

# SIMPLIFYING & QUANTIFYING JAMES HANSEN'S CARBON-CONTRACTION BUDGETS FOR 350 ppmv

On page 2 is a composite graphic from James Hansen. It is from this work that the 350.org campaign takes its name and so its position

Hansen's graphic shows 3 factors: -  
Future CO<sub>2</sub> [1] **emissions** [2] **concentrations** [3] **temperature**,

It shows them at 3 rates for achieving 350 ppmv: -  
[1] **higher** [2] **medium** and [3] **lower**

Hansen's graphic shows these as a time-series running from 1990 - 2300. He has put all of these factors and these rates on the same graphic.

~~~~~

For a more detailed understanding, this document breaks this down, particularly so the *weight* of the carbon-contraction-budgets can be calculated and shown.

**Higher** means higher or a faster rate of carbon-contraction of emissions.  
**Medium** means a rate of emissions contraction in between higher & lower.  
**Lower** means lower or a slower rate of carbon-contraction of emissions.

On page 3 the time series is reduced to 1990 - 2100 with all 3 factors at all 3 rates

On pages 4, 5 & 6 the 3 the rates are shown separately.

Form this it easier to see the following: -

## At the higher rate: -

**Emissions** go negative by 2020  
**Budget** weighs 124 Gt C to then followed by -156 Gt C to 2100  
**Concentrations** fall back to 350 ppmv by 2050  
**Temperature** net-rise 0.4 of a degree by 2100 against 1990

## At the medium rate

**Emissions** go negative by 2050  
**Budget** weighs 176 Gt C to then followed by - 63 Gt C to 2100  
**Concentrations** fall back to 350 ppmv by 2100  
**Temperature** net-rise 0.8 of a degree by 2100 against 1990

## At the lower rate

**Emissions** go negative by 2080  
**Budget** weighs 320 Gt C to then followed by - 4 Gt C to 2100  
**Concentrations** fall back to 350 ppmv by 2300  
**Temperature** net-rise 1.4 of a degree by 2100 against 1990

~~~~~

Fig B3: Hansen's Global Average Annual Temperature Change (0C 1990)

— Hansen (IPCC reserves)  
— Hansen with 20% of IPCC reserves  
— Hansen with EIA reserves

