China emission paradox: Cancun emissions intensity pledge to be surpassed but emissions higher

Climate Action Tracker Update, 4 October 2011

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In this update, the Climate Action Tracker provides insights on China, the USA, Brazil, Japan, South Korea and Australia Government actions on climate change, new economic and energy data, government policies and announcements and developments at the UN climate talks in Panama.

Summary

China

- Recent energy and emissions data and China's new 12th Five-year indicate that China is set to surpass its Cancun Agreement pledge for emission intensity for 2020.
- But largely due to faster than expected economic growth, emissions in 2020 are likely to be higher than previous estimates by about 1 $GtCO_2e$ per year.
- China has been successful in rapidly reducing its energy intensity and in introducing renewable energy and other non-fossil energy sources. China's new target for wind is 70 gigawatts of additional installation by 2015.
- These targets constitute a major effort and, for most model calculations, the non-fossil target leads to emissions dropping by around 580 to 800 Mt CO2 (or 6-8%) below business as usual in 2020.

USA

- The ongoing delays in the USA on climate and energy policy are likely to make achievement if its 17% reduction target more expensive

Brazil

- New data from Brazil shows emissions will grow more rapidly than previously expected (new BAU 18% higher)

South Korea

- Policies are being introduced to implement its pledge

Japan

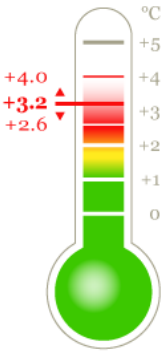
- Japan is holding its conditional 25% reduction below 1990 by 2020 emission reduction pledge, despite the tragic and extremely damaging Tsunami caused by the 2011 Tōhoku earthquake
- Japan introduced a new renewable energy bill in August, which has the potential to reduce emissions.

Australia

- Australia is about to put a price on carbon with a bill currently being discussed in the Parliament, which will introduce a fixed carbon price starting in June 2012, to be replaced by a cap and trade system in 2015.

So how does all of this affect global temperature?

Overall, the aggregated emission-reduction pledges of all Parties fall far short of what is needed to get the world on track for limiting global warming to 2 and 1.5°C above pre-industrial levels. Both of these warming limits are mentioned in the Cancun Agreements. Similar emission levels are needed in 2020 to meet both temperature targets: Global emissions need to be at 40-44 billion tonnes CO_2 equivalent per year by 2020, and to steeply decline afterwards.



The Climate Action Tracker added up the international reduction target and pledges of individual countries, and has estimated that global emissions in 2020 would total 54 billion tonnes CO_2e/year in 2020: A gap of 10-14 billion tonnes remains to reach the reduction level required. If countries implemented the most stringent reductions they have proposed, with the most stringent accounting, the Climate Action Tracker has calculated the remaining gap would shrink to 8-12 billion tonnes[1].

[1] The UNEP Emissions Gap Report, presented in Cancun, December 2010, estimated a smaller remaining gap at 5-9 GtCO2eq, assuming a 2020 2°C-consistent level of 44 GtCO2eq (rather than a range of 39-44 assessed in that report), including the effect of national policy plans beyond international pledges and assuming a certain level of emission reductions from international transport.

The Paradox of China[2]: Cancun Pledge likely to be surpassed but emissions rising faster than expected

Recent energy and emissions data combined with China's 12th Five-year plan announced in March 2011 indicate that China is set to not only meet its Cancun Agreement emissions intensity pledge[3], but is likely to go beyond it. However, at the same time, largely due to faster than expected economic growth, emissions in 2020 are likely to be higher than previous estimates.

A range of data, consistent with the 2011 IMF economic growth outlook for China over the next five years, indicate that China's business as usual emissions will likely be around 13.5 to 14 $GtCO_2e$ per year in 2020 - about 1 $GtCO_2e$ per year above earlier estimates. Previously, the full range estimated was 12.5 to 14 $GtCO_2e$.

China's international emissions intensity target (carbon dioxide emissions/GDP) of 40-45% reduction by 2020 from 2005 levels and its target to achieve a share of 15% non-fossil energy consumption translates into emissions of about 13 $GtCO_2e$ by 2020.

However, this is higher than our previous estimate as it is based on economic growth assumed to be higher than the planned 7% per year. National action not included in the Cancun pledge could reduce China's emissions even further.

