



The State of Compliance in the Kyoto Protocol

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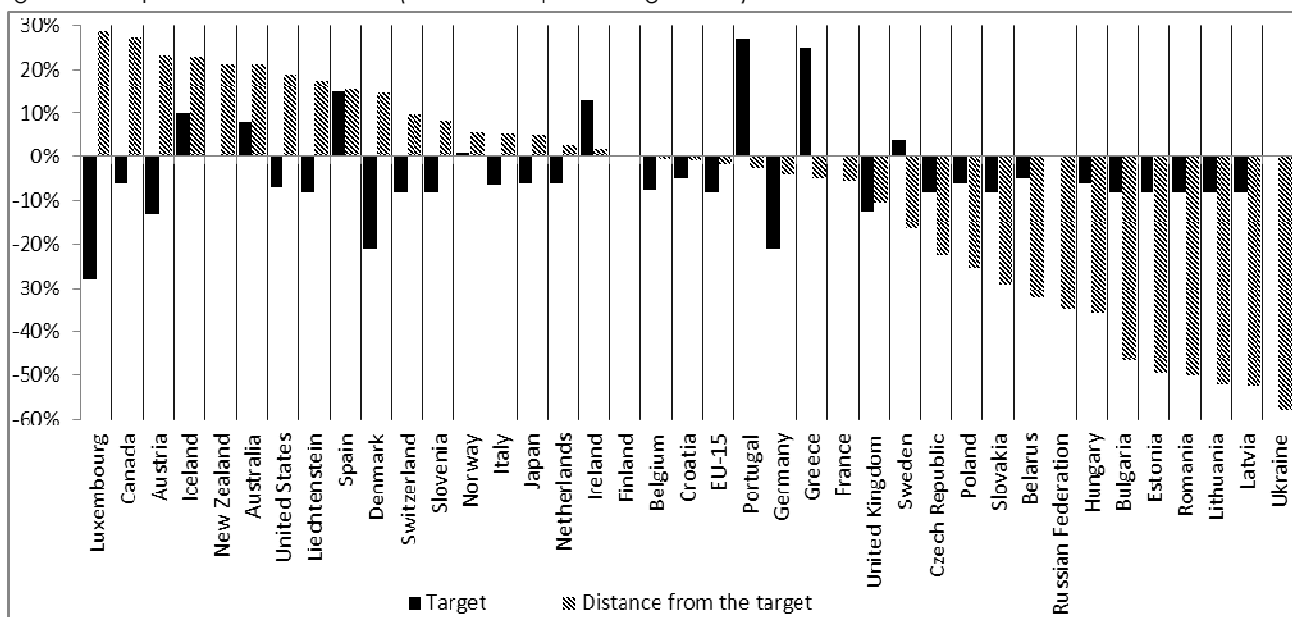
Abstract

The first Kyoto commitment period ends this year. The EU-15 is on track to meet its common target, thanks to Finland, Greece, Portugal, Ireland, France, Belgium, Sweden, the UK and Germany, who accomplished or surpassed their respective targets. Sweden was the best performing country within the EU-15 during 2008-2011. China, currently a crucial player for international climate change agreements, has kept her leading position in global emissions with a share of 29%, ahead of the USA and the EU. This country initiated seven regional ETS pilots in 2012 with trading starting in 2013 and a national ETS in 2015. India, the fifth largest emitter of GHG in the world in 2008 and the fourth largest emitter of CO₂ as recently as in 2011, is said to adopt an innovative market-based scheme for promoting energy efficiency, covering eight sectors responsible for 54% of its energy consumption.

The state of compliance

According to a report released by the Dutch Environmental Assessment Agency this year,¹ global CO₂ emissions reached a peak of 34 billion tonnes in 2011 with the top 5 emitters being China (29% share), the United States (16%), the European Union (EU27) (11%), India (6%) and the Russian Federation (5%), followed by Japan (4%). Among these countries, China and India do not have commitment targets within the Kyoto protocol. The first commitment period of the Kyoto Protocol, which covers six main greenhouse gases (GHGs), runs from 2008 to 2012. During this period, the Annex I² countries have binding commitments to reduce their GHG emissions by given percentages relative to their respective base years, which in most cases is the year 1990, and a common commitment for and aggregate reduction by 5% relative to the 1990 emissions level. The EU-15 itself has committed to a reduction of 8% from the base year, which is distributed among its members via the burden sharing agreement.

