
China's Coming of Age on Climate Change
Just in time for Paris?

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Executive Summary

The upcoming Paris climate conference (COP21) is opening the door to a new post-2020 climate regime in which China and other large emitters will have to provide strong evidence of their domestic efforts in addressing global warming in the next century.

China's domestic climate policy remains consistent in favoring robust action to reduce the country's projected emissions trajectory and its impact on climate change. An increased emphasis on environmental protection at the political level, the identification of clean energy technologies as new strategic industries for China and a push to restructure the country's economy towards less energy-intensive sectors, provide an outlook scenario for a peak in CO₂ emissions by 2030. This was ultimately the target offered by China in its landmark climate agreement with the US in November 2014, which also saw China agreeing to achieve 20% of its energy production from non-fossil fuel sources by 2030.

Nevertheless, there are doubts regarding China's willingness to make commitments beyond what it has already announced in the November agreement and the role it will ultimately play in Paris this December. On the one hand, its remaining domestic challenges provide a hefty degree of uncertainty about whether it can achieve the commitments it has already made. A strong political will to combat pollution, for example, does not always translate into decreased emissions at the national level. Moreover, it remains uncertain whether China's vast anti-corruption campaign will ultimately facilitate strong reforms by reinforcing the central government's power, stall the country's bureaucratic machine and thus weaken momentum for reforms, or perhaps even lead to a longer-term political instability. Each of these scenarios will have a different affect on the country's ability to implement climate policy. China's position is also complicated by a unique international stance between an increasingly diverse group of developing countries and the need to maintain a level of entente and cooperation with more technologically advanced economies such as Europe or strategic rivals such as the US.

Nevertheless, China's emphasis on developing globally competitive industries for low-carbon or clean energy technologies means that it has a clear interest in seeing a more robust set of engagements from its partners during COP21 in order to expand the global market for these technologies. In the long term, China may well be in a position to dictate a new climate agenda based on green and nuclear technologies.

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Introduction

This December, 196 parties to the United Nations Framework Convention on Climate Change (UNFCCC) will gather in Paris for the 21st Conference of Parties (COP21) to negotiate what is expected to be a landmark climate agreement. The stakes are high as the long-awaited climate deal, aimed at limiting global warming by 2100,¹ will be applied as of 2020. The Paris climate conference gives China, the world's second biggest economy and today's largest emitter of greenhouse gases, a crucial role around the negotiating table. In the past, China has been a reluctant participant in negotiations – even receiving (justly or unjustly) a large part of the blame for the failure of a comprehensive accord in Copenhagen in 2009.

Today, there are a growing number of reasons why China is in a position to put forward a stronger contribution to a future international climate change policy framework, and why an ambitious deal may in fact be in China's interest. These owe largely to domestic factors such as an increased emphasis on environmental protection, the identification of clean energy technologies as new strategic industries for China and a push to restructure the country's economy towards less energy-intensive sectors.

As such, the objectives announced by China in its agreement² with the United States in November 2014 to cap overall emissions and aim for a target of 20% of energy production from non-fossil fuel sources, both by 2030, fit with China's projected evolution in the years to come. This commitment marks a shift from an emphasis on improving energy efficiency and reducing the carbon intensity of GDP to one of an overall cap on emissions.

However, China's own commitments should not be interpreted as a sign that it will necessarily play a more proactive role in the Paris negotiations this December, nor that these negotiations will ultimately

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¹ to 2 degrees in the 21st century compared to pre-industrial levels according to the UNFCCC – COP16 – Conclusions from Cancun

² See Factsheet: "U.S.-China Joint Announcement on Climate Change and Clean Energy Cooperation", <https://www.whitehouse.gov/the-press-office/2014/11/11/fact-sheet-us-china-joint-announcement-climate-change-and-clean-energy-c>

be successful. Notably, a number of significant hurdles lie on China's path to a greener future, including complications related to energy market reforms and carbon pricing. Moreover, China's international position is evolving to a certain extent. It has traditionally aligned with the G77, and in particular the BASIC³ negotiating bloc of developing countries, and continues to argue that the principle of common but differentiated responsibilities should be retained when it comes to mitigation commitments. However, factors such as the relationship with the United States and a public diplomacy campaign bent on avoiding an image of 'climate spoiler' are changing this landscape.

Therefore, whereas China is able to make stronger commitments related to climate change, its ultimate role in international negotiations will depend in large part on the positions of other key emitters such as the US, and, on the understanding of the fact that national emissions patterns are also interlinked as a result of global trade and trade partnerships.

³ Brazil, South Africa, India and China

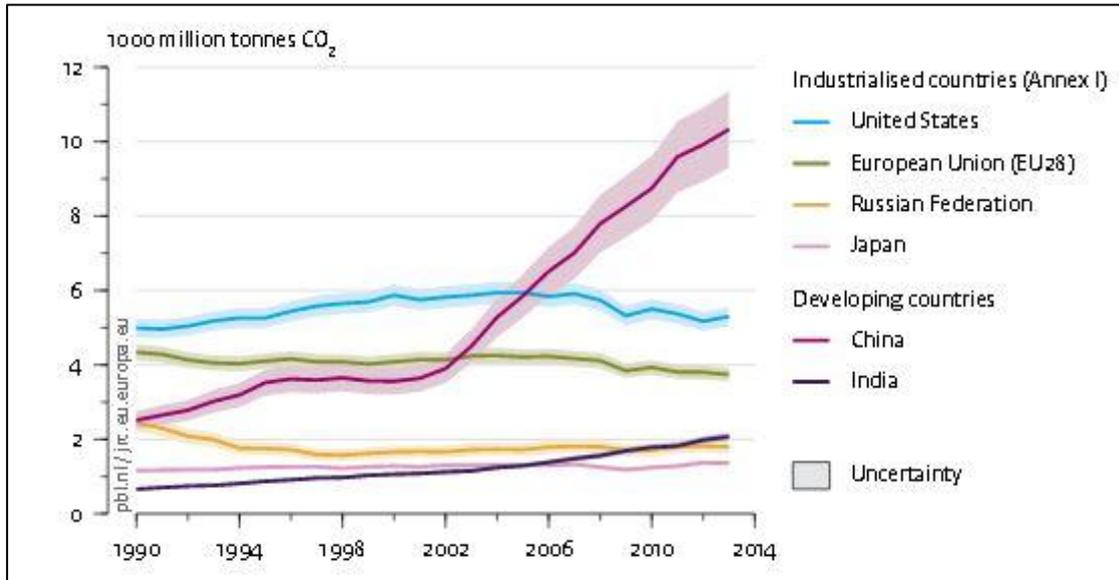
Politics and change in China: Paving the way for stronger climate commitments?