China has been successful in rapidly reducing its energy intensity. China reported that energy consumption per GDP decreased by more than 19% over the period 2006 to 2010, coming in just under the domestic target of 20%.

Domestic action included strict energy-saving targets for provinces and companies, leading to closure of small, inefficient industrial plants. Energy per GDP also decreased, because the GDP grew by around 11% per year in that period, compared to the official 11th Five-year plan's projections of 7.5%.

The target of aiming for a further reduction of energy per GDP of 16% 2011 to 2015 is a continuation of the gains achieved over the last 5-10 years. The 12th Five Year Plan introduces a "10,000 Enterprises Program", which is a continuation of the "Top 1,000 Enterprises Program" of the last 5-year-plan. It also specifically endorses market approaches like energy service companies that help to finance energy efficiency.

China has been successful in introducing renewable energy and other non-fossil energy sources. The share of non-fossil energy sources has increased to 8.3% in 2010. China revised its expectations for wind energy upwards: the new target for wind is 70 gigawatts of additional installation by 2015. The domestic target to increase the share of non-fossil fuels in primary energy consumption to 11.4% in 2015 is consistent with the international pledge to increase it to 15% in 2020.

We find that these targets constitute a major effort. China's non-fossil fuel target could lead to emissions dropping by around 580 to 800 Mt CO2 below BAU in 2020 (6-8%).

[2] Ecofys has been analysing energy and climate policies in China for the last five years. Ecofys has representation in China, which closely monitors policy developments.

[3] In April, the Climate Action Tracker rated the China pledge as "inadequate"

China's Climate and Energy Targets

China's Cancun pledge

- **Emissions intensity** - Decrease its carbon dioxide emissions per unit of GDP by **40-45%** by 2020 compared to the 2005 level
- **Non-fossil fuel target** - Increase the share of non-fossil fuels in primary energy consumption to around **15%** by 2020
- **Forestry target** - Increase forest coverage by **40 million hectares** and forest stock volume by **1.3 billion cubic meters** by 2020 from 2005 levels

China's new Five-year plan (12th FYP, 2011-2015)

- **Emissions intensity** - Decrease its carbon dioxide emissions per unit of GDP **-17%** from 2011 to 2015
- **Non-fossil fuel target** - Increase the share of non-fossil fuels in primary energy consumption from 8.3% in 2010 to **11.4%** in 2015
- **Energy intensity** – Decrease energy consumption per GDP by **-16%** from 2011 to 2015

Analysing China's Policies

Any analysis of the impact of these targets on absolute emission depends on assumptions of changes in GDP, energy supply and greenhouse gas emissions. The official GDP, energy and emission data that were used to formulate these targets were not made available with the targets. GDP, energy and emission data from Chinese and international sources are inconsistent due to varying definitions and scope.

Calculations are most sensitive to different assumptions on economic growth, which are very uncertain in the current unstable economic times. This emphasises the fact that a good reporting and monitoring system on the pledges and underlying assumptions is necessary to fully understand their implications.

We considered various sources for the data including the Chinese Energy Research Institute, IEA World Energy Outlook, China Statistical Report, World Bank and IMF.

The three energy-related targets are interdependent. Achieving one will also positively affect the other two. We found that they are formulated quite conservatively such that, if efforts to save energy (the energy target) are successful and efforts to introduce renewable energy and other non fossil sources (the non-fossil fuel target), are successful then China will achieve more than its third target (emissions intensity target).

Further Results on China

China's combined efforts to save energy and to introduce non-renewable sources **decreased the overall emission intensity** (defined as carbon dioxide emissions per unit of GDP). Over the period 2006 to 2010, emissions per GDP decreased by 21% (range 18% to 27% depending on the data source). The achievement of this target greatly depended on economic development. China achieved these reductions in emissions intensity to 2010 because of a combination of national actions and higher GDP growth, which increased by around 11% per year – significantly higher than the 7% projection in the official plan.

The international target of reducing China's emission intensity by 40% to 45% from 2005 to 2020 is a conservative formulation. We find that, if it continues its efforts on energy savings and non-fossil energy and economic growth continues to be as high as predicted, China will exceed this target by 2020. From the point of estimating absolute emission levels higher than expected economic growth will increase the emissions resulting from the achievement of this target. As energy consumption and real emissions do not increase as fast as economic growth, paradoxically in some sense, higher economic growth will therefore make it easier to achieve this target, whilst resulting in higher absolute emissions

The last CAT Analysis (April 2011) showed that China's **forestry target** in the international pledge is of limited influence on national total emissions. The new Five Year Plan does include implementing additional national actions that could reduce emissions further, however CAT is still in the process of quantifying the effect of these measures.