Figure 1: Compliance status 2008-2010 (GHG CO₂ eq. excluding LULUCF)



Note: A positive value indicates that the country has exceeded the budget for the 3 years (2008-2010), while negative value shows that the country has emitted less than the 3-year emissions budget.

Source: UNFCCC

Figure 1 shows the compliance with the Kyoto targets during the period of 2008 to 2010, taking account of the emissions without land use (LULUCF). The solid bars represent the targets relative to the base year (1990) as agreed in the protocol. The dashed bars show the distance from the target during the first 3 years of commitment, calculated as a percentage change of the total de facto emissions during 2008-2010, relative to the theoretical 3-year Kyoto emissions budget. The theoretical emissions budget is calculated as:

$$[\text{Theoretical emissions budget}] = [\text{base year emissions}] \times [\text{target}] \times [\text{the number of commitment years}]^3$$

Note that the two bars are not directly comparable with each other. While the first bar shows how countries should perform relative to the base year, the second bar shows how they actually performed relative to where they should be, taking into account the targets calculated from the base year. Thus, bars on the positive side of the graph show that the respective countries have

¹ (Oliver, Janssens-Maenhout, & Peters, 2012)

² These are the developed countries and transition countries which are part of the United Nations Framework Convention on Climate Change. The full list of countries can be found at: http://unfccc.int/parties_and_observers/parties/annex_i/items/2774.php

³ Here the number of commitment years is 3, from 2008 to 2010.

exceeded their targets, at least within the 3-year period for which the data is currently available. For example, Luxembourg and Canada are the farthest from the emissions levels they agreed to keep, by 29% and 27% respectively. Other countries that emitted more than the emissions budget agreed for this period are Austria, Iceland, New Zealand, Australia, the United States, Lichtenstein, Spain, Denmark, Switzerland, Slovenia, Norway, Italy, Japan, the Netherlands and Ireland. The negative dashed bars show countries that have attained a level of over-compliance and most likely have a surplus of Assigned Amount Units. These are mostly those countries that joined the EU after 2004, but Finland, Belgium, Croatia, the EU-15, Portugal, Germany, France, Greece, the UK, Sweden, Belarus and the Russian Federation are also in comfortable positions. Finally, Ukraine is the largest over-supplier of Kyoto units.

On the 2008-2010 horizon, the EU-15 as a whole is almost 2% below the target. However, within the EU-15, seven countries seem to be far from meeting their targets. These are: Luxembourg, Austria, Spain, Denmark, Italy, the Netherlands and Ireland. However, according to the most recent estimates by the Irish Environmental Agency, the emissions inventory of Ireland in 2011⁴ amounted to 57.34 million tonnes,⁵ which brings this country to a status of over-compliance, being 0.55% below the target if the 4-year period of 2008-2011 is considered.

Figure 2 below shows the targets and the distance of the annual average emissions from the base year established by the UN Framework Convention (UNFCCC). The solid bars are the agreed targets, while the dashed bars show the percentage difference between the base year emissions level and the average GHG emissions over the period 2008-2011 for the EU-27 countries and Australia,⁶ and the period 2008-2010 for the rest of the non-EU countries with emission cuts engagements within the Kyoto Protocol. Thus, the difference between the two bars is informative with respect to the under-/over-achievement of countries. The EU-15 is well on its way to achieve its 8% reduction target, being already, on average, more than 10% below the base-year's emissions. Annually, while the EU-15 was above the target in the initial year of the protocol, it performed below its target in the subsequent years. Generally, all countries performed better relative to their targets in the second and third year of the compliance period, which is undoubtedly due to the global economic crisis⁷ (data not shown).