China's policies for combating climate change are driven first and foremost by domestic factors linked to the country's economic, social and political stability. In spite of the country's place as the world's top emitter of CO₂ and a traditional emphasis on economic growth at all costs, China's political climate is evolving in ways that will likely favour stronger climate policy, though uncertainties remain.

Brief history of China's record on emissions

Since 1990, the reference year of the Kyoto protocol, China's carbon dioxide (CO₂) emissions have more than tripled, to over one quarter of global CO₂ emissions in 2012. By 2006, China overtook the US to become the world's leading carbon emitter. The bulk of the country's growth in emissions has come from electricity and heating (roughly 50% of emissions in 2012) as well as from manufacturing and construction (31%). According to IEA statistics, coal was responsible for 82% of China's emissions in 2012, while another 14% came from oil consumption.⁴ Estimates on **China's total emissions vary widely between 9 billion tCO₂ and 11 billion tCO₂ in 2014.**

⁴ Based on a total of IEA, *CO₂ Emissions from Fuel Combustion*, International Energy Agency: Paris, 2014.

China's CO₂ Emissions relative to other emitters (1990-2014)

Source: PLB/JRC, Trends in Global CO₂ Emissions, 2014

China, together with India, has been leading the rebalancing of global green-house gas emissions⁵ from developed countries, mostly grouped under the classification of Annex I countries of the Kyoto Protocol⁶, towards developing countries. Whereas Annex I countries accounted for 66% of worldwide energy combustion-related emissions in 1990, they only accounted for 42% in 2011.⁷ Yet, these statistics hide a number of readings that ultimately soften China's role in global emissions. First is the level of emissions over time, according to which China's contribution is moderated by historical emissions from the US and Europe.⁸ This fact, regularly underlined by Chinese officials and experts, is challenged by the scale of China's growth in emissions over the last decade. Second is the impact of global trade on the delocalization of emissions, wherein emissions-intensive manufacturing has over time shifted to countries like China,

⁵ Based on the Kyoto Protocol, greenhouse gases cover CO₂, CH₄, N₂O, HFCs, PFCs and SF₆, weighted by their global warming potential (GWP). UNEP Report : The 2013 Emissions Gap Report

⁶ List of Annex I countries, with binding commitments under the Kyoto Protocol: Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Croatia, Cyprus, Czech Republic, Denmark, Estonia, EU, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, UK and USA.

⁷ IEA 2013, *op cit*.

⁸ Johannes Friedrich and Thomas Damassa, "The History of Carbon Dioxide Emissions", World Resources Institute Blog, 21 May 2014, <http://www.wri.org/blog/2014/05/history-carbon-dioxide-emissions>

while much of the final consumption of manufactured goods remains in developed economies.⁹ Finally China's per capita emissions still remain at an intermediary level. Its ratio of emissions per capita has more than tripled since 1990 to 7,4 tCO₂ per inhabitant,¹⁰ largely overtaking other developing countries like India (1,7 tCO₂) or Brazil (2,1 tCO₂), but still remains far below South Korea (13 tCO₂), and the USA (16,4 tCO₂).

A shifting balance between economic growth and environmental concerns

Much of China's economic growth miracle of the past three decades has come at the expense of the country's environment. The country's dramatic growth in CO₂ emission levels are a testament to this. Yet, as the environmental crisis has only worsened in recent years, calls for a stronger hand in dealing with pollution have grown louder, increasingly taking the form of public protest, particularly among the younger, urban generation of China's growing middle class.¹¹ Furthermore, a poll conducted in 2014 by Jiaotong University in Shanghai of over one thousand respondents in 35 cities across China, suggested that roughly 60% of urban Chinese "want the government to give priority to environmental protection when boosting economic growth".¹² Beyond the social factor, environmental degradation has an increasingly negative impact on China's economy, both in terms of economic efficiency and a reduction in the attractiveness for foreign investment.¹³ It has become clear that these dynamics also increase the threats to the country's political stability and have spurred action at the highest levels of power.

Consequently, the 'growth first' model of economic development has been increasingly tempered by concerted efforts to move the country in the direction of more environmentally sustainable development. In relation to climate change, the country's 11th Five

⁹ Peters, G. P., Minx, J. C., Weber, C. L., & Edenhofer, O. (2011b). *Growth in emission transfers via international trade from 1990 to 2008*. Proceedings of the National Academy of Sciences,

<http://www.pnas.org/content/108/21/8903>

¹⁰ Based on an estimation of 10.3 billion tCO₂ emissions in 2013 as referenced in PLB/JRC, *Trends in Global CO₂ Emissions, 2014*

¹¹ Alice Ekman, "China's Emerging Middle Classes: What political impact?", *Asie.Visions*, Ifri, forthcoming, April 2015.

