasing the economic efficiency of its development path.

53 Ibid.

54 Chen Bo et al. (2014), Op. cit.

4. How has this agenda played out in the EU – lessons for China

Europe provides a good reference point for China in relation to creating the right environment for low carbon financing. Like China, Europe also has large-scale investment needs as many of its infrastructure and power plants are due for upgrades. Furthermore, in order to achieve the emission reduction targets of at least 40% by 2030 and 80% by 2050, Europe needs huge amount of investment in energy efficiency and low carbon and clean energy, its transport system and building stocks. For example, power sector investment needs to increase by 2.5 times from BAU levels over the next 10 – 20 years.⁵⁵ Investment in energy efficiency needs to increase significantly – with over EUR60 - 100 billion per year needed for buildings just to 2020⁵⁶ – and has a far weaker supply chain and financial infrastructure supporting it. So far, financing had been done by energy companies on balance sheets; but some of the offshore wind projects require capital investment bigger than the market capacity of the biggest utilities.⁵⁷ Also, project finance has become harder to get as banks no longer lend the volumes of debt they used to.

Similarly to China, Europe also has to deal with the high(er) risks associated with low carbon solutions and limited public finance. Decarbonisation of its energy sector, for example, is shifting investment from lower capex, better understood assets with higher running costs to investment with higher capex, less well-tested assets with lower running costs. The aggregate investment costs mask a non-trivial large-scale shift in investor preferences from well-understood high carbon industrial sectors, business models and technologies to less mature and more policy-dependent low carbon ones. This is needed at a time when the financial markets are dysfunctional because of the financial and economic crises. Even without the financial crisis, Europe would be facing a low carbon investment challenge given the huge investment needed to decarbonise its economy.

To meet these challenges, a few European governments and institutions have made the decisions to refocus public finance to climate. This is because – as in China – private sector finance will not flow to the right investments without direct public finance interventions and regulatory/market reforms to reduce risk. In the UK, the government has set up the Green Investment Bank (GIB) to address the market failure and enable investments in the green sector – its priority sectors are offshore wind,

55 Ingrid Holmes, et al, Financing the Decarbonisation of European Infrastructure: 30 percent and beyond, E3G, July 2012. Available: http://www.e3g.org/docs/E3G_Financing_the_Decarbonisation_of_European_Infrastructure.pdf

56 Energy Efficiency – the first fuel for EU Economy: How to drive new finance for energy efficiency investments, Part 1: Buildings (Interim Report), Energy Efficiency Financial Institutions Group, 2014. Available: http://www.unepfi.org/fileadmin/publications/investment/2014_fig_how_drive_finance_for_economy.pdf

57 Ingrid Holmes, EU's Low Carbon Finance Challenges, 2014

58 Ingrid Holmes (2012), Op. cit.

waste, domestic and non-domestic energy efficiency. It currently has £3.8 billion under management and its current leverage ratio is 1:3.⁵⁹ Similarly, the European Investment Bank is also focusing on leveraging private sector investment in low carbon/green sectors, through starting to screen energy projects for climate impacts – introducing an emissions performance standard of 550gCO₂/kWh in 2013 – and streamlining lending to energy efficiency and renewable energy projects.⁶⁰ In addition to meeting climate targets, public finance can also provide resilience to boom and bust investment cycles that will otherwise derail Europe's decarbonisation pathway, as private finance is withdrawn in times of shortage.

At the same time, Europe is undertaking financial reforms to address gaps exposed by the financial crisis and meet future challenges. This has inadvertently created unfavourable conditions for low carbon investment in Europe: capital requirements on banks have increased; Solvency II regulation risks reducing the ability of pension funds to invest in long dated illiquid assets; and public accounting rules for PPPs and guarantees are unclear.⁶¹ Furthermore, market liberalisation rules can also have perverse impacts on low carbon investment: European State Aid rules aiming to avoid market distortions resulting from public finance interventions limit the role of the UK GIB and other public banks in some areas (e.g. guarantees), including their ability to blend different sources of public finance (e.g. grants, loans and guarantees). As in China, Europe needs to make sure that its financial reforms are aligned with its climate objectives. Specifically, it needs to create a long-term regulatory framework to provide certainty for the commercial sector – effectively 'procuring' energy and energy efficiency from the market⁶²:

- > Addressing market capacity limits – through introducing a bigger role for public banks to encourage investment at scale and creating financial regulation that is conducive to low carbon infrastructure investment.
- > Designing investment grade policy frameworks – the need for targets and for policies that are transparent, of suitable duration, avoid retroactive adjustment and are easy to comprehend.
- > Driving regulated asset base investment – accelerating the process by which regulators provide clarity on what is required from regulated investment as well as early clarity on who pays for innovation.
- > Tackling the aggregation challenge – ensuring policy-makers focus on ensuring both small and large scale infrastructure investment is adequately incentivised.

59 Ingrid Holmes (2014), Op. cit.

60 European Investment Bank Turns Away from Coal Financing as a New Emissions Performance Standard is Agreed, Press Release, E3G, 24 July 2013. Available: http://www.e3g.org/docs/Press_briefing-24-7-2013.pdf

61 Ingrid Holmes (2014), Op. cit.

62 Ingrid Holmes et al (2012), Op. cit.

- > Scaling up support for development and deployment of innovation technologies – a renowned public investment effort to secure high quality European jobs and revenue flows for the future.

To make more informed decisions about the level of decarbonisation effort needed, some countries have set up multi-stakeholder platforms at the national level that allow consolidated and integrated discussions and decision making, incorporating the multi-dimension elements of climate change. For example, the French government set up the ‘Grenelle de l’environnement’ in 2007, which is an open cross-party debate in France that brings together representatives of national and local government and organizations (industry, labour, professional associations, non-governmental organizations) on an equal footing, with the goal of arriving at a unified position on a specific theme, and then drawing up a plan of action of concrete measures to tackle the environmental issue, which can include climate change. Through this process, the government managed to adopt targets and measures to promote energy efficiency and renewable energy. However, a plan to introduce a carbon tax has not yet materialised. A similar process also takes place in the UK through the electricity market reform debate and the new GIB, where dialogue around how to finance the investment needs of a ‘greener’ economy in the UK are playing out.

5. Financial reform and the impact on low carbon investment

5.1 The case for financial reform

As China focuses on economic restructuring, financial reform could play a central role in realising the economic efficiency measures envisioned by the government. In parallel to the further liberalisation of China's economy, China's financial reform also aims to further open up its financial sector to non-state players and international investors, to encourage use of market-based instruments and to require investment on commercial terms.

The ultimate purpose of financial reform is two-fold: to enable a more efficient allocation of resources domestically, and to further open up China's financial sector to the international market. In relation to the former, the main elements of the reforms are: increasing the role of the private sector in the financial system; increased access to money by private SMEs; and more efficient use of public money. For example, gradually removing the government's control on the base interest rate will enable the market to play a more important role in distribution of capital.

By increasing the return to savers and also opening up more sectors for private investment, reforms will increase the spending ability of individual savers (as they do not have to save as much money to get the same return). This can help direct capital flows into the most 'valuable' economic activities in terms of the long-term benefits and returns to the society, not the 'easiest'. This will curb excessive investment in the over-heated property sector and help the Chinese economy to be more consumption-oriented. It will also help to achieve the government's goals of establishing a market system that is conducive to a more sustainable economic model and de-linking growth with CO₂ emission by 2030.

However, financial reform within China will likely be fraught with tensions, which will create considerable challenges for the government that will need to carefully balance objectives, for example between:

- a) Excessive money supply in the overall economy versus inadequate financing for the agricultural sector, urbanisation and SMEs;
- b) The role of policy banks in the face of further commercialisation of the financial sector;
- c) Controlling the risk of 'high leverage' financial products while supporting innovative finance, and;

- d) Managing the social consequences of the upheaval in the financial sector as competition is strengthened.

5.2 The financial reform process

The new round of financial reform is a continuation and acceleration of the piecemeal measures that have been introduced over the last few years. These measures are aimed at reducing administrative intervention in the financial market e.g. further privatisation of state-owned financial institutions, liberalisation of interest rates, a shift from approval-to registration-based system for certain bond markets, the abolition of the floor of lending rates and so on. Local governments will also be able to raise money by selling municipal bonds⁶⁴, which could provide a more low cost and potentially more sustainable source of income than the current practice of selling land to raise capital.