Over the period 2008-2011, the EU-15 has met its target thanks to nine countries (Portugal, Greece, Ireland, Finland, France, Belgium, Sweden, the UK and Germany), which surpassed their targets in the burden-sharing agreement. The worst performing countries are Luxembourg, Austria and Spain, followed by Denmark, Italy and the Netherlands. Within the EU-15 it is interesting to note the case of Finland, whose target is to preserve its emissions at the same level as in 1990. According to the latest data published by the Finish National institute, Finland decreased its emissions by 9.7% to 67.3 million tonnes in 2011,⁸ which brings it to 1.15% below the target. Among the EU-15, Sweden is the best performing relative to its target. Although it was allowed to go 4% above the 1990 emissions level, during the period from 2008 to 2010, Sweden's emissions were about 17% below the Kyoto budget for these 3 years, or 13.3% below the base year (Figure 2).

GHG data for 2011 is also available for Australia. In its March quarterly report from 2012, the Australian Government shows that the level of GHG during the year to December 2011 was 546.3 million tonnes CO₂-eq.⁹ Australia, a key GHG emitter, is one of the main non-compliant signatories of the protocol, being 21% over the 4-year Kyoto budget to 2011. Despite its reliance on coal for electricity production, Australia has recently announced its intention to agree on a continuation of the Kyoto protocol as well as on further commitments.¹⁰

⁴ Inventory emissions data for 2011 is generally unavailable.

⁵ (EPA, 2012)

⁶ The data for 2011 is based on the estimates published by (European Environment Agency, 2012)

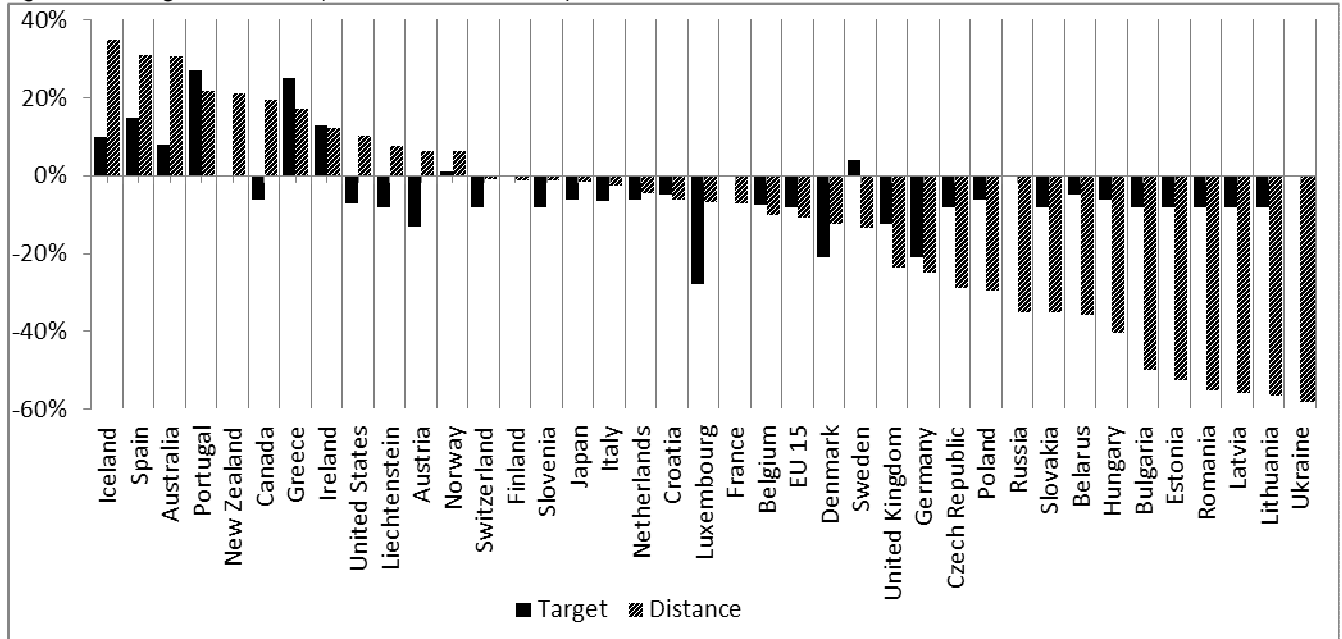
⁷ (European Environment Agency, 2012)

