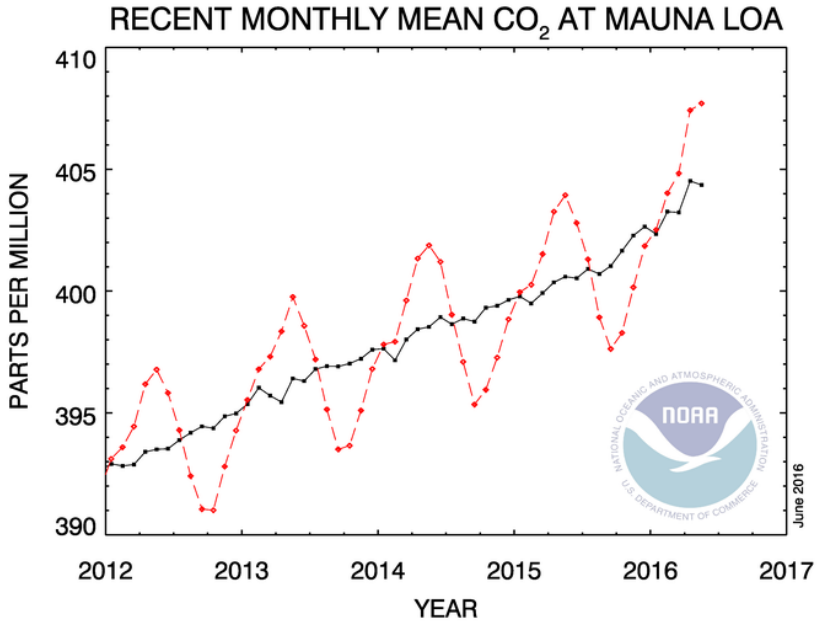
IEAGHG Information Paper: 2016-IP15; Hitting new highs and lows and Achieving Goals, news from the USA

The US National Oceanographic and Atmospheric Administration (NOAA) provides up to date data on the atmospheric concentrations of CO_2 in the atmosphere[1]. The data record for the last 4 years was published in June 2016, see below.



The data set shows a steadily increasing concentration of CO_2 in the atmosphere. In June 2016 NOAA reported that in May 2016 they recorded the biggest year-over-year jump in atmospheric levels of CO_2 record — 3.76 parts per million. This took May 2016 to the highest monthly levels of CO_2 in the air ever measured — 407.7 ppm. Projecting forward this trends look like we will hit 410ppm by 2020.

Other news from the USA however gives us some cause for optimism that we can slow this rise. The US Energy Information Administration (EIA) has just published data[2] that shows that CO_2 emissions from electric power plants have fallen to their lowest level in decades. Emissions from electricity generation in 2015 were 21 percent below 2005 levels.

Electricity generation in the U.S. produced 1.9 billion metric tons of CO_2 emissions in 2015 approximately the same as in 1993. Emissions peaked in 2007, when the country's power plants emitted 2.4 billion metric tons of CO_2. By 2014, power plant emissions had dropped to about 2.05 billion metric tons.

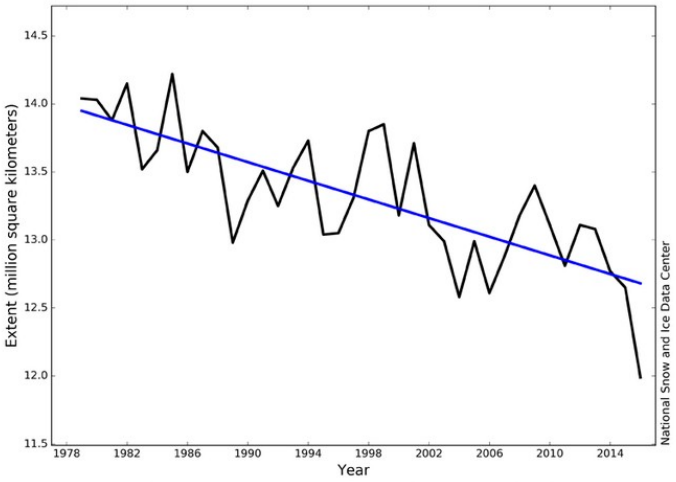
The reasons attributed by the EIA as contributors to the fall in emissions are:

- Warmer winters in the U.S. (influenced by global warming), have reduced heating needs for homes, driving down electric power demand in the winter months.
- There has been a shift in the way electricity is generated — from coal to natural gas and renewables from coal to natural gas and renewables. A decade ago, 8 percent of U.S. electricity came from renewables. Last year, they were the source of 13 percent of the country's electricity. Low natural gas prices have encouraged to build new power plants that run on natural gas

[1] http://www.esrl.noaa.gov/gmd/ccgg/trends/index.html
[2] http://www.eia.gov/?src=apiviz

It is interesting to note that the key legislative action in the USA, the Clean Power Plan to reduce emissions from power plants has been stalled. The emission reductions are being driven by market factors like the low price of natural gas and the declining cost of renewable generation technologies, which of course can change. The emission reductions go a long way to achieving the targets of the Clean Power Act which is to cut emissions by 32 percent below 2005 levels by 2030, mainly by reducing CO_2 emissions from coal-fired power plants.

The National Snow and Ice Data Center of the USA reported that May 2016 saw Arctic sea ice extent drop "about 600,000 square km (232,000 square miles). This was the lowest artic ice sea ice extent in the 38-years that satellite recording of the sea ice has been undertaken



Average Monthly Arctic Sea Ice Extent
May 1979 - 2016

It seems that the Arctic has been setting records for warmth. In May, key portions of the Arctic Ocean were 4-5°C (7-9°F) above the 1981 to 2010 average[3]. Climate models have always predicted that global warming would be at least twice as fast in the Arctic as in the rest of the planet as a whole thanks to Arctic Amplification. Arctic Amplification is the process that includes higher temperatures melting highly reflective white ice and snow, which is replaced by the dark blue sea or dark land, both of which absorb more solar energy than ice and lead to more melting.

Coupled to this is the fact that the permafrost contains twice as much carbon as the atmosphere, and as it defrosts, it releases that carbon in the form of either CO_2 or even worse methane (CH_4) thus accelerated warming of the Arctic leads to accelerated global warming which leads to even more warming of the Arctic and so on, not good news.

John Gale
10/06/2016

[3] http://thinkprogress.org/climate/2016/03/13/3759569/record-february-warmth-alaska-arctic/