

Jenni Pääkkönen: China and the new climate treaty

The objective of the climate conference in Copenhagen is to achieve a new climate treaty to replace the Kyoto Protocol, which expires in 2012. This time, it is hoped to get all the key countries on board, as the United States, China and India, the largest producers of greenhouse gases, did not sign the Kyoto Protocol. The key objective of the new treaty will be to keep average temperatures from rising more than two degrees Celsius by 2050. In Europe, the view seems to be that the target will be reached if carbon dioxide (CO₂) emissions are reduced globally by at least 50% below 1990 levels by 2050. Annual emissions should thus be reduced to 10.5 billion CO₂ tonnes, or even further. Emission levels should start falling by 2020.

With regard to reaching the emission target and achieving a binding agreement, the key issues are burden sharing and the allocation of costs, ie what the country-specific emission reduction targets will be and who will pay. Agreement must also be reached on the transfer of technology from industrial to emerging economies.

How will the burden be shared?

China's and India's CO₂ emissions grew by over 170% and 125%, respectively, in 1990–2007. In the same period, US emissions grew by less than 20% and those in the EU27 shrank by 3%. In Russia, emissions decreased by nearly 30%, as production facilities were closed and industry was modernised following the collapse of the Soviet Union. Using 1990 as a baseline is, however, problematic, as it is only in recent decades that eg China and India have begun to develop and shrink the income disparity between themselves and the wealthiest countries. Moreover, industrial economies' history of pollution is much longer than that of the emerging economies.

It is hard to compare the absolute emissions of different countries, as the most common indicators measure pollution relative to output instead of relative to final consumption. Industrial economies have transferred production to emerging economies, which are therefore polluting on behalf of the West. Dividing the emissions burden equally between all countries would thus lead to an unfair outcome for the emerging economies. In China, for example, reducing emissions by 50% from 1990 levels by 2050 would mean cutting emissions by over 80% from their current level, while the United States, the EU27 and Russia would have to reduce emissions by 58%,

48% and only slightly under one-third, respectively. Some G8 countries have therefore proposed that industrial economies should reduce emissions by as much as 80% and emerging economies take responsibility for the rest of the reductions.

Emissions per capita is a useful measure, as it reflects differences in way of life. Currently, US emissions per capita average 19 tonnes per year, and it should be no surprise that the USA ranks 8th in the global list of polluters. EU emissions per capita totalled nearly 8 tonnes in 2007, and those of China 4.6 tonnes. The IEA forecasts that China's emissions per capita will reach the level of European OECD countries in 2030 (ie 7.5 CO₂ tonnes per capita). In 2030, the Chinese population will total around 1.4 billion, and China's absolute CO₂ emissions would be around 10.5 billion tonnes. It is therefore clear that, without a significant effort by China, the target of reducing greenhouse gases globally by 10.5 billion CO₂ tonnes annually will not be reached.

Let us look at the issue from another angle. If the target for 2050 is set at 10.5 billion tonnes, and the G8 countries were to reduce emissions by 80%, how much of the emissions quota would be left to divide between the rest of the world? If we assume that, in addition to the G8, all the OECD countries and Russia, together with the entire former Soviet Union, sign the treaty, the emissions quota of these countries would be slightly less than 3 billion tonnes per year in 2050. The quota to be divided between the rest would thus be slightly over 7 billion tonnes, equal to the aggregate emissions of China and India in 2007. Thus, if these countries do not agree to considerable reductions, the target for 2050 cannot be reached.

Is technology transfer the answer?

What type of production structure and technology could yield the desired outcome? If we examine emissions relative to purchasing-power-parity-adjusted GDP (CO₂ emissions per GDP (PPP)), ie carbon intensity, we get a picture of the pollution generated by the production structure and technology of various countries. As pollution is measured relative to a country's current income level, this approach favours wealthy countries. Keeping this in mind, the indicator gives a fairly good picture of a country's current level of production technology.

