IEAGHG Information Paper: 2017-IP6; The Technological Challenge to meet 2^{0}C warming

An interesting new study has been published in Nature Climate Change. The study entitled: Key Indicators to Track Current Progress and Future Ambition of the Paris Agreement has been shared online by the authors[1] at:
http://www.nature.com/articles/nclimate3202.epdf?author_access_token=1Sd7iKv52Fj3ZhT-DHvZ0NRgN0jAjWel9jnR3ZoTv0O4_VJdbVdaQEq3dQ_4Qoie9NCOH5YfFZCvgtQFGXT2eqWlJYF5H83_LnTa_jtLV_6ba8Ft_aC5cZE_2uvqjQtK.

The underlying issues covered in the paper are:

That the Current emission pledges in the NDCs to the Paris Agreement are insufficient to hold the global average temperature increase to well below 2°C above pre-industrial levels. Which I think is generally agreed.

With regard to global CO_2 emissions, they conclude that the recent slowdown in global emissions growth is due to reduced growth in coal use since 2011, primarily in China and the United States. This is again consistent with other published data. They project that the slowdown will continue in 2016, with global CO_2 emissions from fossil fuels and industry projected to be similar to the 2015 level of 36 $GtCO_2$. In other words, global emissions will have not increased for 3 years in a row. Whilst the authors stress this is positive news, they raise their underlying concerns that: cumulatively emissions are still increasing and that emissions need to rapidly decrease to zero to meet the Paris Agreement target.

In terms of CO_2 emissions and GDP they indicate there was a historical link with rising emissions and GDP growth. More recently, however, that link has been broken and that emissions in countries like China are now increasing at a lower rate than GDP growth. This decoupling is something the IEA has identified[2].

Reductions in the carbon intensity of countries like China, the EU and the USA have resulted as a consequence of the increased share of renewables in their energy mix. They indicate that there has been strong growth in renewables (wind/solar) for energy use in these regions, but despite this the growth in energy use globally has largely been taken up by increased fossil fuels use. Nuclear and hydropower have not contributed much at all.

The authors suggest that, whilst the uptake in wind/solar for energy use has been significant, they do not feel that it will be possible for renewables to meet the full demand in energy growth going forward unless growth in energy use globally declines sharply in coming years.

On technological developments and their impact on the 2^{0}C scenario they conclude:

- Nuclear growth has stalled post Fukushima
- Hydro power is not predicted to grow strongly

[1] The authors are from: the Centre on International Climate and Environmental Climate Research (Norway), the Global Carbon Project, CSIRO Oceans and Atmosphere, (Australia), the Mercator Research Institute on Global Commons and Climate Change (Germany), the Department of Earth Systems Science, Stanford University (USA), the Tyndall Centre for Climate Change Research, University of East Anglia (UK)
[2] IEAGHG Information Paper: 2016-IP5; PRESS RELEASE: Decoupling of global emissions and economic growth confirmed, see http://www.ieaghg.org/docs/General_Docs/Publications/Information_Papers/2016-IP5.pdf

- Fossil fuel use must decrease significantly soon and must deploy CCS. They acknowledge that CCS deployment is off target to meet the 2^0C scenario, as does the IEA[3].
- Wind/Solar deployment is on target with the 2^0C scenario, but growth must accelerate rapidly in future years, again as noted by the IEA.
- On negative emissions and bioenergy/BioCCS the authors cast doubt whether sufficient sustainably grown biomass will be available at the scales needed.

The authors then suggest that up to 2030 current technology deployment is in line with the 2^0C scenarios drawn up the by the IPCC in its 5th Assessment report, but then raise the question what happens if deployment of certain key technologies in the scenarios like CCS don't ramp up. They raise the prospect that other technologies will have to ramp up even faster, if that is possible.

Finally, they suggest that there is an absence of alternative scenarios that include; transformational and behavioural life style changes, low CCS/high renewables deployment, alternative forms of CO_2 removal like DAC's and solar radiation management.

Overall, I don't think there is anything new with regard to the rate of technological deployment etc. of CCS and renewables, BioCCS that has not been muted elsewhere. But the paper does help reinforce the message to Governments that the NDCs are not enough and you must show more ambition and invest in the deployment of technologies like CCS now, not continue to build unabated fossil plants.

In a separate article in Phyics.Org that reported on this paper which headlined: **Renewables can't deliver Paris climate goals:** see https://phys.org/news/2017-01-renewables-paris-climate-goals.html
In this paper they quote the lead author of the above study as saying that:
"Unless the emissions from fossil fuels goes down, the 2^0C target is an impossibility".

They then go on to say that CCS has been promoted by the UN's Climate Science Panel (the IPCC) that CCS is the answer to the problem, but whereas thousands of plants need to be built by 2030 to date, only 2 have been. Two is a strange number to quote, it might refer to Boundary Dam 3 and the NRG project in Texas in the power sector, whereas we know there are 16 or more in both industry and the power sector. But the messaging in the media is quite consistent that it downplays the number of CCS plants that are operational, but at least we seem to have stepped away from "none have been built yet"; a small step forward.

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[3] http://www.iea.org/publications/freepublications/publication/TrackingCleanEnergyProgress2016.pdf