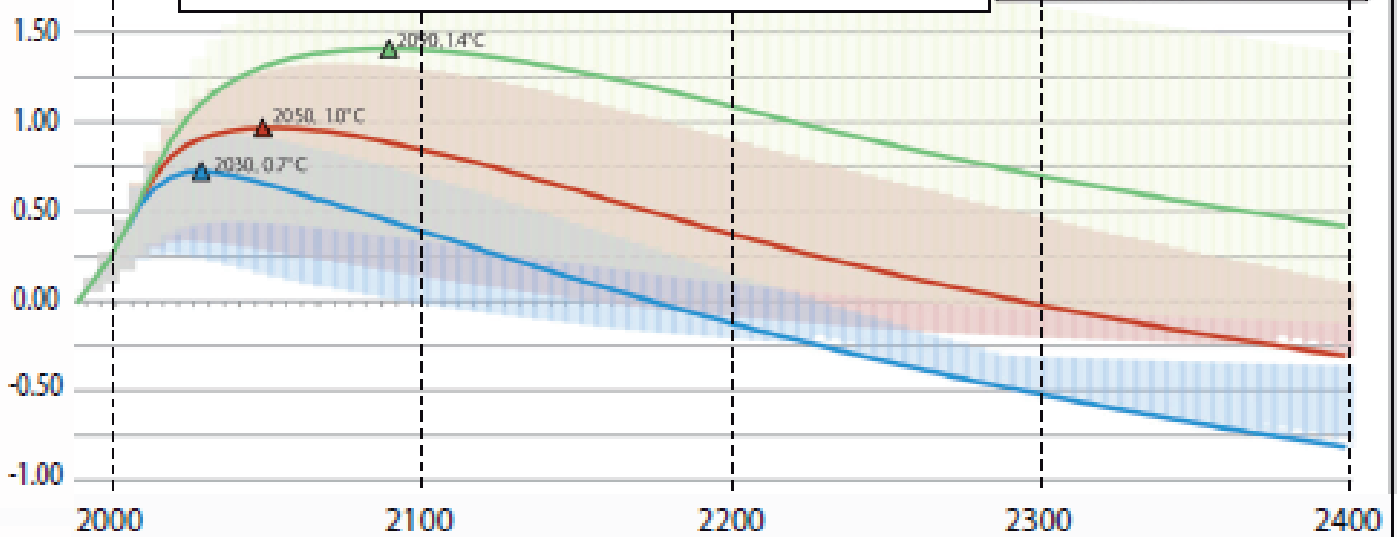


Fig B2: Hansen CO<sub>2</sub> Emissions in ppmv

— Hansen (IPCC reserves)  
— Hansen with 20% of IPCC reserves  
— Hansen with EIA reserves