USA: Major policies delayed

The USA's pledge is a 17% reduction below 2005 levels. The Obama Administration has experienced difficulties in moving major policies forward that would contribute substantively to achieving this goal.

Delays in bringing in measures will increase the pressure on policy action. We have looked at the increasing pressure on policy in the USA by analysing the effect of different starting points for implementing action on the required emission reduction rates to achieve the United States' Cancun pledge of -17% below 2005 levels[4].

Annual reductions rate of 1.3% annually would have been needed to reach a 17% reduction from emission levels that prevailed in 2010, just after the announcement of the US target in Copenhagen in December 2009. If the US is not able to substantially ramp up policies before 2015, it will need larger reduction rates of 3% annually to meet its target.

Higher annual reduction rates are more expensive to achieve. The technical feasibility of actually achieving reductions decreases with higher reduction rates, and the costs tend to increase rapidly. Both are depending on national circumstances, but research suggests that a 3% annual reduction would be very ambitious and costly.

[4] Noting that the Climate Action Tracker has already rated the target itself "inadequate"

The reduction rate for delayed action strongly depends on the level of emissions assumed for 2015. In this analysis we make the simplified assumption that emissions reach a level in line with the average of the last five years (2006 to 2010) after 2010, to conservatively demonstrate the overall effect.

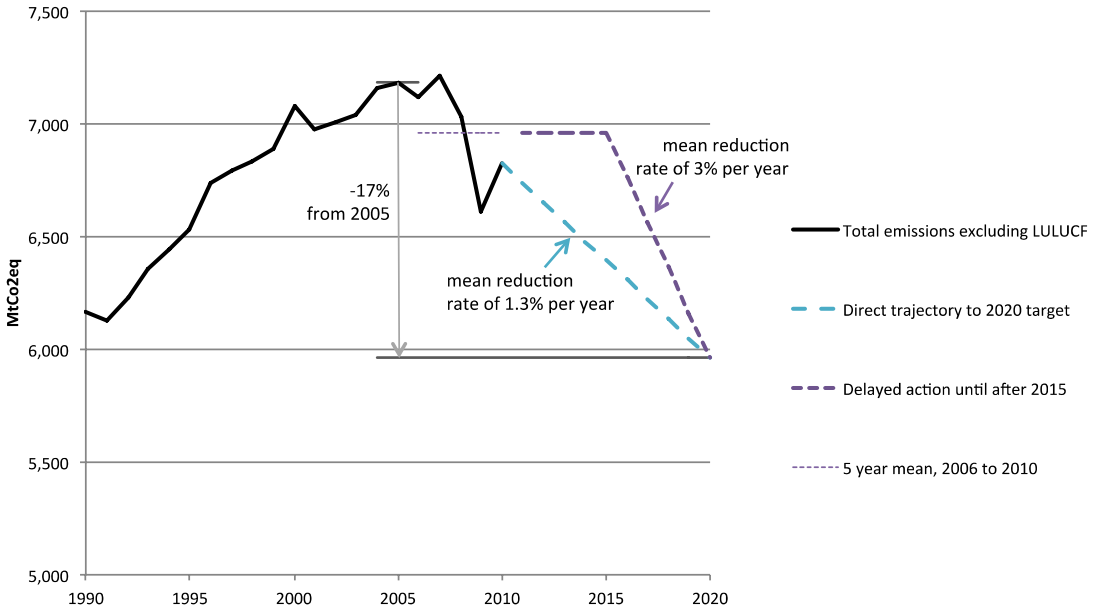


Figure 1: the effect of delays in US policy action [5]

Brazil – Pledge clarified but emissions higher

In April 2011, for the first time, Brazil presented a business-as-usual scenario that forms the basis for its internationally pledged 36% to 39% reduction from business as usual reduction target.

Since Brazil did not specify a baseline in the Copenhagen Accord submission made in January 2010, past analyses had to rely on assumptions and data derived from the Brazilian submission.

The emissions level presented by Brazil in April 2011 is significantly higher than the level that had been previously estimated, leading to a significantly higher absolute emission level in 2020.

