October 2015

China Carbon Forum
中国碳论坛

An independent platform to foster trust and cooperation among China's stakeholders for climate action

Insights: China's carbon emission targets and the Paris COP

Key Points

- China's carbon emissions may have reduced during 2014 for the first time in almost twenty years, on the back of lower coal consumption. Efforts to rein in coal use will continue to have the most important direct impact on emission reductions.
- As China's 'new normal' takes hold, transitioning the economy to lower levels of growth will be a key policy challenge for government. Concerns about unemployment could lead to a return to a policy of investment-driven growth if significant economic disruption occurs. In the event of a severe economic downturn, China's leadership should avoid a response which involves stimulus to energy intensive sectors.
- While restrictions on coal and promotion of renewables in energy production and industry are important, we identify two key sectors which are strong drivers for continued energy demand and emissions growth: building operation and transport.
- CCF advisors suggest that government should help provide better access for energy-efficient building operation, make carbon reduction a key indicator of building performance, and promote low carbon technologies and materials for buildings, both new-built and retrofitting.

US-China Presidential Statement

On September 25th, the Chinese and American presidents made their second Joint Statement on the issue of climate change, building on the ground-breaking statement in November 2014. A number of key commitments were made from the Chinese side:

- A national emissions trading scheme (ETS) will be introduced in 2017.
- A reformed electricity dispatch policy to prioritise lower carbon sources of electricity generation.
- A contribution from China to developing countries of CNY 20 billion to help mitigate and adapt to climate change.
- A commitment to introduce higher fuel efficiency standards for heavy-duty vehicles.
- A commitment to accelerate the development of green buildings, and mode-shifting to public transport in order reduce urban emissions.

The statement has been widely considered to add much needed momentum to the preparations for November's Conference of Parties to the UNFCCC in Paris. At the same time, the commitments made do not include any specific raising of ambition from either side of their respective emissions targets, and as shown by CCF''s *2015 China Carbon Pricing Survey*, significant uncertainty remains about the manner in which the national ETS will be rolled out. To what extent are the commitments significant, and what more could be expected of China at the Paris meeting?

Given the censure that China received following the failure of the 2009 Copenhagen conference to live up to expectations, it is possible that its negotiators will plan to make further significant commitments at the Paris conference itself. However this is unlikely to involve a major change its existing emissions target.

Huw Slater

Research & Projects Manager, China Carbon Forum:

huwslater@chinacarbon.info

View China Carbon Forum research and activities at:

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China's emissions targets

China's existing emissions targets are to reduce carbon intensity of GDP (from the 2005 level) by 40-45% by 2020 and 60-65% by 2030. Recent progress means that these targets seem well within reach.

By the end of 2014, China had achieved 16% of the 17% target set for the 12th Five Year Plan Period (2011-2015). Given the current trend, China may also overshoot its 2020 target, and is on track to achieving the 2030 target.

China will likely continue to be conservative in its announced emissions targets, partly because climate change mitigation is a lower priority than several potentially conflicting policies, including avoiding social disruption. Based on past performance, however, the likelihood of China meeting its announced targets is high.

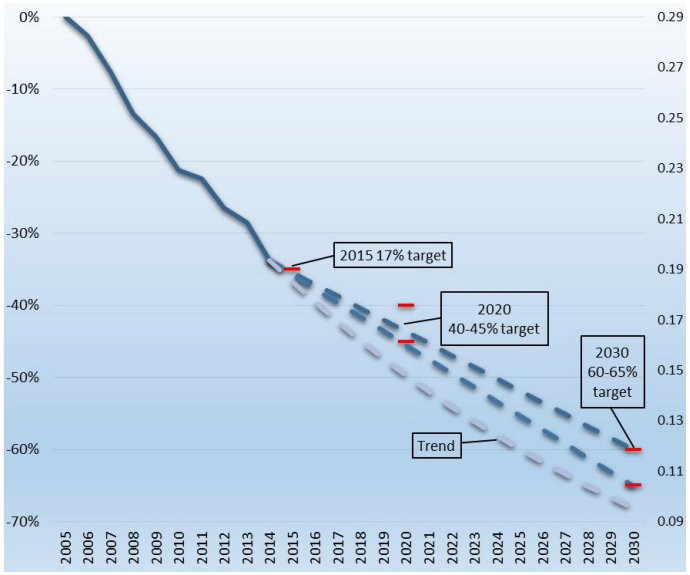

Figure 1: Emissions intensity of the Chinese economy. Reduction from 2005 on left, overall level on right (tonnes per CNY1000). Source: L. Myllyvirta, government announcements and author's calculation.