¹² Hongyi Wang, "Protecting environment tops public concerns in poll", *China Daily*, 16 May 2014, http://www.chinadaily.com.cn/china/2014-05/16/content_17511326.htm

¹³ Estimates put the cost of pollution to China's economy anywhere between the equivalent of anywhere between 3.5% and 9% of its GDP. See Beinda Xu, "China's Environmental Crisis", *Backgrounders*, Council on Foreign Relations, 25 April 2014, <http://www.cfr.org/china/chinas-environmental-crisis/p12608>

Year Plan (2006-2010) was the first to establish binding targets to improve energy efficiency (in this case by 20% over the plan's application period). In 2007, the National Development and Reform Commission (NDRC) published the country's first national strategy to combat climate change, marking the evolution of the issue from a matter of scientific study to a subject of national policy concern.¹⁴ On the eve of the Copenhagen climate change conference in November 2009, Premier Wen Jiabao unveiled the country's first plan to directly target carbon emissions, aiming for a reduction of the carbon intensity of GDP by 40-45% by 2020.¹⁵ Wen also pledged to boost the contribution of non-fossil fuels to 15% of China's energy mix by 2020. These targets would be reflected proportionally in the country's 12th Five Year Plan (2011-2015), which additionally set a target for further improving energy efficiency.¹⁶

As smog and pollution in China's major cities have also taken on more importance at the political level in recent years, with a particular focus on addressing the role played by fossil fuels and coal, there is a growing synergy between dealing with air pollution and reducing consumption-based carbon emissions. This is not to say that all initiatives respond to both challenges. In particular, China's increasing use of coal gasification technologies or the relocation of coal-fired power plants away from urban areas and closer to coal mining regions, have only displaced emissions, or reduced certain pollutants such as NO_x or SO_x, without substantially reducing the country's overall CO₂ emissions.

A more fundamental shift occurred in the spring of 2014. As China's new Premier Li Keqiang declared a "war on pollution"¹⁷, the Standing Committee of the National People's Congress adopted a new Environmental Protection Law, which goes into effect this year. The country's previous environmental legal code dated from 1989. On paper at least, this new law allows for **greater public participation and requires a higher degree of accountability**. In particular, it is set to increase the authority of law enforcement agencies (or Environmental Protection Bureaus), levy heavier penalties on polluters and facilitate greater public interest litigation against polluting entities. Perhaps most importantly, it aims to reform the evaluation system for local government officials by formalizing an environmental performance standard to be included in the promotion

¹⁴ Joanna Lewis, "China's Strategic Priorities in International Climate Change Negotiations", *The Washington Quarterly*, Winter 2007-08, pp. 155-174.

¹⁵ Based on the ratio of carbon emissions per unit of GDP in 2005.

¹⁶ The 12th Five Year Plan set out to reduce carbon emissions per unit of GDP by 17% and improving energy efficiency of GDP by 16% by 2015, using 2010 levels. It also sought to increase the level of non-fossil fuel energy sources to 11.4% of the total energy mix over the same period, from 8.3% in 2010.

¹⁷ Zhu Ningzhu, "Xinhua Insight: China declares war on pollution", Xinhua, 5 March 2014, http://news.xinhuanet.com/english/special/2014-03/05/c_133163557.htm

evaluation for local officials.¹⁸ If implemented properly, this last point will mark a clear shift away from **performance indicators based primarily on economic achievements**, provide powerful incentives for local officials to enforce stricter environmental regulations and instil a sense of environmental responsibility within the country's up-and-coming leadership.

The anti-corruption campaign and the consolidation of political power: good or bad for climate policy?

At a time when China is adopting increasingly difficult reforms and regulations that will inevitably challenge a number of vested interests in both government and industry, President Xi Jinping is pursuing a deep-rooted anti-corruption campaign that seeks to eliminate graft in all sectors of the economy, and reassert a new role for the central government, and President Xi in particular. This could prove to be a crucial factor in achieving a lower-carbon future for China, and impact the country's international climate policy as a consequence.

Intricate relationships between various levels of government and enterprise have necessarily created strong links between influential businessmen, party cadres and government officials that fuel corruption and act in the defence of established interest groups. Some State Owned Enterprises (SOEs) wield notoriously high levels of influence over policymaking and have on many occasions been accused of holding back much-needed reforms of environmental standards.¹⁹

These power relationships are now being transformed, if not fundamentally redrawn. Since the anti-corruption campaign began in 2012/13, over 70,000 state and party officials at all levels have been investigated, with a growing number of formal charges being brought against not only low-level government and party officials, or "flies", but also top-ranking "tigers" that yield considerable amounts of influence.

This campaign has hit the energy sector particularly hard. For instance, in the pursuit of Zhou Yongkang, a Politbureau Standing

¹⁸ Jianqiang Liu, "China's new environmental law looks good on paper", Chinadialogue.net, 24 April 2014 <https://www.chinadialogue.net/blog/6937-China-s-new-environmental-law-looks-good-on-paper/en> and Jöst Wubekke, "The three-year battle for China's new environmental law", Chinadialogue.net, 25 April 2014

¹⁹ See, for example, Chai Jing's March 2015 documentary "Under the Dome" <http://www.smh.com.au/digital-life/digital-life-news/under-the-dome-watch-the-viral-video-documentary-about-pollution-that-is-scaring-the-chinese-government-20150308-13yag6.html>

Committee Member until 2012 with deep networks of patronage in the fields of energy and domestic security, dozens of party cadres and officials active in or with strong ties to the energy sector, and in particular to the state-owned oil conglomerate CNPC, were investigated and/or arrested on various charges of corruption. Beyond the pursuit of Mr. Zhou, the anti-corruption campaign has hit the coal, nuclear and hydropower sectors particularly hard, including investigations at the highest levels of the National Energy Agency (NEA), China's top energy policy organization. In particular, Liu Tienan, director of the NEA from 2011-13 and former deputy head of the NDRC (2008-11), was sentenced to life in prison for accepting bribes.²⁰ And the list continues to grow.²¹

While the anti-corruption campaign will have an impact on China's domestic reforms and ultimately the adoption and implementation of policies related to environmental protection and climate change, the nature of this impact is still open for discussion. On the one hand, if the campaign is ultimately successful, the current shaking-up or dismantling of broad and intricate networks between Party, government and business will lead to a strong vertical leadership structure, greatly increasing the power of the central government and Xi himself. In such a case, should it truly be an objective of the current leadership, difficult industry reforms and environmental regulations could be more easily adopted and implemented. This in turn would allow China's leadership a greater degree of flexibility than in the past to engage in a more ambitious climate mitigation regime.