Brazil added sources to historical emissions that were not previously included - and projected larger emissions from deforestation and other sources. It also explicitly excluded the effect of planned policies. The baseline also excludes the most recent data on deforestation, which is available for 2006 to 2010, but instead calculates future trend on the basis of the average rate from 1996 to 2005. This also implies higher emissions in the baseline for 2020.

[5] Historical emissions from 2011 national inventory, extended to 2010 using emissions growth estimates from BP Statistical Review of World Energy 2011, see www.primap.org Documentation.

Taken together the new Brazilian information results in business-as-usual emissions being over 0.5 GtCO2 or 18% higher in 2020 than previously estimated, and hence the international pledge will result in significantly higher emissions.

This illustrates the importance of data for estimating the effects of international pledges particularly when they are expressed relative to uncertainty business-as-usual estimates.

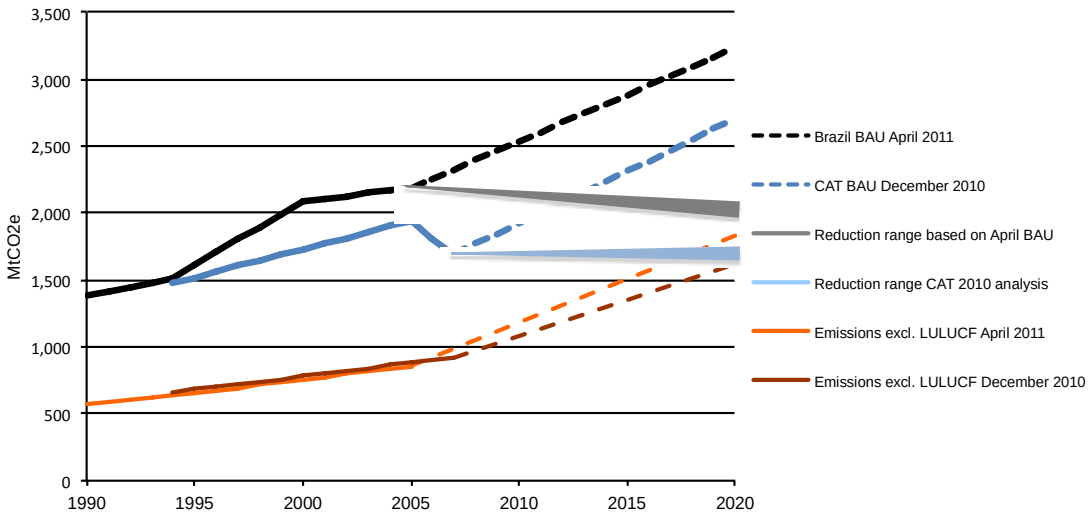


Figure 2 Comparison of latest BAU data provided by Brazil in 2011 and CAT analysis from December 2010

South Korea – starting policies to implement pledge

South Korea pledged to reduce its greenhouse gas emissions by 30% below BAU by 2020. One of the major tools to achieve this will be an emissions trading system (ETS).

Due to resistance from the industry sector, South Korea has delayed the start of the national mandatory scheme to 2015 by two years. This will leave less time than originally intended and require more stringent reductions from 2015 onward to achieve the 2020 target.

South Korea is running a second pilot phase to prepare for 2015 and is working on the legislation necessary for its ETS. If agreed, the ETS would have a target reduction of 236 Mt CO_2 (-29%) compared to BAU by 2020 (industry: -83 Mt, electricity: -68.2 Mt, building sector: -48 Mt, transport: -36.8 Mt). If this plan is agreed and implemented, South Korea will be well on the way to achieving the 30% reduction target.

Japan – Sticking with its pledge and introducing a renewable energy bill

The new Government of Japan is holding to Japan's conditional 25% reduction below 1990 by 2020 emission reduction pledge, despite the tragic and extremely damaging tsunami caused by the 2011 Tōhoku earthquake and the meltdowns at three reactors in the Fukushima Nuclear power plant complex.

Japan is moving on domestic implementation with the approval of a new **renewable energy bill** in August, which has the potential to improve performance. Japan has made clear that achievement of this emissions target is contingent on an international agreement including China and India: "This is not something Japan will do on its own," party secretary-general Katsuya Okada has been quoted as stating in an interview with Reuters[6].