In 2007, Russia's CO₂ emissions per GDP (PPP) totalled 1 kilo of CO₂, ie one of the largest in the world. The figure for China is 0.61 kilo of CO₂ per

GDP. In this comparison, the United States (0.50) comes close to China, whereas the EU (0.32) does better than the United States. Of the industrial economies, Sweden comes out best: its emissions per unit of production were only 0.15 kilo of CO₂. Sweden's production structure and technology can thus be considered fairly clean by current standards.

Would even a level of technology equal to that of Sweden be enough to reach the global emissions target of 10.5 billion tonnes of CO₂? If the world economy continues to grow for the next 40 years at nearly the same pace as in the past 40 years, the global aggregate GDP at PPP will be nearly USD 185,000 billion in 2050. If we multiply this figure by Sweden's current carbon intensity, the estimated level of emissions in 2050 would be 27.8 billion tonnes, 150% higher than the target. To reach the target, the G8 would have to achieve a carbon intensity of 0.02 by 2050, and the other countries a carbon intensity of less than 0.1. Technology transfer will not be enough; technological advances will also be essential.

Could China benefit from a strict treaty?

China has actively pointed out that it is an emerging economy that produces consumer goods for other countries and is actually not responsible for polluting the Earth prior to the start of its recent economic growth. However, even if these factors are taken into consideration when emission targets are set, without China, the target will not be achieved.

Despite its expressed reservations, China has understood the impact of pollution on the environment and its citizens. Of the world's most polluted cities, 25 are located in China, and annually around 300,000 Chinese die prematurely as a result of pollution. The surface water is highly polluted and the sufficiency of groundwater is a problem. China simply has to focus on its environment.

Of China's emissions, as much as 83% are due to the burning of coal, as approximately 70% of energy is generated with coal. Coal accounts for a much higher proportion of energy production in China than in any other country. Emissions could easily be cut by decreasing the use of coal and increasing the proportion of non-fossil energy sources, to which China has already committed itself.

Somewhat surprisingly, China seems to have become one of the forerunners in the production of clean technology. According to some estimates, China's public investment in clean technology in 2009–2013 will be many fold compared with other

Asian countries and the United States. China is the leading manufacturer of wind power turbines and solar panels and has invested in the production of electric cars. In addition, China recently agreed with Japan on cooperation in waste management, energy saving and technology transfer. Considering the current state of the Chinese environment and China's investment in clean technology, the Copenhagen treaty might not be a threat but an opportunity.

Where do we stand on the eve of Copenhagen?

It seems that China and the United States will not accept 1990 as a baseline, but opt for 2005, as 1990 is unfavourable for them. Both countries announced their targets on the eve of the conference. The USA promised to reduce emissions from 2005 levels by 17% by 2020 and 83% by 2050. This corresponds to approximately 1% and 76% reductions from 1990.

China expressed its emission reduction targets in terms of carbon intensity, announcing a target of reducing carbon intensity by 40–45% by 2020. At China's current rate of GDP growth (approx. 8%), reaching this target will not require major sacrifices. China's carbon intensity was 0.63 in 2005, meaning a 45% reduction equals a carbon intensity of approx. 0.35. An 8% growth in China's GDP (PPP) in 2005–2020 equals a GDP of USD 23,800. This, multiplied by the targeted carbon intensity, gives a target level of 8,200 million tonnes of absolute emissions, which is as much as 35% higher than the current level.

The point of departure for the Copenhagen negotiations is interesting. China and the United States have announced their targets, but they are far from what Europe wants.

Table: CO₂ emissions in 1990 and 2007.

Emissions CO ₂	Mill. tonnes		per capita		per GDP	
	1990	2007	1990	2007	1990	2007
China	2244	6071	2.0	4.6	1.1	0.6
United States	4863	5769	19.4	19.1	0.7	0.5
Russia	2180	1587	14.7	11.2	1.4	1.0
India	589	1324	0.7	1.2	0.4	0.3
Japan	1065	1236	8.6	9.7	0.4	0.3
EU27	4059	3926	8.6	7.9	0.5	0.3
Latin. America	604	1016	1.7	2.2	0.3	0.3
Africa	546	882	0.9	0.9	0.4	0.9
World	20981	28962	4.0	4.4	0.6	0.5

Source: IEA.

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