On the other hand, the far-reaching nature of the campaign has today contributed to a prevailing climate of fear and a certain level of paralysis on the part of Party and state officials at all levels – rather than take risks by adopting ambitious policy measures, officials prefer to keep a low profile in order to avoid calling attention to themselves. This will likely have an impact – at least in the short term – on the country's efforts to reduce emissions. Meanwhile, in the longer term, many experts note that establishing a stronger vertical authority of the central government and Party leadership will ultimately be met by a heavy resistance from local officials and party

²⁰ Josh Chin, "China Sentences Liu Tienan to Live in Prison", The Wall Street Journal, 10 December 2014, <http://www.wsj.com/articles/china-sentences-liu-tienan-to-life-in-prison-xinhua-says-1418179307>

²¹ For instance, in China's Shanxi province, a crucial heartland for China's coal industry, at least seven of the province's 13 party bosses and no fewer than 17 other provincial officials were investigated in 2014 on charges of corruption or other abuses of power. See: Chris Buckley, "China's Antigraft Campaign Expands to Coal-Rich Northern Province", The New York Times, 29 August 2014, <http://www.nytimes.com/2014/08/30/world/asia/chinese-antigraft-campaign-focuses-on-a-coal-rich-province.html>

cadres.²² Others, such as David Shambaugh, go so far as to consider this the beginning of a “protracted, messy and violent” end of China’s one-party system.²³ Whether such an extreme is in China’s future or not, any level of political instability would certainly complicate Beijing’s ability to successfully enact fundamental reforms and align with other large emitters in an ambitious international agreement. Achieving a successful deal in Paris certainly requires a level of confidence in the political stability of China, as in any key party to the conference.

²² Joseph Fewsmith, “China’s Political Ecology and the Fight Against Corruption”, *China Leadership Monitor*, Winter 2015, Issue 46, pp.17-18, <http://www.hoover.org/research/chinas-political-ecology-and-fight-against-corruption>

²³ David Shambaugh, “The Coming Chinese Crackup”, *The Wall Street Journal*, 6 March 2015, <http://www.wsj.com/articles/the-coming-chinese-crack-up-1425659198>

Towards a greater convergence of China's economic, energy and climate strategies?

As China's political landscape evolves, and some uncertainties remain, a transformation of the Chinese economy is already having a significant impact on the country's contribution to climate change. Dramatic improvements in energy efficiency, a structural transformation of China's economy, concerted efforts to adjust the country's energy mix and the increasing centrality of low-carbon technologies as strategic industries for China's future are driving the country towards more ambitious climate objectives. Nevertheless, a number of challenges lie ahead on the country's path to decarbonisation.

Towards a peaking of emissions levels by 2030?

China has seen a net improvement on its emissions outlook in recent years. Not long ago, scenarios plotting China's CO₂ emissions trajectory regularly projected a peak on the horizon of 2050. Today, they are more likely to show a peak by 2040 at the latest, with a challenging, yet theoretically feasible range as early as 2025. Following China's climate agreement with the US last November, the country's official stance is now a peak by 2030 at the latest.

A project led by a joint MIT-Tsinghua University research team shows that under a scenario in which current efforts to reduce carbon intensity of GDP are continued, carbon emissions will peak between 2030 and 2040, levelling out at 12-14 billion tCO₂/year. Advancing the calendar to a peak by 2030, or even as early as 2025, will require concerted efforts in the near term, including establishing a functional mechanism for carbon pricing by this year.²⁴

²⁴ Xiliang Zhang, et. al. "Carbon emissions in China: How far can new efforts bend the curve?" Report No. 267, MIT Joint Program on the Science and Policy of Global Change, Tsinghua-MIT China Energy & Climate Project, October 2014,

With vast regional differences in China's economic development, **the possibility of regional peaks in emission levels** is also being discussed, according to experts and media reports. Indeed, China has recently announced a number of regionally-specific plans to combat air pollution, such as regional bans on the construction of new coal-fired power plants that focus primarily on major coastal regions, including the region around Beijing, the Yangtze River Delta (Shanghai) and the Pearl River Delta (Guangzhou/Shenzhen). As such, it is likely that progress will be made much faster in the more developed coastal regions than in China's land-locked and more economically underdeveloped interior.

Energy intensity, efficiency and economic restructuring

At the heart of the country's improved outlook has been a concerted effort to improve energy efficiency and carbon intensity of the Chinese economy, particularly as noted in the targets set in 11th and 12th Five Year Plans. While the amount of energy needed to produce a unit of GDP in China is still far above the OECD average, substantial progress in emissions mitigation has been made over the years.

One pillar of China's strategy to improve efficiency has been to replace small, inefficient coal-fired power plants with larger, more efficient supercritical or ultra-supercritical boilers. Between 2006 and 2010, China closed 72.1 GW of inefficient thermal capacity,²⁵ while over the period 2009-2014 the average amount of coal required to produce 1 kWh of electricity decreased by 6.2%, from 340 to 318 grams/kWh.²⁶ According to China's latest climate action plan, this amount should decrease further to 300 grams/kWh or less by 2020.

Another key approach to efficiency gains has been to set improvement goals for the most energy intensive and polluting industries. During the 11th Five Year Plan, China established a 'Top 1,000 Program' setting specific improvement targets for one thousand of the most inefficient industries, accounting for roughly one-third of the country's energy consumption. During the 12th Five Year Plan, this program was expanded to the 'Top 10,000 Program', which has pushed for net improvements in energy efficiency among companies that together account for two-thirds of the country's energy demand.

Nevertheless, many of the gains that have been made thus far have often been characterized as picking off "low hanging fruit", or

http://globalchange.mit.edu/CECP/files/document/MITJPSPG_C_Rpt267.pdf

²⁵ This accounted for 16% of the total capacity brought online over the same period.