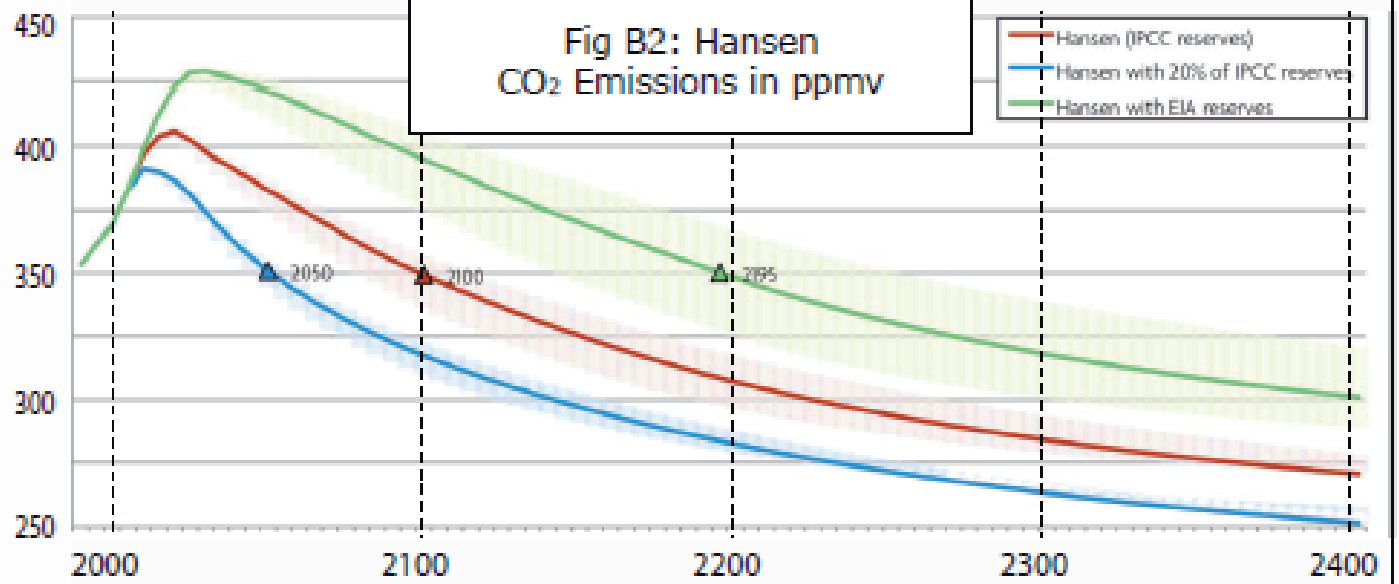
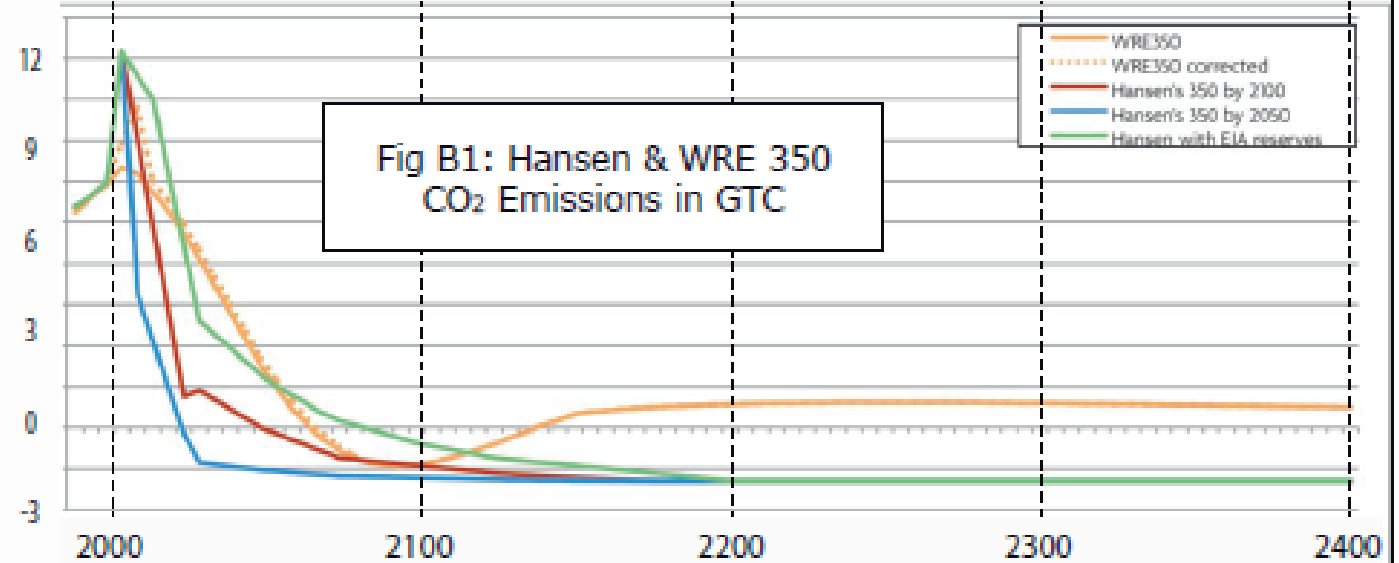
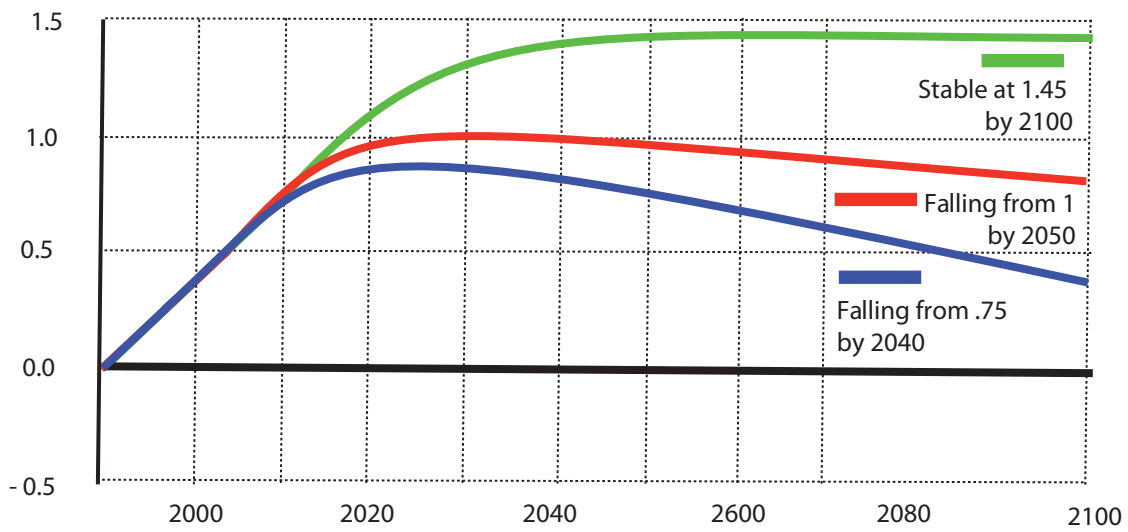