5.2.1 Increasing market transparency and access

Equity investors are currently protected by investing via banks. A recent government initiative aims to loosen the financial requirements for SMEs for joining both debt and equity capital markets, in a bid to reduce businesses' overreliance on indirect financing (and to release banks' credit burden).⁶⁵ Financial reform will make equity investment more transparent and accountable, and increase the proportion of direct financing. In relation to the bond market, the reform will consolidate and make it viable for smaller companies to raise capital directly from the bond markets.

In addition, the reform aims to encourage the entry of private capital to the financial sector – either through the establishment of new private banks or increasing the share of private investors in existing commercial 'state-owned' banks. By the end of March 2013, 836 new 'township' banks have been approved for opening.⁶⁶ This is in line with the overall thrust of the economic reform agenda, which also seeks to open up to private investors previously tightly-controlled sectors such as telecommunications, healthcare and energy. The government aims to improve the effectiveness of resource allocation through increased competitiveness in these sectors.

5.2.2 Lack of synergies with the green and climate finance agendas

Despite the aim of facilitating China's transition to a more sustainable economic growth, there seems to be a lack of a coordinated approach between financial reform and China's green agenda, especially in relation to climate finance. Firstly, green and climate finance are dealt separately from the financial reforms, with the former led by the Ministry of Environment and the NDRC, while the latter is led by the various

64 Jamil Anderlini, "China opens debt window for local governments", Reuters, 21 May 2014.

Available: <http://www.ft.com/cms/s/0/79e0d5e6-e0b4-11e3-875f-00144feabdco.html#axzz32QznGWhi>

65 General Office of State Council (2013), China General Office of State Council Implementation Opinions – Implementation Opinions of State Council on Financial Support to SMEs.

Available: http://www.gov.cn/zwqk/2013-08/12/content_2465243.htm

66 Wang Guoqian, China's financial reform and implications for low carbon investment, Annex C

different regulatory commissions (CBRC, CSRC and CIRC) and the PBoC. There is little evidence that these efforts are coordinated to avoid inconsistencies and potential conflicts, and the implications of one on the other have not been laid out clearly. Climate finance in China has only just started to take shape and grow, and alongside green finance will need to be incorporated into the design and planning of China's overall financial ecosystem going forward. Failure to do so will undermine the ability to resolve China's investment trilemma.

Furthermore, the greening of public finance has not featured highly in China's financial reforms. So far, the reforms have focused on making public finance more transparent and dynamic – either as a source of finance or the way public finance is used. Big state-owned and also commercial banks are now required to follow the GCG introduced by the Chinese government in 2012. In 2014, initial data of green credit investment of top 21 banks was made available. By the end of 2013, total 'green' loans by these banks reached 5.6 trillion RMB (\$0.9 trillion), or over 9% of the overall loan amount.⁶⁷ For every 10,000 RMB of green loan, 2.08 tonnes of CO₂ and 2.9 tonnes of water have been saved.⁶⁸

Among the leading banks in providing 'green' loans are China Industrial Bank (CIB), Shanghai Pudong Development Bank (SPDB), Industrial and Commercial Bank of China (ICBC) and China Merchants Bank, which also rank highly in the overall environmental assessment.⁶⁹ The CIB is the only Chinese bank that has adopted the Equator Principles, and provided nearly 400 billion RMB green loans (including environmental protection, renewable energy, etc) in 2009 alone.⁷⁰ Shanghai Pudong Development Bank ranked highest in 2009 in providing green loans, which constituted 1.89% of its overall loans. It also has an established track record in working with the International Finance Corporation (IFC) and the French Development Agency (AFD) in pioneering innovative financial products for green projects.