²⁶ Rosealea Yao, "Peak Coal is Nigh", Gavekal Dragenomics, China Research, 4 February 2015

focusing on easily achievable objectives for improving energy efficiency and limiting emissions. It is clear that more difficult changes will be necessary in the future. Chief among these changes is a **structural rebalancing of China's economy away from energy intensive manufacturing and heavy industry towards higher value-added and less polluting sectors such as services**. Some of this transformation is already taking place. In 2013, the service sector accounted for roughly 46% of China's GDP, up from a rather consistent average of 40% from 2000-2007. Services have now surpassed industrial production (43%) for the first time since the 1960s. Still, as the service sector in other countries at China's stage of development would typically account for 55-60% of GDP, there is significant room for improvement.²⁷ The 12th Five Year Plan sets a target for a 47% contribution of the service sector to overall GDP, and it can be expected that the next plan will raise the bar even higher. More broadly, China is now thought to be entering a **phase of slower economic growth**, which will further ease the pressure on energy demand and emissions. Whereas in recent decades the country's annual growth in GDP has hovered around 10% or more, it is now slowing to 7%, with a longer-term projection of 4-5% per year by 2030. This downward trend will undoubtedly help China to meet its 2030 targets.²⁸

Assuming that China's economic growth stabilizes at 7% per year, the United Nations Environment Program projects that the country will achieve its non-binding pledges to 2020, formulated as an equivalent of 11.7 billion tCO₂.²⁹ Overall, in light of further economic development (urbanisation, economic restructuring and growth moving from Eastern provinces to Western provinces) and the achievement of a demographic plateau, China will still have to bet on improved efficiency and investments in green technologies. If successful, this strategy would allow the country to go beyond the target of 20% of renewable energy and nuclear based primary energy sources by 2030.

²⁷ S.C., "Economic Rebalancing: Industrial eclipse", Analects blog, The Economist, 15 April 2013, <http://www.economist.com/blogs/analects/2013/04/economic-rebalancing>

²⁸ Ye Qi, "Will Climate Commitments Constrain China's Economic Growth?", *US-China Focus*, 19 January 2015, <http://www.chinausfocus.com/energy-environment/will-climate-commitment-constrain-chinas-economic-growth/>

²⁹ PLB/JRC, 2012 - according to UNEP Emissions Gap Report

Energy security and economic growth driving China's low carbon technology strategy

Beyond gains in energy efficiency, a crucial aspect defining China's contribution to climate change mitigation is its low carbon technology strategy. A core concept of this strategy is redirecting economic growth towards technologies that are both higher value-added and less polluting. Coal has long been the bedrock of China's energy security and a source of cheap fuel allowing for economic competitiveness and rapid growth. As the reliance on cheap, indigenous, dirty coal must be scaled down from nearly 70% of China's energy mix in recent years to below 60% post-2030,³⁰ China is working to develop a comparative advantage in cleaner energy technologies that will provide both new sources of strong economic growth and underwrite the country's energy security.

In 2010, China's State Council identified seven "new strategic industries" to lead the charge of its economic restructuring, increasing the contribution of these industries to GDP from 3% in 2009 to 15% in 2020. In the energy sector, the so called "clean" coal technologies (in particular Coal2Gas), renewable-based electricity generation, nuclear generation, carbon capture and storage (CCS), and bioenergy are pegged to become engines of economic growth and development for the country.

Change in China's "strategic industries" over the last decade	
11th Five Year Plan (2006-2010)	12th Five Year Plan (2011-2015)
<ul style="list-style-type: none"> - National defence - Telecoms - Electricity - Oil - Coal - Airlines - Marine shipping 	<ul style="list-style-type: none"> - Energy saving and environmental protection - Next generation information technology - Biotechnology - High-end manufacturing (e.g. aeronautics, high-speed rail) - New energy (nuclear, solar, wind, biomass) - New materials (special and high performance composites) - Clean energy vehicles (PHEVs and electric cars)

Source: National Development and Reform Commission (NDRC)

³⁰ In exchanges with Ifri researchers in March 2015, some Chinese experts have even discussed a target of below 50% from 2030.

While CCS³¹ technologies are key to achieving decarbonisation by 2030-2100³², they have yet to come up to full scale. In the meantime, the real improvement in energy and carbon intensity comes from China's "green" revolution in the more mature renewable technologies of wind and solar electricity generation, together with the successful build-up of large scale hydro and nuclear capacity. The rapid expansion in renewable sources to 30% of China's 2013 installed capacity, close to the 12th Year Plan target of 32%, puts China as the world leader in renewable technologies.³³ Indeed, China accounted for one third of the world's solar photovoltaic panel additions and 40% the world's added wind generation capacity.³⁴ Excluding hydro capacity, China's domestic renewable capacity stands at 90 W/capita, above the BRICS average of 50 W/capita, but still far below EU-28 average of 470 W/capita.

As wind and solar technologies have gained maturity and volumes ramped up extensively, China has become a key provider of clean-energy technology for foreign markets, creating a trade surplus with the rest of the world in solar components and equipment. China is also a major equipment provider for the nuclear energy sector and has ambitions to become globally competitive in the export of civilian nuclear infrastructure.³⁵ All of this of course has not come without a certain number of "trade tensions".³⁶

Moving forward, fuel substitution away from coal will remain a central element behind the new targets of China's 13th Five Year Plan, which will be announced in March 2016. In November 2014, State Council announced a target to peak national coal use at 4.2 billion tonnes per year through 2020 (compared with roughly 3.6 billion tonnes per year in 2014).³⁷ Natural gas will certainly have an

³¹ "Carbon Capture and Storage: What support is needed and how the UNFCCC can help", IEA Technical Expert Meeting- June 2012 – Moscow – Technology Roadmap, Ellina Nevina, October 2014.

³² IEA's 450 PM scenario: CCS technologies will be alleviating more than 3 Gt of Co2 in power, by 2050 - IEA, *Global Action to Advance Carbon Capture and Storage*, International Energy Agency, Paris, 2013.

³³ Inc. hydro generation, renewable electricity (378 GW) - China's Renewable Energy Industry Association (CREIA)

³⁴ Renewable Energy Policy Network for the 21st Century, "Renewables 2014, Global Status Report", <http://www.ren21.net/ren21activities/globalstatusreport.aspx>.

³⁵ See Nicolas et al., "La nouvelle diplomatie économique asiatique : Chine, Japon, Corée comme exportateurs d'infrastructures », *Asie.Visions* 68, mai 2014, <http://www.ifri.org/en/publications/enotes/asie-visions/nouvelle-diplomatie-economique-asiatique-chine-japon-coree>

³⁶ "Policy Briefing, Trade and economic relations with China 2013", European Parliament, Directorate General for External Policies, April 2013.