Fig B1: Hansen & WRE 350 CO<sub>2</sub> Emissions in GTC

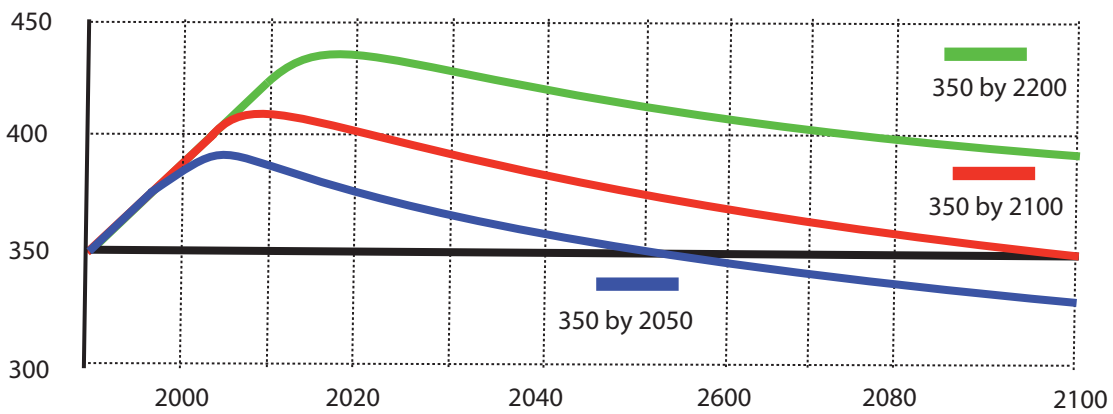
— WRE350  
- - - WRE350 corrected  
— Hansen's 350 by 2100  
— Hansen's 350 by 2050  
— Hansen with EIA reserves



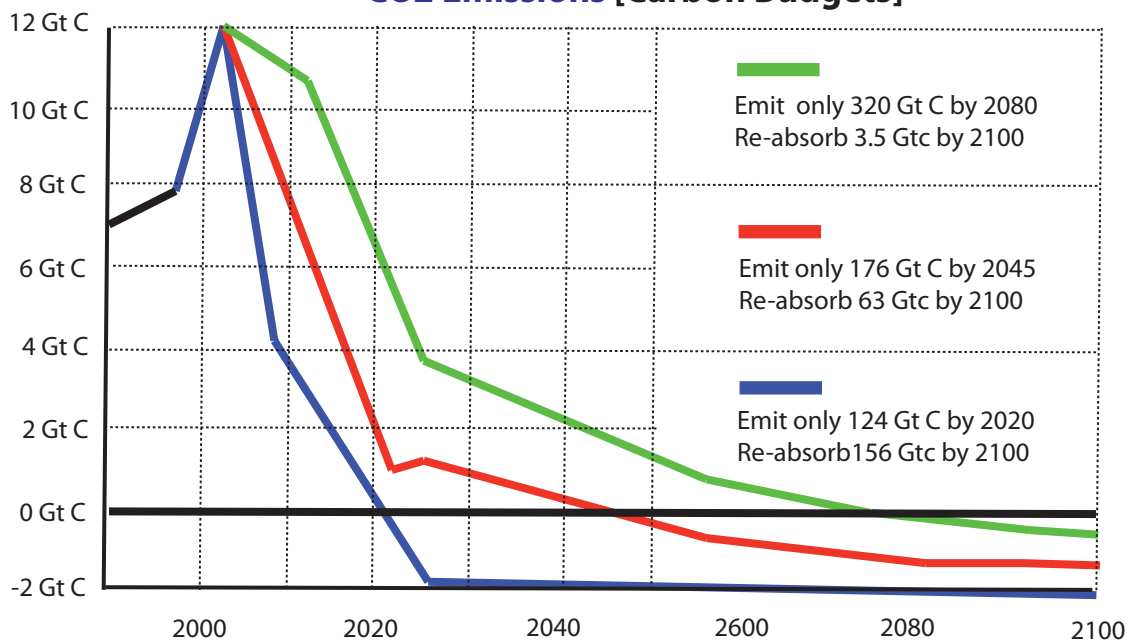
## Global Temperature Averages [1990 = 0] Following Atmospheric Concentrations & Carbon Budgets below



