



BLOG POST March 18th 2015

Stable CO2 emissions in 2014: Why and what implications for Paris ?

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🕒 Reading time: 4 min



A few days ago, the International Energy Agency announced that according to its early estimates, global energy-related CO2 emissions had remained stable in 2014. This is the first time that emissions have not grown, outside of periods of major recession. Indeed, the world economy grew by 3% in 2014.

Why are we seeing this trend and what does it mean for the Paris climate negotiations? It should be noticed that encouraging signs have been seen in the energy sector in three major CO2 emitters (EU, US, China) for some years. They have not suddenly appeared overnight. All three regions have been decarbonizing their electricity supply, the carbon intensity of which has fallen by 18% in the US between 2005 and 2013 for example. China and the EU have shown similar albeit slightly smaller improvements. This has been due to a decrease in coal consumption in the EU

and US. It's interesting to note that US coal consumption in the electricity sector has fallen less than in the EU, despite the supposed benefits of shale gas driving out coal. Coal appears to have declined for the first time in China in 2014 in part in response to efforts to reign in local air pollution. Wind and solar have also shown enormous growth, and now make up 10% of electricity generation in the EU for example up from just 2% in 2005. In China, wind and solar contribute more to electricity production than nuclear.

So in the electricity sector, we are already seeing the signs of significant change, through a combination of policy driven expansion of renewables, and nuclear in China; and a shift to natural gas particularly in the United States.

Another part of the story is what is happening on the demand side. Here it is important to distinguish between three interrelated levels of change: economic, technological and policy-driven. We can illustrate this with the case of China. In China, 2014 saw a dramatic slow-down in electricity demand increase, from the double digits of the decade before to just 1.1% between 2013 and 2014. This is probably a sign of a slowdown in industrial production as China's economy softens and restructures towards less energy intensive activities; this is a trend which could have major implications for China's emissions in the future. So part of China's contributions to lower emissions in 2014 was due to economic factors, related to a slow-down and a (welcome) reorientation of its growth model. But of course, China has also been benefiting from 'natural' and policy-driven technology improvements. The energy intensity of the Chinese economy has dropped by 23 percentage points between 2005 and 2013, even when the effects of economic restructuring are stripped out. Some of this is due to 'natural' technology improvements; some of it is due to significant policy efforts to improve energy efficiency and drive technology innovation and uptake. For example, the efficiency of the transformation of primary energy into useful energy is only 4% lower in China than in the US; this is a clear signal that China is using the best available technologies.

Similar trends can be seen in the EU and the US. Oil demand for transport has fallen by 10% in the EU and by 7% in the US between 2005 and 2013, as consumers reacted to higher oil prices and regulators implemented more stringent fuel economy standards. There are signs, however, that in the US lower oil prices are already shifting consumers' purchase and driving behaviour towards less energy efficiency. Nonetheless, Obama's fuel efficiency standards, in place until 2025, will continue to lift the efficiency of the transport sector in the US. It seems that efficiency measures are also being reflected electricity consumption, which has been roughly stable in the US and EU since 2005.

What are the implications of all this for Paris? Firstly, it is encouraging that we are seeing policy efforts starting to bear fruit in the major economies. The data clearly shows policy-driven declines in the carbon intensity of energy, particularly in the electricity sector. Clearly, this trend is not enough compared to the deep and long-term transformation needed to limit warming to below 2 degrees. Nor is it happening at the same pace in all sectors or for all technologies. But it is a shift in the right direction. Secondly, it shows the importance of a 'real-time' and detailed understanding of policy progress in key economies. Distinguishing the fruits of policy from the fruits of chance is a complicated task, and requires going deeper than just looking at emissions. The transparency regime in the new agreement could also help to provide this detail. It is also important that the civil society and research community also contributes to providing this snapshot, for example through real-time reports on the state of decarbonisation in major economies.

Why is this important? One of the major drivers of policy action is a sense of feasibility and self-interest. If countries and companies see that the world economy is starting to shift, they have every interest in ensuring that they are part of this trend; hence accelerating it.