³⁷ "China unveils energy strategy, targets for 2020", Xinhua, 19 November 2014, http://news.xinhuanet.com/english/china/2014-11/19/c_133801014.htm

increasingly crucial role to play in industrial and residential uses, in power generation and transportation, but, its rapid growth also entails risks of external dependency, and so far has not been underlined as a domain of strategic innovative technology.³⁸ Over the next five years, solar is expected to achieve 100 GW, 5 times' current capacity,³⁹ and nuclear energy capacity will increase along the lines of 7GW per year. Meanwhile, delays have been announced in a number of hydro projects,⁴⁰ reducing China's 2020 hydro capacity objectives from 420 GW to 350 GW. To achieve its goal of meeting 20% of the country's energy needs using non-fossil fuels by 2030, it is estimated that China's power sector will need to add between 800-1,000 GW of non-fossil fuel generation capacity.⁴¹

Market Reform Challenges

The challenges of electricity market reform

The success of China's shift towards a lower-carbon future hinges on the country's ability to acquire or generate technological innovation in the low-carbon field and the incorporation of these technologies into the regional and national electricity grids. Market and regulatory reforms will be fundamental in facilitating this relationship. Structurally evolving China's fuel mix away from coal, or at least towards cleaner, though more costly forms of energy sources, must be supported by internal market reform that use more liberalized pricing mechanisms to give more transparent and efficient signals of decarbonisation.

Some positive evolutions have occurred, for instance direct power purchases between power generators and direct end users, or a liberalization of coal prices between coal mines and thermal power plants. Still, China's policy supporting green technologies remains intrinsically linked with the successful reform of its electricity market, which is still largely dominated by SOEs and characterized by regulated prices. Increased investment in high-voltage transmission networks, which will be rewarded by higher tariffs, will help reconfigure the operation of the grid. This reform will support a more cost-efficient and effective integration of wind and solar power resources, which are mostly situated in the Northwestern and Northern regions, respectively.

³⁸ See John Seaman, "China's Growing Natural Gas Insecurity and the Role of Chinese Shale Gas", *Asie.Visions* 64, Ifri, April 2013, and Sylvie Cornot-Gandolf, "Stratégie gazière de la Chine: Développer la concurrence entre production nationale et importations", Note de l'Ifri, November 2014,

³⁹ China Coal Resource, "China to reduce coal's share to 60pct by 2020, NEA official", September 2014, <http://en.sxcoal.com/165/108627/DataShow.html>.

⁴⁰ Yarlong river (Tibet), Dadu river (Sichuan) and Jinsha river (Qinghai, Sichuan, and Yunnan provinces).

⁴¹ Conversation with Chinese researchers, March 2015

In addition to improving the functioning of the electricity market, significant levels of financing, both internal and external, are required to support the investments needed in the strategic industries plans. Extrapolating current government investment trends, a study from Climate group⁴² concludes that the government's own financing capacities account for 30% of its commitments. The difference will have to be provided by other sources: exports revenues, and private funds providers, in particular through an emissions trading scheme (ETS).

Raising the price of carbon

A related and centrally important challenge in facilitating a lower carbon future for China is the need to set a price for carbon – simultaneously discouraging emissions, increasing the competitiveness of low-carbon technologies and generating additional sources of financing for low-carbon investment.

Over the last five years China has made significant steps on the way toward establishing a nation-wide emissions trading scheme (ETS). As part of the 12th Five Year Plan, in 2011, the NDRC launched seven pilot trading schemes across the country,⁴³ with the aim to create a nation-wide cap-and-trade scheme during the 13th Five Year Plan (2016-2020). Despite this ambitious goal, a number of challenges remain. One in particular is attracting investors and creating market liquidity. Initial ambitions were also to link these schemes with other ETS, for instance in South Korea, California or the European Union.⁴⁴

Since their inception, Chinese carbon schemes have gathered a mixture of interest and critique. The NDRC and other government institutions have issued a number of guidelines and measures to improve transparency of the system, but the trading schemes have yet to inspire investor confidence. By the end of October 2014, the total trading volume of carbon dioxide in the seven trading schemes reached 13.75 million tCO₂⁴⁵ out of a national emissions total of anywhere between 9-11 billion tons.⁴⁶

⁴² "Shaping China's Climate Finance Policy", *Insight Briefing*, The Climate Group, March 2013, http://www.theclimategroup.org/_assets/files/Shaping-Chinas-Climate-Finance-Policy.pdf

⁴³ These include four municipalities (Beijing, Chongqing, Shanghai and Tianjin), two provinces (Guangdong and Hubei) and the special economic zone of Shenzhen.

⁴⁴ "State and Trends of Carbon Pricing 2014", World Bank, Ecofys, May 2014.

⁴⁵ "China's policies and actions on climate change: 2014", National Development Reform Commission, <http://en.ccchina.gov.cn/archiver/ccchinaen/UpFile/Files/Default/20141126133727751798.pdf>

⁴⁶ PBL/JRC, "Trends in Global Co2 emissions", 2012.

These efforts are aimed at raising the country's profile in international discussions taking place in the UNFCCC around sensitive verifications issues. However, the willingness to raise the price of carbon remains under question. There are still opposing forces in China advocating for carbon taxation rather than carbon markets. Given that Chinese carbon emitters are not systematically driven by profits and also rely on subsidies, the mandatory/voluntary character of carbon schemes is yet undecided.

China's place in international climate negotiations

While China's domestic context is the core driver of its climate policy, a variety of international factors should be taken into account when considering the country's negotiating position. Moving away from its traditional positioning as a "developing" country and its relationship to the BASIC and G77 bloc, China will have to balance an important relationship with the United States, with which it hopes to establish a "new type of great power relations". China will also want to reassert its position as a provider of low carbon technologies. The resolution of cases before the World Trade Organization's dispute settlement board, where China has been called up for dumping practices in renewable-energy technologies like solar panels, will also require commercial diplomacy to take action. Moreover, China will pay much closer attention to its public diplomacy than it did six years ago in Copenhagen.