Generally, the success of the development of China's green credit policy and guidelines has been very positive. However in the full implementation of these there is still much room for improvement.⁷¹ This is particularly the case at the local government level, where vast amount of public debts have been raised to spend on building high carbon

67 China Pioneers Sustainable Banking and Shares Experience with Other Emerging Markets, IFC

68 Ye Yanfei and Li Xiaowen, "Constructing China's Green Credit Policy System", Sina Finance, 18 March 2014. Available: http://finance.sina.com.cn/money/bank/bank_hydt/20140318/150718540942.shtml (in Chinese)

69 Environmental Report on Chinese Banks (2010) and (2011).

Available: http://www.banktrack.org/manage/ems_files/download/_2011/_2011_.pdf

70 Ibid. (2010)

71 A report published by the MEP's Policy Research Centre in 2012 ranked China's 50 biggest banks by market capitalisation on green lending criteria. The body's deputy director, Yuan Qingdan, said only 12% of the banks examined were fully implementing a green credit policy. Implementation was not ideal at over half of the banks while 18% had no information available on their policy. Xu Nan, "Chinese banks under "almost negligible" pressure to protect the environment", Chinadialogue, 21 March 2013. Available: <https://www.chinadialogue.net/article/show/single/en/5812-Chinese-banks-under-almost-negligible-pressure-to-protect-the-environment>

Box 2: China's Green Credit Policy and the Green Credit Guidelines

As a core theme of China's national strategy the Green Economy drives the development of sustainable banking practices.

In 2007 the CBRC, the Ministry of Environmental Protection (MEP) and the PBoC jointly launched the Green Credit Policy. Later in 2012 CBRC introduced the Green Credit Guidelines (GCG) with technical support from IFC, which defined this along three pillars:

1. Business Opportunities – increased support for the green, low-carbon and recycling economies
2. Risk Management – mitigate and reduce environmental and social risks
3. Footprint Management – manage banks' own environmental and social footprint

In developing the GCG, rather than command and control, China's regulatory agencies engaged banks, businesses and other stakeholders to design effective transition strategies. The approach has been supported through collaboration and information sharing among government agencies such as the banking and environmental regulators, and has underpinned capacity-building efforts and the development of integrated monitoring systems. The result of this is that many Banks have been convinced of the business case. They are innovating in risk management as well as new lending strategies that leverage the business opportunities of sustainability.

In early 2014, the CBRC launched the Green Credit Statistics system, which includes specific definition of green credit categorized in 12 sectors/industries. The CBRC will soon also launch a mix of qualitative and quantitative key performance indicators (KPIs) as a guidance tool for self-assessment by banks.

The MEP monitors emission data and assesses compliance of local enterprises to regulate banks under the GCG (as they are the banks' potential clients). The policy is not legally binding; however, non-compliance activities may lead the banks to appear on the 'black list' and face punitive measures from PBoC and CBRC through credit and banking licenses control.

The GCG is believed to be successfully promoting green banking within China. However, the degree to the punitive measures are enforced may vary between provinces, depending on the effectiveness of collaboration between the local CBRC and MEP branches.

infrastructure. Moving forward, as local government spending continues to increase due to rapid urbanisation and industrialisation, there is a need to ensure that in addition to carrying out environmental impact assessment (EIA) for individual projects, the green guidelines are monitored and evaluated for all use of public finance and that compliance and enforcement measures are effectively applied.

5.3 Impact of financial reform on a cleaner and low carbon finance and investment pathway

The wide-range of issues covered by financial reform will no doubt have huge implications for China's future growth and economic structure. An important determinant of the impacts will be the pace and sequencing of the overall economic reform, including financial and SOE reform. So far the government has yet to introduce a timeline of when these different elements of the reform will be achieved. It is unclear whether the government aims to complete the reform quickly – over the next few years – or if it will proceed more cautiously. However, given the determination of Xi's new government to push through this agenda and the urgent investment requirements, it is reasonable to assume that the various reforms will be undertaken at a relatively fast pace, i.e. over the next two to five years.

China's financial reform will have both expected and unintended impacts across its economy. First and foremost in the context of this paper, financial reform could create new opportunities for investments within the climate and environment agendas.⁷² Its focus on the role of markets and the private sector can potentially enable the quicker and easier deployment of private investment. As private capital and interest rates are liberalised, banks will become more attracted to providing finance to commercial entities, including SMEs.⁷³ Experience around the world shows that SMEs are the key drivers for innovation and are critical to developing and providing smart climate solutions. In addition, more diversified financing sources like green bonds and equity financing may also have a positive impact on delivering new sources of green or climate finance. Banks, which are good at assessing and managing risks, can kick-start and finance the construction phase. Once the initial construction and technical risks are overcome, debt can then be recycled into the capital markets.