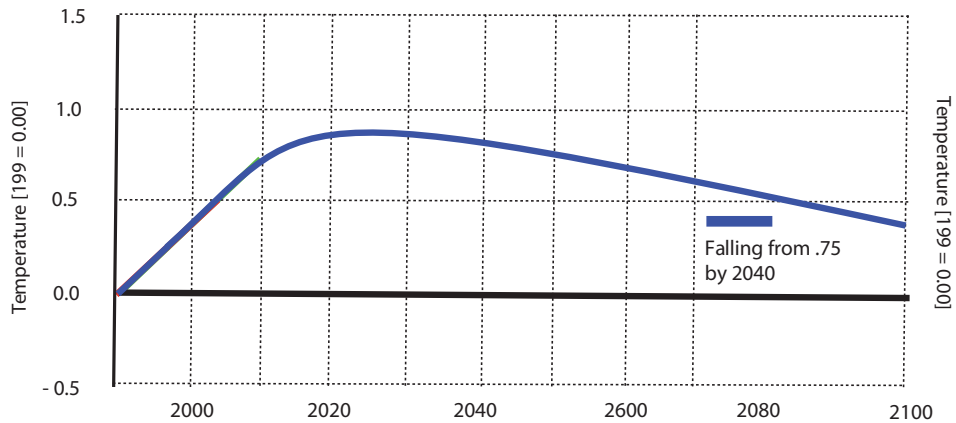
## CO<sub>2</sub> Atmospheric Concentrations Following Carbon Budgets below



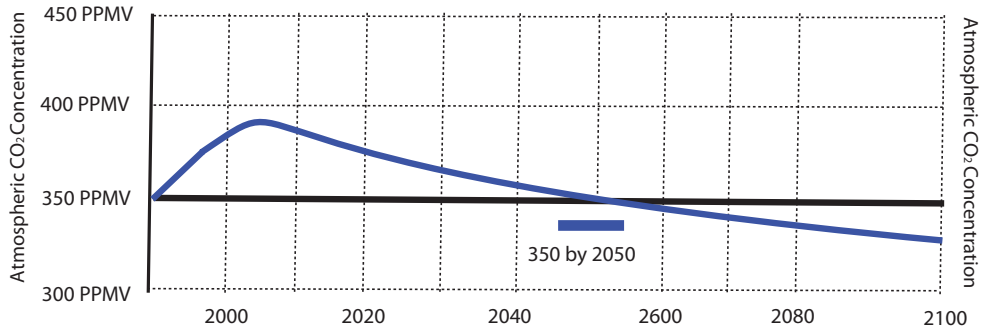
## CO<sub>2</sub> Emissions [Carbon Budgets]