⁸ http://tilastokeskus.fi/til/khki/2010/khki_2010_2012-04-26_tie_001_en.html

⁹ (AUSTRALIAN NATIONAL GREENHOUSE ACCOUNTS, April, 2012)

¹⁰ In the news: http://www.channelnewsasia.com/stories/afp_asiapacific/view/1236183/1.html

Figure 2: Average annual compliance over 2008-2011 period¹¹



Note: A positive value indicates that a country has exceeded its annual budget, while negative value indicates that a country's emissions were below the annual target.

Source: UNFCCC and (European Environment Agency, 2012)

China and India

China and India are becoming important players in the global GHG arena. The CO₂ emissions in these countries increased by 9% and 6% respectively in 2011, relative to the previous year, and their share in global CO₂ emissions now equals that of the OECD.¹² Figure 3 shows the level of CO₂ emissions¹³ over time, from 1990 to 2011, for the six largest emitters in the world. In this chart it is interesting to note the evolution of China, whose CO₂ emissions level was half that of the USA in 1990, as China is currently emitting twice as much as the USA. China overtook the USA in 2005, becoming the largest emitter of GHG. Therefore, China is becoming a crucial player in the international climate change agreements and the continuation of the Kyoto Protocol. Although currently not part of international agreements for climate change mitigation, China has hosted almost half of the CDM projects implemented worldwide, which generated 600 million credits. However, China's emissions are anticipated to reach their peak around the year 2030 due both to a flattening demand for home appliances, which simultaneously are becoming more energy efficient, and the Chinese industry's shift away from coal.¹⁴ Preparing to launch a domestic cap-and-trade scheme starting in 2015, the Chinese government released an order in May of this year, that binds state-owned enterprises in electricity production, manufacturing, telecommunications and transport to monitor and report their emissions of GHG annually, starting this year.¹⁵ The planned national Chinese ETS will include coal-fueled power plants and the steel and cement industry, as the main objective of the scheme is to phase out inefficient industries rather than cut the GHG.¹⁶ China will start seven regional or city level ETS pilots in 2012 and trading can commence as early as 2013. Each region has been given the authority to choose which sectors to include in the scheme.¹⁷

¹¹ For the non-EU countries, only data up until 2010 is available, so the comparison is with respect to the 2008-2010 period.

¹² (Oliver, Janssens-Maenhout, & Peters, 2012)

¹³ Other GHG are not included in these figures.

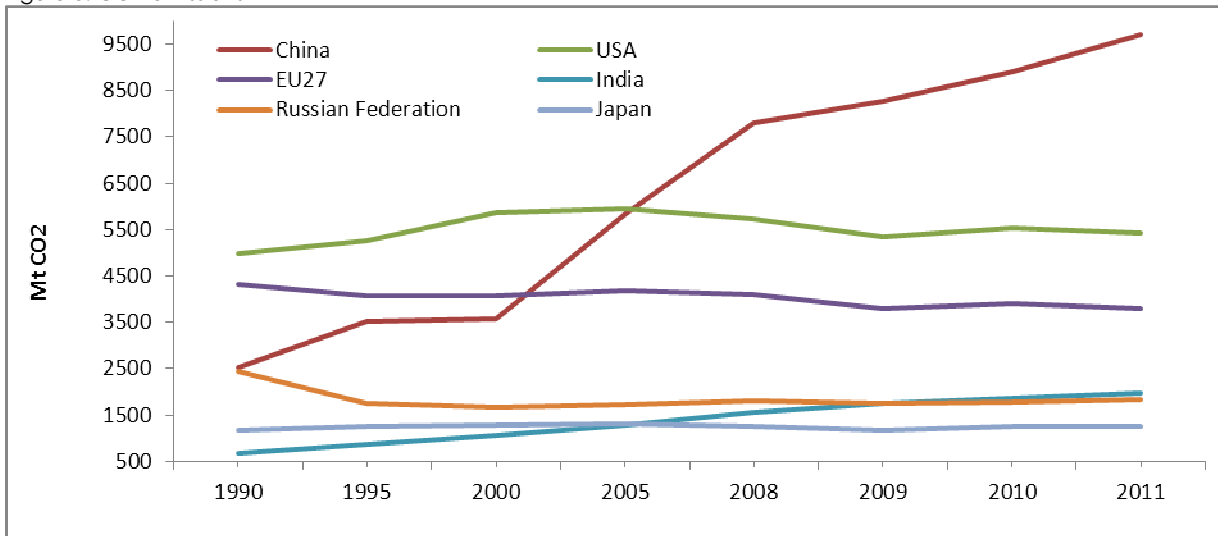
¹⁴ (Zhou, et al., 2011)