Despite the overall positive impacts on the economy, financial reform is going to have unintended consequences on China's low carbon financing and investment. The impact of financial reform on the capital demand by the private sector is far from certain, i.e. whether 'commercial' State Grids and private companies will invest in low carbon despite the more private sector-friendly environment. Shifting to a commercial mode of financing alone will not guarantee investment within the low

⁷² Wang Guoqian (2014), Op. cit.

⁷³ Ibid.

carbon transition. The higher risks of most low carbon investments will deter private sector investors unless measures are in place to incentivise and/or risk-manage such investments.

Delivering the finance required for the 2030 low carbon pathway implies the need for ensuring financial reform measures are accompanied by actions to create a supportive low carbon policy and regulatory framework. This would involve putting in place the appropriate mix of fiscal, policy and public finance incentives and instruments to attract private investors in the most affordable way, as Figure 3 on page 23 shows.

Furthermore, even if there is positive impact on the capital demand side, there is no guarantee that access to capital (supply side) by companies, especially SMEs, will improve greatly, especially in the green and environmental sectors. Financial institutions are risk averse and are not keen to invest in innovative solutions and products that they do not understand or that do not comply with existing standards. Public finance can step in to either provide funding for first of its kind technology, or reduce the risk for private investors through co-financing or guarantee.

Reducing the role of the state (and public finance) too rapidly is likely to have a negative impact on low carbon investment as the private sector is not yet fully ready to step in and 'fill the gap'. The European experience shows that the scale and pace of the low carbon transition leaves the private sector unable to rise to the challenge of providing sufficient finance without meaningful public sector support in the early stages of new business models and technology innovation. Such public support will take the form of carbon markets and other regulatory mechanisms, public policy and the targeted use of public financial instruments to share risks with the private sector public-private partnerships. All may have a strong role to play in facilitating and accelerating the shift of finance from high to low carbon sectors and will need to be carefully combined to ensure the most appropriate and efficient use of public sector resources.

6. Creating a ‘low carbon friendly’ investment and financing environment – closing the investment gap

The success of China’s financial reform needs to be considered in light of its ability to steer the economy towards sustainable growth, including successfully financing a low carbon investment pathway to 2030. European experience shows that to rebalance investment from high to low carbon, the Chinese government needs to address the cost differential ideally through combination of policy reform and incentives, strategic and targeted use of public finance and/or regulations. In addition to a favourable and robust policy and regulatory framework, China needs a financial market that supports and is conducive to low carbon investment. As financial reform unfolds, the government needs to understand the implications of moving towards a more commercial mode of financing on low carbon investment, and what role public finance plays in closing the investment gap.

The following seven areas and recommendations are identified as valuable issues to explore as China progresses its agenda for increasing the overall efficiency of the economy, whilst tackling pollution and delivering a lower carbon path of development:

1) Clear understanding of risk-framing post-financial reform

A major element of the financing and investment challenge is managing risk. Both the Chinese government and the commercial sector need to have a clear understanding of how the financial reform process will impact on investment risks, including policy and market risks. The government needs to ensure that as it moves to commercial based decisions, the underlying policy framework is aligned towards incentivising low carbon investments and an appropriate combination of measures are used to achieve this. Moving forward, there needs to be changes in the structure and regulation of the energy and related sectors.

Simultaneously the structure of the financial sector will also be a key element of how risks are best priced and managed. Creating greater transparency and certainty over financial regulation, that will help to open up the sector for new sources of finance from the private sector, will help to reduce the cost of capital. This will increase the role of non-lending financial products, all of which can help deliver the scale of finance that is required.

In addition, the government should also ensure a robust and independent judicial system is in place to increase the confidence of private investors. Reforms such as

moving budgetary control of local courts from local governments to provincial governments should be implemented in parallel with the push for new public-private cooperation models in China.⁷⁴

In this context, the government will need to consider how it uses relatively more scarce public resources most strategically for incentivising cleaner and low carbon investments that may not be commercially viable in the short term, but are within the Chinese public interest and required for meeting medium and long-term objectives for sustainable development.

