IEAGHG Information Paper: 2017-IP21; Methane Emissions continue to increase

In a recent IP, IEAGHG drew members' attention to the fact that both the IEA and the Global Carbon Project had reported the global emissions of CO_2 had stayed static for the last three years in a row, giving some cause for optimism post COP21[1].

The Global Carbon Project also develops an annual Global Methane Budget, and the budget for 2016 can be found at: http://www.globalcarbonproject.org/methanebudget/

The main headline from this budget analysis is that, unlike CO_2 emissions, methane concentrations in the atmosphere are increasing. This is a significant development because methane is a much more potent greenhouse gas than CO_2 and increases in methane concentrations will offset the impact caused by CO_2 concentrations remaining static.

A paper published in IOP Science, Environmental Research Letters[2] based on the outcomes of the global Methane Budget analysis for 2016 entitled, ***"The growing role of methane in anthropogenic climate change"*** summarises the results as follows:
Unlike CO_2, atmospheric methane concentrations are rising faster than at any time in the past two decades and, since 2014, are now approaching the most greenhouse-gas-intensive scenarios. The reasons for this renewed growth are still unclear, primarily because of uncertainties in the global methane budget. New analysis suggests that the recent rapid rise in global methane concentrations is predominantly biogenic-most likely from agriculture-with smaller contributions from fossil fuel use and possibly wetlands. Additional attention is urgently needed to quantify and reduce methane emissions. Methane mitigation offers rapid climate benefits and economic, health and agricultural co-benefits that are highly complementary to CO_2 mitigation.

Methane appears to play an increasing role in on-going anthropogenic climate change, particularly in light of the slowdown of CO_2 fossil fuel emissions over the past three years. Methane emissions from increasing agricultural activities seem to be a major, possibly dominant, cause of the atmospheric growth trends of the past decade. The rapid increase in methane concentrations offers a growing mitigation opportunity, acknowledging the need to balance food security and environmental protection. Keeping global warming below 2°C is already a challenging target, with most of the attention placed primarily on CO_2 emissions. Such a target will become increasingly difficult if reductions in methane emissions are not also addressed strongly.

There are also two press releases in English that offer further reading for those interested:

1. Atmospheric methane concentrations are rising faster over the last years than the past 20 years.See: www.globalcarbonproject.org/methanebudget/16/files/France_LSCE_GCPMethaneBudget2016.pdf

2. Methane from food production could be wildcard in combating climate change, Stanford scientist says, see http://news.stanford.edu/press/view/11773

The first introduces an infographic that summareises the emissions sources and sinks for methane, which is given below for reference overleaf.

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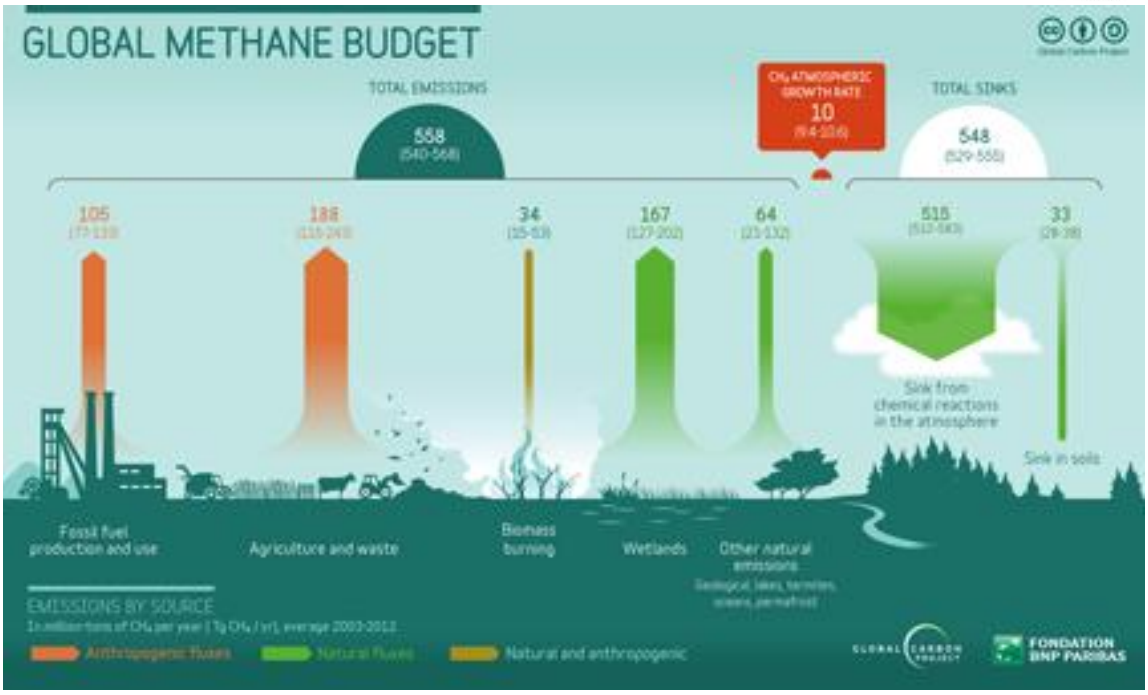
1 Information Paper: 2017-IP20; The Global Carbon Budget for 2016 and its implications - http://www.ieaghg.org/docs/General_Docs/Publications/Information_Papers/2017-IP20.pdf

2 http://iopscience.iop.org/article/10.1088/1748-9326/11/12/120207



The main points to emphasise from the first paper are:

- Since 1750, its atmospheric concentration has more than doubled due to human activities. After a period of stabilizations in the early 2000s, methane concentrations are rising again since 2007, and faster than at any time in the past two decades since 2014.

The methane budget shows that:

- Natural emissions: Adding-up the individual estimates of all natural sources of methane using process-based approaches leads to much larger total emissions than expected from atmospheric observations.
- Anthropogenic emissions represent about 60% of total methane emissions.
- Fossil related emissions: Emissions of methane produced more than 50,000 years ago, could represent about 30% of the total methane emission, tough it is still debated. Among them, 30% are natural (geological seepages) and 70% anthropogenic (coal, oil and gas production and use).
- Methane emissions from agriculture activities and waste management (enteric fermentation, manure management, rice cultivation, landfills and wastewater handling) represent about 60% of the anthropogenic emissions. Livestock (enteric fermentation and manure management) contribute one third of anthropogenic emissions; rice cultivation about 10% of anthropogenic emissions.

The second discusses the need for methane mitigation, particularly in the agricultural sector. What it does not address is the difficulty in achieving methane reductions in the agricultural sector. This is a point that IEAGHG raised in an earlier IP on this topic see: IEAGHG Information Paper: 2016-IP14; Climate Targets for Agriculture in a post COP21 World, see:
http://www.ieaghg.org/docs/General_Docs/Publications/Information_Papers/2016-IP14.pdf

The IP was based on a report by IIASA, which raised many issues and concerns regarding the ability of the agriculture sector to be able to mitigate greenhouse gas emissions whist meeting the food production needs of growing regional populations.

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