¹⁵ <http://www.pointcarbon.com/news/1.1910936?date=20120601&sdctc=1>

¹⁶ (Point Carbon, 2012)

¹⁷ The regions are: Beijing, Chongqing, Guangdong, Hunan, Shanghai, Shenzhen and Tianjin.

Figure 3: CO₂ emissions



Source: EDGAR database

While in the past India has been below Russia and Japan, its upward and steadily increasing CO₂ emissions trend has exceeded both of these countries. In 2008, India was the fifth largest emitter of GHG in the world and in 2011 it was already the fourth emitter in terms of CO₂ alone (see Figure 3), overtaking Russia to a position behind China, the USA and the EU-27. A report released by the Government of India, which forecasts the Indian production of GHG based on five different models, shows that India's GHG will be between 4 and 7 billion tonnes in 2030.¹⁸ However, the per capita GHG in 2030, estimated to be between 2.8 and 5 tonnes CO₂-eq, will still be below the global average 25 years prior. Four out of the five studies in this report estimate that the per capita emissions will stay below 4 tonnes. Despite the fact that India, like China, refuses to engage in emissions cuts through international binding agreements, the country is said to adopt an innovative market-based scheme (PAT) as part of the National Action Plan for Climate Change, to promote energy efficiency, based on certificates for meeting energy efficiency targets and allowing for their trading.¹⁹ The mandatory energy efficiency scheme, planned to commence in 2014 aims to reduce the emissions intensity by 20%, to 25% of the 2005 level, by 2020. The scheme will cover eight sectors responsible for 54% of India's energy consumption.²⁰

Conclusions

On the 2008-2010 horizon, the EU-15 as a whole was almost 2% below the target, an achievement that was facilitated to some extent by the recent economic crisis. However, within the EU-15, seven countries were far from meeting their targets: Luxembourg, Austria, Spain, Denmark, Italy, the Netherlands and Ireland. In the extended period to 2011, the EU-15 has surpassed its target thanks to the good performance of nine countries (Portugal, Greece, Ireland, Finland, France, Belgium, Sweden, the UK and Germany) that surpassed their targets in the burden sharing agreement. The worst performing countries are Luxembourg, Austria and Spain, followed by Denmark, Italy and the Netherlands. As for the countries with non-binding agreements in the Kyoto Protocol, China is currently the largest emitter of GHG, having overtaken the USA in 2005. This year China launched domestic ETS pilots at regional level in seven regions or cities, with trading to be expected as early as 2013. In turn, India was the fifth largest emitter of GHG in the world in 2008, and in 2011 it was already the fourth emitter in terms of CO₂ alone. India's per capita emissions are estimated to stay below 4 tonnes in 2030. Thus, given their continuous emissions growth, China and India are now crucial players in the global emissions arena. Despite this fact, they are not currently part of any international climate change agreements.

¹⁸ (Climate Modelling Forum, 2009)

¹⁹ <http://www.thehindubusinessline.com/opinion/article2726531.ece>

²⁰ (Han, Olsson, Hallding, & Lunsford, 2012)

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