2) Optimising the role of public finance through financial institution champions

China's CDM Fund has developed a track record in using concessional resources for mobilising other investors into low carbon projects. As revenues from the CDM wind down, the future of the CDM Fund is uncertain. However, it presents a valuable model to build on and its role could be expanded and enhanced to play a more critical role in leveraging private investment by using public finance. One source of new revenues could come from the auctioning of Chinese emissions trading permits that could be channelled exclusively to the Fund to support investment in low carbon activities and projects.

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Like the UK's GIB, the CDM Fund can therefore become a key player in driving low carbon investment through the provision of 'blended' finance, co-investment alongside commercial lenders and as a policy adviser to the government. This policy advice will be valuable in thinking through how different reform options may facilitate scaled up and long-term low carbon investment.

In addition, there would be value in establishing Green Finance Units within the policy banks that would focus on mainstreaming green/climate finance across the operations of all Chinese banks. This would ideally mean that they have dedicated grant for providing technical assistance to help increase green project preparation and pipelines, as well as green credit and other financial instruments. The China Development Bank, one of three policy banks left, can strengthen in-house expertise on low carbon finance and spearhead large-scale low carbon investment through its role as a wholesale finance provider. Other banks such as the China Industrial Bank (CIB), the Shanghai Pudong Development Bank and the Industrial and Commerce Bank of China (ICBC) can continue in their leadership roles by sharing their emerging best practices that helps mobilise other banks.

However, these Banks, that are championing green credit, would benefit from being able to deploy and demonstrate the effectiveness of a wider range of financial instruments such as equity, guarantees and insurance. The use of these instruments is will be required for targeting specific risks and barriers, and so will allow more

74 John Wager Givens, *Fleshing out the Third Plenum: The Direction of China's Legal Reform*, China Brief, Vol 14, Issue 6, 21 March 2014. Available: http://www.jamestown.org/uploads/media/China_Brief_Vol_14_Issue_6_-_Copy__3_.pdf

effective use of public green or climate finance resources for catalysing scaled up private investment.

3) Testing innovative financing strategies in low carbon zone pilots

Low carbon pilot cities and provinces in China can provide the testing ground for innovative financing strategies. Local governments in these pilots can be natural alliances to the CDM Fund and other financial institution champions in testing innovative financing instruments, include more vigorous screening procedures to ensure that only high quality projects are approved. For example, local governments could set up provincial or municipal green banks/funds using revenues from ETS. These new green funds could invest alongside the CDM Fund and other commercial investors to manage and share risks of the low carbon transition. Combined with new business models (such as public-private partnerships), these low carbon pilots can therefore attract large scale private investment into its low carbon infrastructure projects. The central government should provide the political space and regulatory framework for these pilots to try out new and innovative policy.

Similarly, as the Government opens up the financial sector to allow corporates to establish small and medium-sized banks, this will help drive innovation in the range of financing products (i.e. venture capital and equity alongside micro-credit) to meet growing local demand for finance. This will be particularly important for financing SMEs that will be important players in creation of local markets for cleaner products, and services, including for increasing energy efficiency of consumers.

4) Build on success of green credit guidelines

Building on the success of the existing Green Credit Policy and Guidelines, these could be extended from the current focus on bank lenders (which includes SOEs as borrowers) to other non-bank lenders such as providers of equity or corporate bonds. The focus on including green finance incentives into the policy is very welcome and should ideally be developed in coordination with discussions on the climate finance agenda, including the role of the CDM Fund moving forward.

The GCG needs to be accompanied by a robust assessment of the environmental impact assessment before projects are implemented, and more importantly, monitoring and evaluation needs to be supported by effective compliance and enforcement measures. This will be particularly important to improve compliance at the local level where local governments often collude with companies and local branches of regulatory bodies to not report or hide pollution.⁷⁵ Creating open and systemic disclosure of information will greatly help create the transparency required for ensuring accountability in the use of green credit, as well as help to provide transparency of the

⁷⁵ City-level commercial banks are strongly influenced by local governments, which prevent the local environmental authorities from providing information on breaches of environmental law by some companies, or in some projects. Some local governments even require local banks to lend to environmental risky projects/companies. Xu Nan (2013), Op. cit.

broader investment framework that will also be important for encouraging the participation of private sector investors.