According to estimates, China's carbon dioxide emissions dropped in 2014 for the first time since the period after the Asian Financial Crisis in the late 1990s [Peters 2015; Bloomberg 2015]. This is attributed to official statistics suggesting a reduction in coal consumption nation-wide during 2014. Coal consumption statistics, however, vary between agencies and a level of caution must be maintained when predicting precise emission levels. In any case, it is clear that carbon emissions growth is well down from the over ten per cent annual growth during the first half of the previous decade.

Recent analysis has suggested that the changing trend is a result of structural changes in China's economy, rather than cyclical ones. Green and Stern [2015], in particular, analysed trends in both the electricity sector and industrial sectors, especially steel and cement, concluding that carbon emissions could peak by 2025 or even earlier. It is these deep changes in Chinese economic activity that provide significant implications for climate change efforts, more so than what may be achieved by a marginal change to the country's carbon emission targets. That said, it is too early to be confident that China's emissions are on the way down. We consider here the implications of three possible emissions trajectories from now until 2030.

Scenario One: China continues a steady shift away from energy intensive industries and investment-led growth, towards more moderate levels of growth driven by domestic consumption. It handles the transition without any major social disruption and continues to facilitate the integration of low-carbon energy. This pathway provides a moderate level of additional ambition beyond existing policy. It would see China slightly over-achieve its 2030 target for a 65% reduction in emissions intensity, and a peak in CO_2 emissions by 2026.

Scenario Two: China's economy slows significantly between now and 2020. In this scenario, carbon emissions have already peaked by 2014 and plateau during the 2020s. Without counteracting measures, CCF advisors consider that this scenario carries enhanced potential for economic disruption, given the much lower levels of growth and consequent job losses in heavy industry. This scenario draws on a recent prediction by Citibank analysts of a China-led global recession. [Buiter 2015] It also assumes the continuation of the current trend in emissions intensity to 2030.

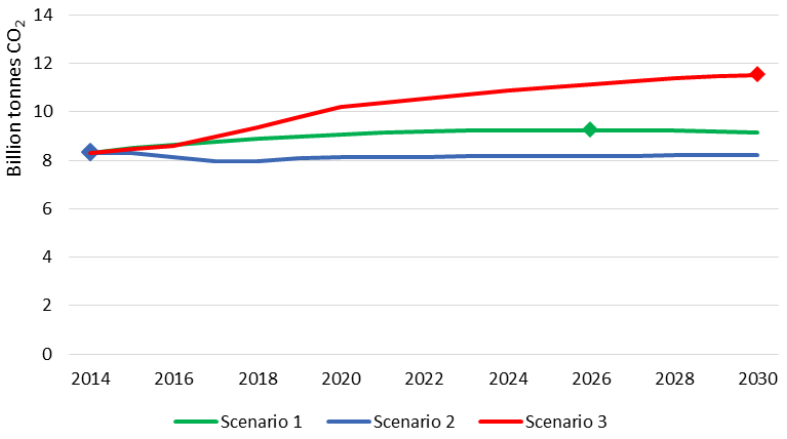

Figure 2: Alternative emission pathways and peak dates depending on economic growth and government policy (for detail see below).

Scenario Three: Similar to Scenario Two, however the government responds to low growth with significant economic stimulus to mitigate

social disruption, limiting the reduction in emissions intensity. This scenario sees slower growth in the coming few years, but assumes that higher, more emissions intensive growth will follow, reaching the low end of China's 2030 emissions intensity target (60%). This scenario would not see carbon emission peak until at least 2030.