New Prime Minister Yoshihiko Noda envisions a new energy strategy for Japan that will be revealed next year. Plans are for Japan to become a leader in alternative energies and energy efficiency, with a long-term phase out of nuclear energy. A first step towards improved deployment of renewable energy is the "*Act on Purchase of Renewable Energy Sourced Electricity by Electric Utilities*", which was passed in August 2011.

Important details of the bill, like the feed-in rates and the length of the support, still need to be determined. However, the basic regulations regarding the obligation for grid connection and purchase from renewable sources are in place.

Australia – planning a carbon price system

Australia is about to put a price on carbon. Although there is no news on Australia's international position, domestic implementation is moving forward. The bill, currently being discussed in the Parliament, will introduce a fixed carbon price first, starting in June 2012, to be replaced by a cap and trade system in 2015. The initial carbon price will be set at $23 per tonne CO2e, with an annual increase of 2.5%.

[6] "Japan's target hinges on international deal", Reuters, 4 September 2009 http://reut.rs/mynRPy

Background on the Climate Action Tracker

The "Climate Action Tracker", www.climateactiontracker.org, is a science-based assessment by Ecofys, Climate Analytics and the Potsdam Institute for Climate Impact Research (PIK) that provides regularly updated information on countries' reduction proposals.

The Climate Action Tracker[7] reflects the latest status of the progress being made at international climate negotiations. The team that performed the analyses followed peer-reviewed scientific methods (see publications in Nature and other journals)[8] and significantly contributed to the UNEP Emissions Gap Report[9].

The Climate Action Tracker enables the public to track the emission commitments and actions of countries. The website provides an up-to-date assessment of individual country pledges about greenhouse gas emission reductions. It also plots the consequences for the global climate of commitments and actions made ahead of and during the Copenhagen Climate Summit.

The Climate Action Tracker shows that much greater transparency is needed when it comes to targets and actions proposed by countries. In the case of developed countries, accounting for forests and land-use change significantly degrades the overall stringency of the targets. For developing countries, climate plans often lack calculations of the resulting impact on emissions.

Contacts

Dr. Niklas Höhne (n.hoehne@ecofys.com) - Director of Energy and Climate Policy at Ecofys and lead author at the IPCC developed, together with Dr. Michel den Elzen from MNP, the table in the IPCC report that is the basis for the reduction range of -25% to -40% below 1990 levels by 2020 that is currently being discussed for Annex I countries.

Dr. h.c. Bill Hare (bill.hare@climateanalytics.org) (PIK and Climate Analytics) was a lead author of the IPCC Fourth Assessment Report, is guest scientist at PIK and CEO at Climate Analytics.

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7 www.climateactiontracker.org

8 e.g. http://www.nature.com/nature/journal/v464/n7292/full/4641126a.html and http://iopscience.iop.org/1748-9326/5/3/034013/fulltext

9 www.unep.org/publications/ebooks/emissionsgapreport

Ecofys – experts in energy

Established in 1984 with the vision of achieving “sustainable energy for everyone”, Ecofys has become the leading expert in renewable energy, energy & carbon efficiency, energy systems & markets as well as energy & climate policies. The unique synergy between those areas of expertise is the key to its success. Ecofys creates smart, effective, practical and sustainable solutions for and with public and corporate clients all over the world. With offices in the Netherlands, Germany, United Kingdom, China and the US Ecofys employs over 250 experts dedicated to solving energy and climate challenges.
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Climate Analytics

CLIMATE ANALYTICS GmbH is a non-profit organization based in Potsdam, Germany. It has been established to synthesize climate science and policy research that is relevant for international climate policy negotiations. It aims to provide scientific, policy and analytical support for Small Island States (SIDS) and the least developed country group (LDCs) negotiators, as well as non-governmental organisations and other stakeholders in the ‘post-2012’ negotiations. Furthermore, it assists in building in-house capacity within SIDS and LDCs.

www.climateanalytics.org

Potsdam Institute for Climate Impact Research (PIK)

The PIK conducts research into global climate change and issues of sustainable development. Set up in 1992, the Institute is regarded as a pioneer in interdisciplinary research and as one of the world's leading establishments in this field. Scientists, economists and social scientists work together, investigating how the earth is changing as a system, studying the ecological, economic and social consequences of climate change, and assessing which strategies are appropriate for sustainable development.

www.pik-potsdam.de