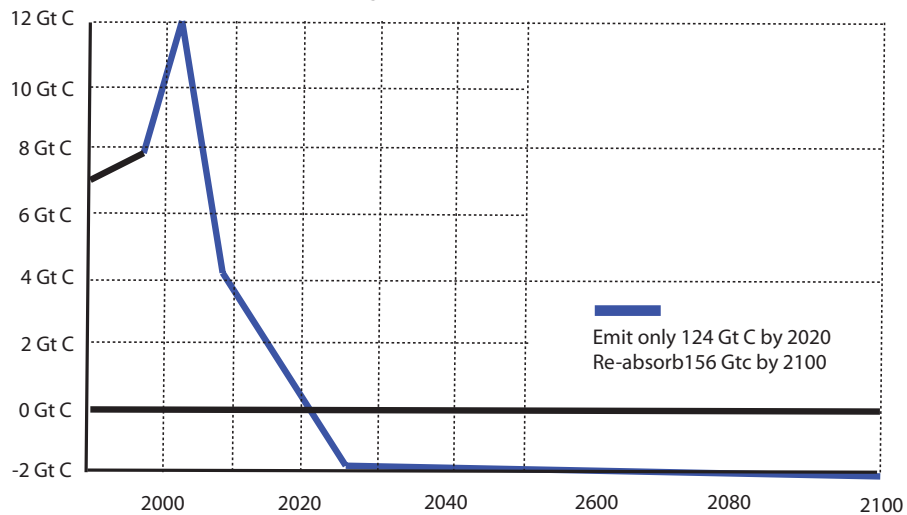
**Global Temperature Averages [1990 = 0]**  
**Following Atmospheric Concentrations & Carbon Budget below**



**CO<sub>2</sub> Atmospheric Concentrations**  
**Following Carbon Budget below**



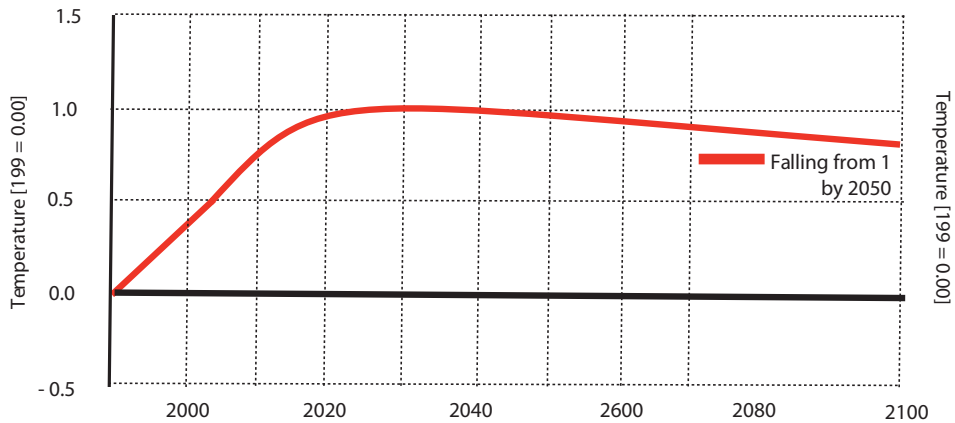
**CO<sub>2</sub> Emissions Carbon Budget**  
**[in Gigatonnes Carbon - Gt C]**