A role that has evolved over time

Over time, China has been progressively more involved in climate negotiations. Its first steps in climate change diplomacy at the Copenhagen Conference (COP15) of December 2009 were soon turned into direct confrontation with the main industrialised countries. China, together with India, Brazil and South Africa (part of the BASIC alliance) and with the larger group of G77 (China+G77), stood out against the EU and the US, and refrained from committing to legally binding emission reduction pledges for the post-Kyoto period of 2013 - 2020. China and its allies were strict in sticking to the principle of common but differentiated responsibilities recognised in the Kyoto Protocol for developing countries.

Aware of the negative consequences of the Copenhagen conference, China took a more constructive diplomatic approach in February 2010, agreeing on the Copenhagen Accords. This political, though non-binding agreement led China to pledge CO₂ emission cuts per unit of GDP by 40-45% by 2020, compared with 2005 levels. Behind this pledge, the Copenhagen Accords continued to reflect the principle of common but differentiated responsibilities, the foundation

of the 1991 Kyoto Protocol⁴⁷, but in a different manner than in Kyoto. The new concept of mitigation actions (Nationally Appropriate Mitigation Action or NAMAs) for developing countries, separate from legally binding obligations of developed countries, includes a process of verification that does not impact developing countries' sovereignty. In the Copenhagen Accords, China defended a position whereby NAMAs should be based on a developing country's domestic sustainable development goal⁴⁸, with national monitoring and verification⁴⁹ only subject to international oversight in certain cases.

Following COP16, the Cancún Agreement was built on non-binding promises made at Copenhagen in 2009, and on the engagement of developed countries to contribute to a Green Climate Fund to help poor countries fight climate change. Under the 2010 Cancún Agreements of the Climate Convention, China enlarged its 2020 pledges and agreed to the following three elements:

- Overall reduction of CO₂ emissions per unit of GDP by 40-45% by 2020 compared to the 2005 level;
- Increase in the share of non-fossil fuels in primary energy consumption to around 15% by 2020;
- Increase in forest coverage by 40 million hectares and forest stock volume by 1.3 billion cubic meters by 2020 from the 2005 levels.

Lastly, in November 2014, the US and China announced their intention to rein in their greenhouse gas emissions, sending an encouraging signal to the world that both emitters are ready to align their emission trends, although leaving the policy mix of domestic climate mitigation measures up to national and economic circumstances. In particular, China's stated shift last year from a carbon intensity target to an absolute emissions cap can be considered as a milestone in international climate change negotiations.

If China's positions and steps taken in international negotiations point to an increasingly positive dynamic, the country's negotiating room in the lead up to Paris still needs to be assessed. The binding nature of its announced emissions cap is not defined, while commitments to climate adaptation are lagging. The timing and

⁴⁷ Kyoto was signed in Rio in 1992.

⁴⁸ Jiankun He, "Nationally Appropriate Mitigation Actions (NAMAs) by Developing Countries", Tsinghua University, https://unfccc.int/files/kyoto_protocol/application/pdf/chinaii.pdf

⁴⁹ The Copenhagen Climate Change Conference: A Post-Mortem, *Daniel Bodansky, University of Georgia School of Law*, February 2010, http://www.fao.org/fileadmin/user_upload/rome2007/docs/Copenhagen_Climate_Change.pdf

form of its Intended Nationally Determined Contribution (INDC) remain uncertain.

China's 'developing country' status increasingly irrelevant

The rules of the game will be different in Paris than in Kyoto. In Paris, China and other developing countries will not have to hinge upon the principle of 'common but differentiated responsibilities' wherein countries share obligations towards the protection of the environment, but with differentiated levels of ambition depending on special needs, economic development, and historic emissions. Historically, this protected China and other developing countries from having to engage in legally binding emissions' reductions.

Back in 2007, in the early stage of the negotiations of the post-Kyoto agreement,⁵⁰ the US pressed for and ultimately obtained a new concept of "contributions", initially leaving aside the question of its legal definition, a longstanding subject of opposition in the US Congress. From this point on, parties to the UN convention were able to put on the table a heterogeneous number of base years and emissions-related targets – some countries focusing on renewable energy policies, specific sectors or domains like reforestation. Framed in the Lima text, these indicators form the basis of the INDCs. Still, the scope and legal nature of the contributions will be the subject of negotiations on the final COP21 text.⁵¹ The Paris agreement aims at building a framework that consolidates INDCs from all parties in a comprehensive, measurable and verifiable agreement.⁵²

In December, the Paris agreement is expected to blur the division between developing and developed countries. The timing is now appropriate, given the growth in the part of developing countries in global emission levels, both in current and historical terms.⁵³

In the negotiations, China is not expected to use the same leverage of developing-country status to the extent it has used it in

⁵² Carole Mathieu, "Road to Paris: What would be a successful outcome for COP21?", *Edito - Ifri*, April 2015, <http://www.ifri.org/fr/publications/editoriaux/edito-energie/road-paris-what-would-be-successful-outcome-cop21>

⁵³ den Elzen, et al., "Countries' contributions to climate change: effect of accounting for all greenhouse gases, recent trends, basic needs and technological progress", *Climate Change*, Vol. 121, Issue 2, pp 397-412, November 2013, <http://www.pbl.nl/en/publications/countries-contributions-to-climate-change>

the previous rounds. For instance, China may have to balance the fact that urbanization remains a major trend for the country in the years to come with the growing concentration of emissions in urban areas, which already account for three quarters of the China's emissions. At some point, environmental challenges linked to the developed and urban character of China - mainly air pollution but also issues like waste and water management - will form part of the discussions.

Looking to Paris and beyond, the internal dynamic of the BASIC group is changing under the new mode of "bottom-up" contributions to the Paris agreement, and the classical divide between developed and developing countries has largely eroded, or at least become more complex. The rising need for technology transfer and financing for both mitigation and adaptation confronts the group of developing countries with new challenges. On one side, those countries having access to technology and finance (of which China is a prime example), and, on the other side, those having no access, but having to face other issues like poverty eradication and access to energy (least developed countries). Moreover, a high-level political agreement on the agendas of adaptation versus economic development for developing countries also needs to be consolidated. While technology transfers are being mentioned in the INDCs supporting adaptation, it is also stated that they should not overcome other UN development related priorities of economic and social development and poverty eradication. Ultimately, this new dynamic distinguishes China from its traditional base among developing countries and as such will impact the way in which it formulates its negotiation position.