5) Integration between 'green' and 'climate' financing agendas

Progress on the green finance agenda being taken forward by the CBRC, the PBoC and the MEP can be built upon to strengthen integration with the emerging climate finance agenda. This will help avoid potentially confusing distinctions between green finance, climate finance and the carbon markets. Developing a common terminology and definitions would help create a more coherent and transparent governance system, including for monitoring and evaluation of financial flows.

Measures for integration would be further supported by arrangements that facilitate dialogue between different ministries and relevant stakeholders, including the private sector.

6) Encourage green domestic savings

To fully harness public resources and support for a green and low carbon development path, the government should introduce new products that encourage green savings. Similar proposals have emerged within the UK around Green Individual Saving Accounts (Green ISAs). Promoting individuals' awareness and participation in green savings would help embed a greener lifestyle into people's mind set and Chinese culture. This would help towards making an "ecological civilisation" a reality within China.

To create savers' confidence in green saving products, China needs a strong regulatory system that has the ability to properly oversee the financial market and avoid potential for abuse. The newly proposed Super-Agency, which aims to coordinate monetary and financial supervisory policies and regulates new financial products, could play an important role in protecting consumers as well as creating an attractive market for green saving products. It would need to work closely with the CBRC, MEP and the PBoC to ensure these new products build upon and are consistent with existing Green Credit Policy and Guidelines.

7) Facilitating dialogue and peer-to-peer engagement across policy and financing agendas

Facilitating and strengthening dialogue across the various policy agendas identified in this paper would help identify ways for effectively tackling China's investment trilemma. Deepening engagement with international experts and thinkers on green and low carbon finance and investment would also help identify ways for maximising opportunities and synergies across policy agendas.

The success of the evolving Sustainable Banking Network clearly demonstrates how valuable Chinese leadership on green finance is to other emerging economies. Such

lessons would also benefit other economies, including Central Bankers and financial regulators of OECD countries.

6.1 Towards a Chinese Platform on the financing pathway towards a green and low carbon economy

Based on this paper's analysis and following discussions with potential partners, a new China Platform for Low Carbon Finance and Investment could be established to increase dialogue on issues important for integration between the financial reform process and policy agendas for tackling pollution and promotion of a lower carbon path of development.

A new Chinese Platform could be modelled on the successful Conference of Chinese Banking Industry on Settlement of Excessive Capacities and Practice of Green Credit, that was sponsored by China Banking Association and involved experts from the Ministry of Environmental Protection, the International Finance Corporation (IFC) and the World Wide Fund for Nature (WWF) alongside the CDB, ICBC, CIB and so on.⁷⁶

As a multi-stakeholder platform that brings together differing experts in their respective policy and finance agendas, this should include representatives from the government, including NDRC, MEP, Ministry of Finance, PBoC and CBRC, and finance providers across the spectrum from policy and commercial banks, providers of equity/project sponsors and institutional investors. It should also involve project developers, which may be SOEs, private utilities, merchant investors, municipalities, national government and the State Grid, as well as domestic and international experts that are leading thinking on how to use finance a smooth transition to green and low carbon economies.

Such a Platform would present be a valuable step towards capturing and sharing valuable learning that is now being generated through the green credit policy and guidelines process, the practical investment experiences of the CDM Fund and banks, such as the CIB, leading on green finance and investments. It would foster dialogue that builds a more coherent approach with the climate finance agenda and lessons emerging from the carbon market pilots.

Primarily the Platform would allow potential synergies and opportunities between these agendas and that of the financial reform process to be identified and discussed. The Platform would therefore create a forum for an on-going and semi-structured dialogue on the low carbon financing and investment challenges within the context of on-going financial reform.

The Platform would help identify issues that impact on the ability of the private sector

76 Industrial Bank of China (8 November 2013), Op. cit.

to deliver scaled up low carbon investment. The Platform could also consider different potential financing pathways for delivering the scale of low carbon investment required for the transition within priority sectors. These pathways would be developed in light of differing public policy and financing scenarios.

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