

CBAT

<http://www.gci.org.uk/CBAT.html>

# "Ticking Arctic Carbon Bomb May Be Bigger Than Thought."



This image portrays the effect on the atmosphere of releasing another 1.9 Trillions Tonnes Carbon from CO<sub>2</sub> from Perma Frost melt in a defendably calculated time-frame. AAAs article in Science argues this release has already begun.

3000 Gt C 1,400 ppmv

**Science AAAS**  
**An extra 1.9 trillion tonnes carbon**  
"Ticking Arctic Carbon Bomb May Be Bigger Than Thought"  
<http://news.sciencemag.org/sciencenow/2012/12/ticking-arctic-carbon-bomb-may-b.html>

It is estimated that another 1.9 trillion tonnes of carbon is stored in the 'perma-frost' [Science]. This permafrost has already started slowly melting due to enhanced global warming.

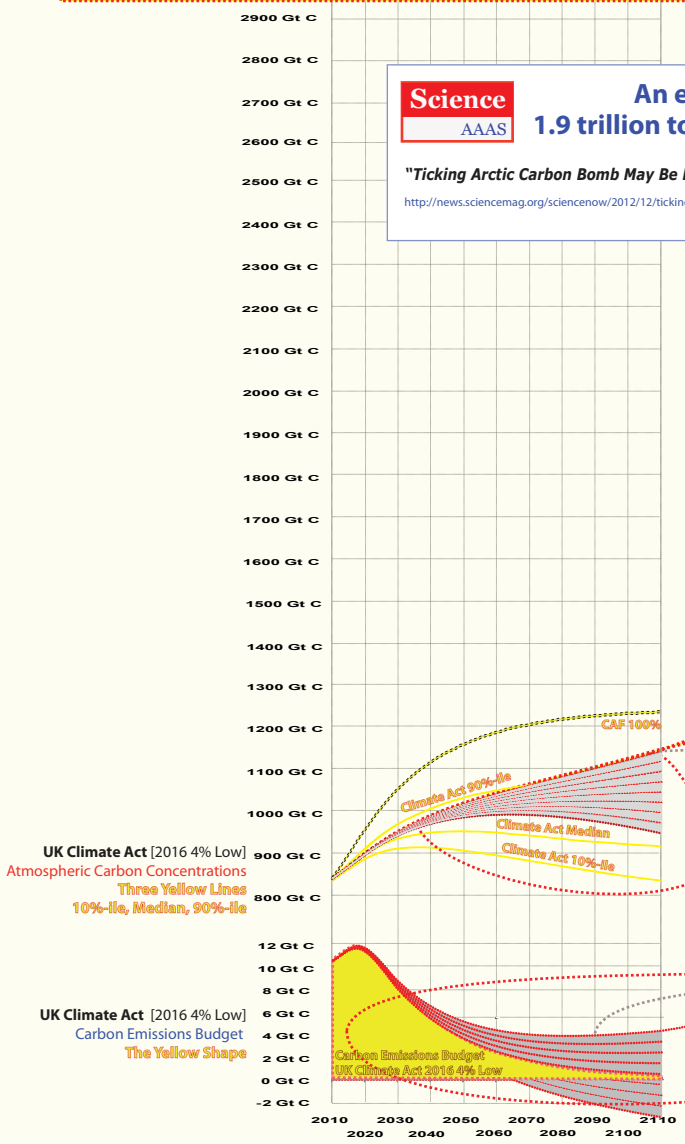
Once on this path, the potential release of this extra CO<sub>2</sub> to the atmosphere, is on a time-frame that is hard to calculate.

However, weighed on a scale of Billions of Tonnes of Carbon [Giga Tonnes or Gt C] it is easy to calculate, and once under way, it is virtually impossible to stop.

The weight reaches the top of this yellow shape at around 3 trill. tonnes of atmospheric carbon, or 1400 ppmv carbon [only].

IPCC estimates 1000 CO<sub>2</sub>-e is equal to a temperature rise of 4-8°.

So the worst-case of perma-frost melt alone, dwarfs human emissions control and presages a climate holocaust.



Atmospheric CO<sub>2</sub> concentrations would increase at the rate shown here -

NB - this rate of growth is initially slower than the 90%-ile rate which was given as top rate of concentration build-up in the UK Climate Act. Moreover, it now also appears increasingly unlikely, due to the lack of fossil-source-emissions-control, that the **Carbon Budget** 2016 4% Low, cited in the UK Climate Act, will be adhered to.

Consequently, if CO<sub>2</sub> emissions, from Perma Frost melt, increased at **this - the highest - rate** above the **Carbon Budget** 2016 4% Low, on which the UK Climate Act is based.

NB - specifying that temperature would increase throughout the next 100 years, the Climate Act gave just 44% odds for holding to a two degree temperature rise, if the **'median case'** for CO<sub>2</sub> concentration rise is what evolved. Omitting permafrost feedback altogether, Climate Act authors incorrectly claimed to have, 'modelled all known feedbacks'.

The lined 'grey' areas in 'Emissions' and 'Concentrations' mathematically relate the former to the latter in forty theoretical steps downward & upwards from 'the budget' with concentrations at CAF 50-% for Budget + 'feedback' in each of the steps. So these are showing theoretically possible rates of *negative* & *positive* feedback from the process of carbon-cycling as a whole.

In the cause of UNFCCC-compliance, the world might theoretically hold to the '2016 4% Low' Carbon Emissions Budget [as in the UK Climate Act].

However, *positive* feedback in the carbon cycle - e.g. from melting permafrost as suggested here - will release more CO<sub>2</sub>. The highest rate of CO<sub>2</sub> emissions:concentration calculated here, shows a steady rate of acceleration across the Century ahead. By mid-Century it is clear that, in this scenario, *positive* feedback is driving the system as a whole, driving to a point where 'human-emission-control' has become completely irrelevant.

There are two simple messages - we need to: -  
[1] leave fossil carbon [oil coal & gas] in the ground  
[2] get on with 'human-emissions-control' asap.