China-US mutual understanding on climate issues

The recent bilateral US-China climate deal signals an improved mutual understanding between the two major powers, both seemingly willing to build a "new type of great power relations". The agreement came on the heels of a US Supreme Court ruling stating that air pollutants have a direct impact on global warming.⁵⁴ This ruling created new conditions for the second Obama administration, both in enacting domestic legislative developments,⁵⁵ and in elevating climate discussions to a foreign policy level.

⁵⁴ Court Backs E.P.A. Over Emissions Limits Intended to Reduce Global Warming, New York Times, June 2012, http://www.nytimes.com/2012/06/27/science/earth/epa-emissions-rules-backed-by-court.html?_r=0

⁵⁵ Under Environmental Protection Agency, <http://www.epa.gov>

While rising concentration of air particulates in Beijing was closely monitored from the US embassy in China, much to the ire of the Chinese government, 2013-2014 climate discussions in the bilateral relationship were successfully brought to a level of mutual understanding. Indeed, cooperation on clean energy and energy technologies – for instance, the creation of a joint Clean Energy Research Center in 2009 and a Climate Change Working Group in 2013, or cooperation in the development of CCS or shale gas extraction technologies– has been a bright spot in an otherwise complex bilateral relationship since 2009.

The US-China climate deal is significant in that climate change has now become a domain in which the two countries are seemingly willing to cooperate, whereas China's lack of commitment on the issue, along with other major developing countries, was cited as a major roadblock prompting the exit of the US from the Kyoto Protocol under the Bush Administration in 2001.

Still room for progress

The Lima process, based on a bottom-up approach, accords each country the responsibility of defining its own level of contribution for the COP21 negotiations and obliges China to assess its domestic challenges. These are mostly linked to the reforms of the energy sector and the transition towards low carbon energy sources, as discussed above. As a part of these challenges, the country will also have to tackle important considerations in the way it is aggregating and accounting its data. Enhanced transparency on carbon emissions data and energy statistics may be required in order to provide an effective understanding of primary energy consumption drivers, one of the main sources of CO₂ emissions, and its mitigation pathway.

For instance, calculating China's coal consumption, the largest source of CO₂ emissions for China, has proven particularly problematic. Using coal's share in primary energy consumption (66% in 2015), the cap on primary consumption announced by the National Energy Administration, expressed in tonnes of coal equivalent (Tce)⁵⁶, is considerably lower than statistics on China's overall coal production released by the National Coal Association, by around 400mt of coal, or 10%. More clarity on China's coal consumption data will be required to understand the drivers of climate change, and China's contribution to it.

⁵⁶ Cap on coal consumption stands at 4000 MTce overstating National Coal Association of 4368 MTce.

China's Outlook for Coal Consumption

	2015	NEA 2017 Target	NEA 2020 Target
Cap Primary Energy Consumption (Tce)	4000	4277	4728
Coal share in primary energy consumption	66%	65%	60%

Sources: China's National Energy Administration (NEA); Ifri calculations

Funding for adaptation – an open question

In Copenhagen, developing countries agreed to create the United Nations Green Climate Fund, a \$100 billion fund designed to transfer funds to help poor and vulnerable countries adapt to the effects of climate change. It is not yet certain how firmly China will position itself in relation to this fund, of which only 10% has been committed so far. President Obama announced the United States will contribute US\$3 billion, which may suggest that it is waiting for China's financial pledge before it moves forward with a potentially larger contribution. Adaptation will be a crucial issue moving forward, but experts on the Chinese side have explained that the country has focused primarily on mitigation efforts and that, despite the NDRC's recent addition of an adaptation strategy to its national climate change policy,⁵⁷ a robust position on this issue has not been fully appreciated and fleshed out domestically.

⁵⁷ National Development and Reform Commission (NDRC), *China's Policies and Actions for Addressing Climate Change* (2013), <http://en.ndrc.gov.cn/newsrelease/201311/P020131108611533042884.pdf>

Conclusion

China's domestic climate policy favours robust action to reduce the country's projected emissions trajectory and its impact on climate change. In particular, its emphasis on developing globally competitive industries for low-carbon or clean energy technologies means that it has a clear interest in seeing a more robust set of engagements from its partners during COP21 in order to expand the global market for these technologies. Nevertheless, China is unlikely to make commitments beyond what it has already announced last November 2014. On the one hand, its remaining domestic challenges provide a hefty degree of uncertainty about whether it can achieve the commitments it has already made. Not only do difficult energy-sector reforms lie ahead, but the effects of the ongoing anti-corruption campaign in China, both on short-term policy initiatives and on longer-term political stability, remain uncertain. Moreover, the country's position is complicated by a unique international stance between an increasingly diverse group of developing countries and the need to maintain a level of entente and cooperation with more technologically advanced economies such as Europe or strategic rivals such as the US.

Many questions still remain on how China will position itself on a number of key issues. One question is on the future of global carbon markets and whether or not a global price for carbon is needed or even desirable. China has proven that it is willing to experiment with domestic carbon markets, with an objective to build a nation-wide market in the coming years. Yet, if the Chinese experience is any testament, creating a functioning carbon market, particularly on the global scale, will face a great number of fundamental challenges. On the topic of financing for adaptation and the creation of a functioning Green Climate Fund, China is clearly in favour of a robust funding mechanism but it is yet unclear as to what China's beneficiary role in this fund will be.

Moving beyond COP21, China will have a clear and long-term interest in using climate negotiations as a means to develop overseas markets for low-carbon technologies. Indeed, China's support of green technologies has always gone well beyond the climate agenda, in order to improve its energy security, create growth in higher value added sectors and respond to its own environmental needs. In the long term, could China dictate a new climate agenda based on green and nuclear technologies?

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