

2. Opposite is text and image detailing how UKMO stated in a supplement to the EAC Enquiry in 2009 ['answering GCI'] to have incorporated the Coupled-Carbon-Cycle modelling in IPCC AR4 from the C4MIP programme, into the global 'CO₂-carbon-emissions-contraction-budget' on which the UK Climate Act is based.

This is what UKMO stated in the memo: -

*"The models used by the Committee on Climate Change **did** include a coupling between climate and the carbon cycle & **took full account of the 'coupled' model research** presented in the AR4 WG1 report, the C4MIP study and related research."*

UKMO/Hadley's 'Uncoupled Carbon Budget' for 450 PPMV published in IPCC SAR and TAR: -

- Starting in 2010 at over 11.2 Gt C
- It peaks at around 13 Gt C around 2020
- Shrinks on average by ~ 3% a year by 2110
- When it has reached an output value of ~ 1.5 Gt C per annum
- Between 2010 and 2100 it weighed around 520 Gt C
- **Giving an outcome value for CO₂ concentrations of ~450PPMV or 960 Gt C.**

This is similar to the SRES range of Carbon-Emissions-Budgets for 450PPMV in SAR % TAR: -

UKMO/Hadley's 'Coupled Carbon Budget' for 450 PPMV published in IPCC SAR and TAR: -

- Starting in 2010 at around 9 Gt C
- It peaks at around 10 Gt C around 2020
- Shrinks on average by over 4% year
- And by 2070 has gone to nearly zero emissions
- Which is continued into the 22nd Century
- Between 2010 and 2100 it weighed around 295 Gt C [a reduction of over 50%] but
- **Giving an outcome value for CO₂ concentrations of ~450PPMV or 960 Gt C.**

Median CO₂ concentration value calculated by UKMO in the UK Climate Act measured in: -

- Parts Per Million by Volume [PPMV] and as Weight in Gigatonnes Carbon [Gt C].

The UKMO memo stating how the Carbon Budget modelling in the UK Climate Act reflected 'Coupled', compiled a Carbon Budget: -

- That starts in 2010 at 10.9 Gt C
- Peaks in 2016 just under 12 Gt C
- Shrinks on average by 4% a year
- Reaching an output value of 0.3 Gt C by 2100
- Weighing 395 Gt C 2010 – 2100
- Giving a peak value for CO₂ concentrations of PPMV as 445.72 or 949 Gt C in 2050
- **With an outcome value lowered to 427 PPMV or 910 Gt C in 2100**

GCI's answer to this 'memo' is to point out that to, 'take full account of the Coupling' [in their words] in the UKCA Carbon Budget, what the UKMO did was: -

- **To add over 114 Gt C or 25% to their 'Coupled Budget' but also . . .**
- **To subtract nearly 60 Gt C from their atmospheric concentration outcome [!]**

This concentration result is negative feedback. It misled everyone. It was a result that contradicts all the models in the C4MIP study reported in the IPCC AR4, even before addressing the other positive feedback effects. While they subsequently admitted the omission of these, no attention was drawn to the negative feedback UKMO were now claiming for coupled carbon cycling, a totally opposite result.

Dr Jason Lowe to the EAC Enquiry into Carbon Budgets in the UK Climate Act 2009:

"I had a look at the submission from the Global Commons Institute last night and the figure I think you refer to comes from IPCC in chapter 10 and, in this context, 'uncoupled' refers to whether temperature feeds back onto the carbon cycle, so where the temperature and rainfall can affect how trees take up carbon, and it has a very particular meaning.

For the curve in question, basically you run the model without this effect of climate feedback on to trees and the biosphere and you get one number, you run it again with this effect, the coupled version, you get a different number.

If you have got the same emissions going in, the coupled version leads to typically a higher concentration because you are increasing the emissions that come back from the biosphere. [i.e. a positive feedback].

The runs that the Climate Change Committee used to include those feedbacks, so in that definition they were described as coupled. The precise values we use to work out the magnitude of the coupling comes from elsewhere in IPCC and from a study referred to as a C4MIP study, which to date is the most comprehensive analysis of that particular type of feedback onto the carbon cycle."

However, Dr Lowe must have known at that moment that coupled carbon cycling had been modelled in the UK Climate Act as a 'negative feedback' [with concentrations falling, as below] as the Climate Act became UK legislation in 2008.

Moreover, he and his colleagues have been modelling this as negative feedback ever since [see pages 29 to 34 this evidence] and have played a part in causing this negative feedback to be the basis of the RCP scenarios now informing IPCC AR5.