While the second scenario holds the potential for a significant reduction in emissions, in CCF's view it is the least likely of the three to eventuate, as a significant slowing of economic growth is likely to lead to stimulus measures of some kind. In this sense, the first scenario, with a peak in carbon emission by the middle of the next decade would be a relatively positive outcome for the climate.

Obstacles to achieving an early emissions peak

While the government has been actively pursuing strong measures to curtail coal use and encourage the integration of renewable energy, more aggressive measures are needed in other sectors with strong emissions growth potential over coming years. Here we identify two such sectors: building operation and transport.

Energy use in building operation is experiencing significant growth as China urbanises. According to CCF Advisor, Professor Zou Ji, "effective measures have so far not been taken to rein in emissions resulting from rapid urbanisation". The share of overall energy use attributable to building operation is expected to increase between now and 2030, even as overall energy growth slows. This is a significant challenge and must be addressed.

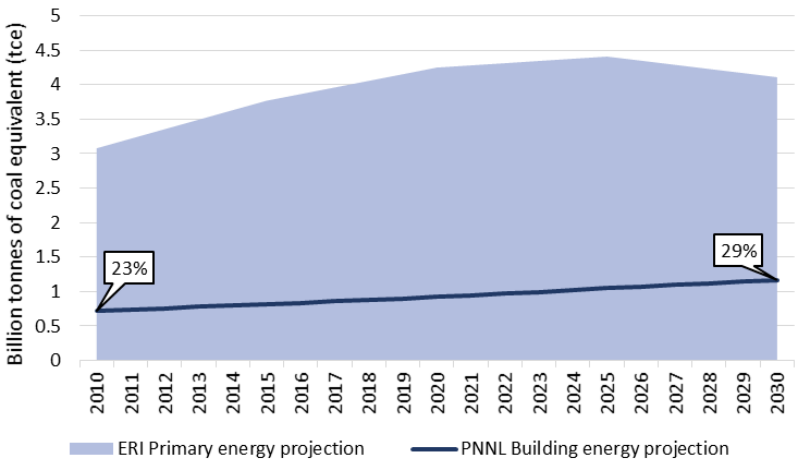

Figure 3: Projected energy demand for the Energy Research Institute's 'High Renewable Energy Penetration Scenario' (ERI, 2015); projected energy demand from building operation by Pacific Northwest National Laboratory (Eom et al, 2012).

Emissions from China's transport sector are also expected to continue to rise. The International Energy Agency's *2014 World Energy Outlook* projected that current policies at the time would lead to transport accounting for over thirty percent of China's CO_2 emissions by 2040, up from the current level of about 9 per cent. The IEA's "450ppm Scenario" aimed at stabilising global temperature rise would see this share reach only 24 per cent (see figure 4).

These two sectors together, building energy use and transportation, present a significant challenge to China meeting its emissions goals. It is to be welcomed, then, that September's Joint Statement between Xi and Obama had additional measures addressing each of these challenges.

The statement set a goal for China, that "50 percent of new buildings in urban areas will meet green building standards by 2020". Experts welcome the commitment. "I think the target is ambitious, to get half of new-builds as green buildings is quite difficult", said Dr Zhou Lei, President of the Chinese Built Environment Experts (C-BEEs).

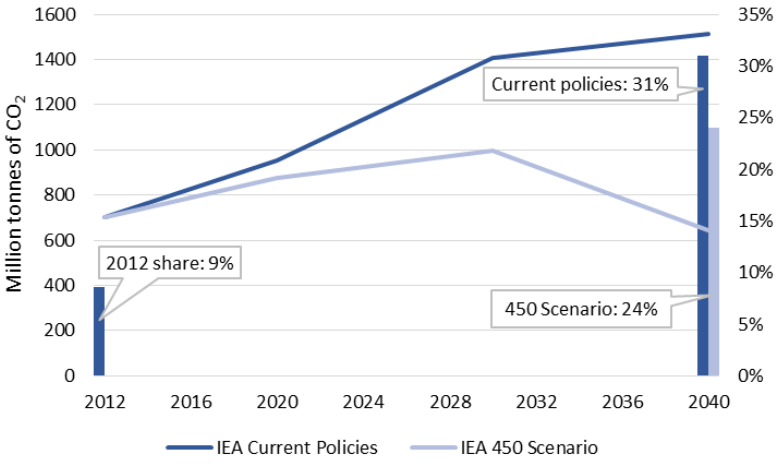

Figure 4: CO_2 emissions from transport, current policies and IEA 450 scenario (OECD/IEA 2014).

However as the economy is slowing down, the construction industry is cooling down, and according to Dr Zhou this brings extra challenges. "Property developers will try to survive this economic cycle, but without enough financial incentives they won't pay attention to the green building commitment", Zhou said. He lays out three reforms to help achieve the target: 1) provide more funding and bank loans to support green building development; 2) make carbon reduction a key indicator for green building development, estimating both embodied and operational carbon; and 3) promote low carbon building technologies and materials, and link them to carbon trading. Moreover, Dr Zhou

suggests, "the government should not only promote standards for new-built construction, but needs to put more effort on existing building stock and encourage retrofits of old buildings".

In the presidential statement, China also committed to "finalize next-stage fuel efficiency standards for heavy-duty vehicles in 2016 and implement them in 2019". Heavy-duty vehicles (HDVs) contribute by far the majority of China's transport emissions, and the International Council on Clean Transportation (ICCT) has suggested that these measures could reduce China's CO_2 emissions by a cumulative 2-4 billion tonnes by 2050, beyond measures already in place. This represents a substantial contribution.

China currently also has in place policies to encourage the adoption of electric vehicles (EVs). It is important to remember, however, that any emissions benefit from EVs depends on the emissions intensity of the energy source, i.e. the electricity grid. In CCF's analysis, due to the Chinese grid's heavy reliance on coal, it is unlikely that conversion to EVs will provide a net emission benefit prior to 2030 (even with ambitious grid decarbonisation). Therefore, alternative fuel-switching options, such as to compressed natural gas (CNG), could be explored further in the meantime for HDVs, public buses and private vehicles. Recent analysis also suggests that significant emission reductions could be achieved through the deployment of fuel-cell vehicles [Gambhir A et al. 2015; ERI 2012]

Conclusions

We identify three key policy challenges which could impact significantly on China's emission reduction efforts to 2030, one macro in scale and two sector-specific. On the economy, trends for key economic drivers suggest lower economic growth in China over the next two years. In that case, it is important that any stimulus measures are targeted toward low-carbon growth, rather than energy intensive construction and support for heavy industry.

In addition, CCF advisors identify two key sectors driving continued emissions growth that will require additional policy measures in order to avoid them pushing back China's emission peak to 2030 or later. The commitments to increase "green buildings" and to adopt higher standards for heavy vehicles are important, however government should work to increase access to finance for green buildings and commit to making carbon reduction a key indicator for building development. While CCF believes that the government could also consider policies to further limit transport emissions, the measure announced in the joint statement is significant. Demonstration of China's commitment to tackle these key sectors for carbon emissions growth could significantly boost confidence in China's emissions commitments at Paris.

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Scenario methodology

Scenario one: follows the same assumptions as in the New Climate Economy China Report 'Accelerated Emissions Reduction Scenario', updated to reflect emission level for 2014.

Avg. GDP growth 2015-2020: 7.31%; 2020-2030: 4.77%.

Emissions intensity reduction 2020: 50%; 2030: 68%.

Scenario two: uses Citi estimates of 'True' growth to 2020, and the NCE estimates thereafter, and uses the current trend in emissions intensity reduction.

GDP growth 2015: 4.66%; 2016: 2.72%; 2017: 2.50%; 2018: 4.35%; 2019: 6.20%; 2020: 5.49%; 2021-2030: 4.77% (avg).

Emissions intensity reduction 2020: 50%; 2030: 68%.

Scenario three: follows drop in GDP growth in scenario two until mid-2016, then moves up to the level suggested by the NCE report. Emissions intensity meets the low end of China's 2030 target (a 60 per cent reduction).

Avg. GDP growth 2015: 4.66%; 2016: 3.92%; 2017-2020: 7.31%; 2020-2030: 4.77% (avg).

Emissions intensity reduction 2020: 44%; 2030: 60%.

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