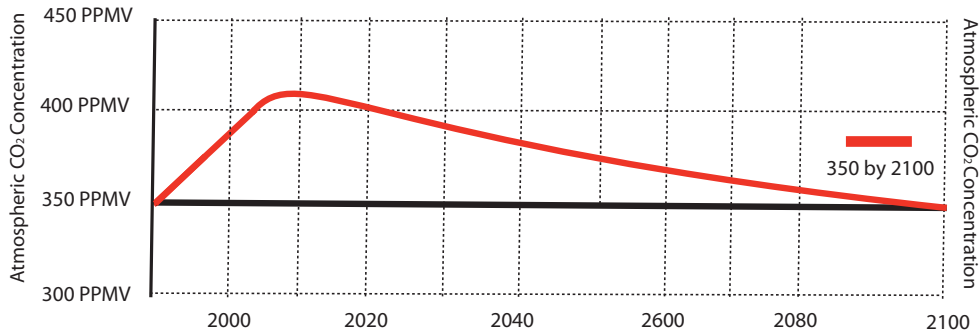
**At this higher rate: -**

**Emissions** go negative by 2020  
**Budget** weighs 124 Gt C to then followed by -156 Gt C to 2100  
**Concentrations** fall back to 350 ppmv by 2050  
**Temperature** net-rise 0.4 of a degree by 2100 against 1990

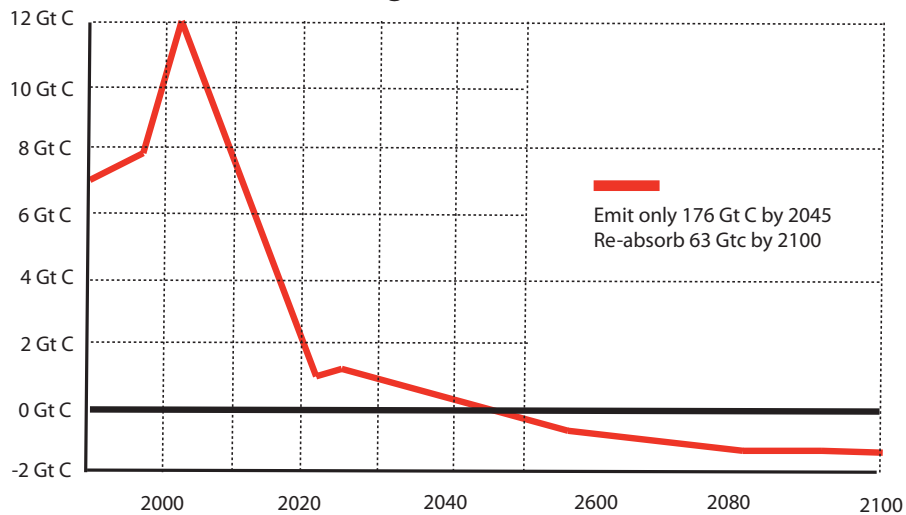
**Global Temperature Averages [1990 = 0]  
Following Atmospheric Concentrations & Carbon Budgets below**



**CO<sub>2</sub> Atmospheric Concentrations  
Following Carbon Budget below**



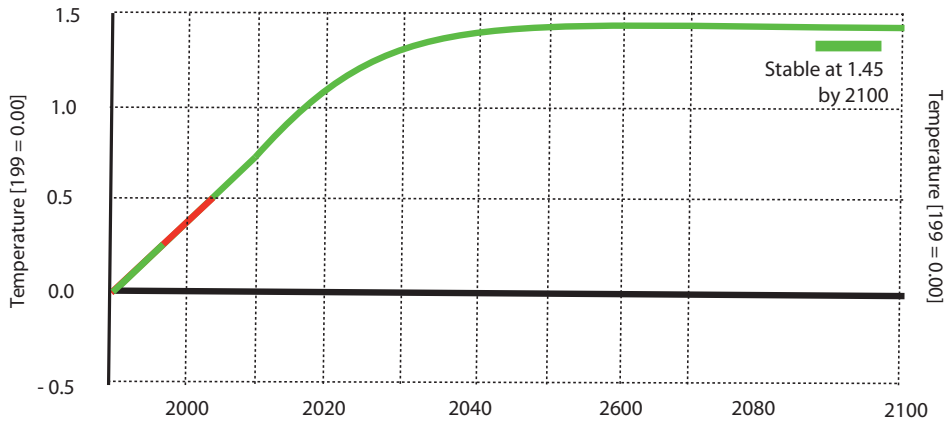
**CO<sub>2</sub> Emissions Carbon Budget  
[in Gigatonnes Carbon - Gt C]**



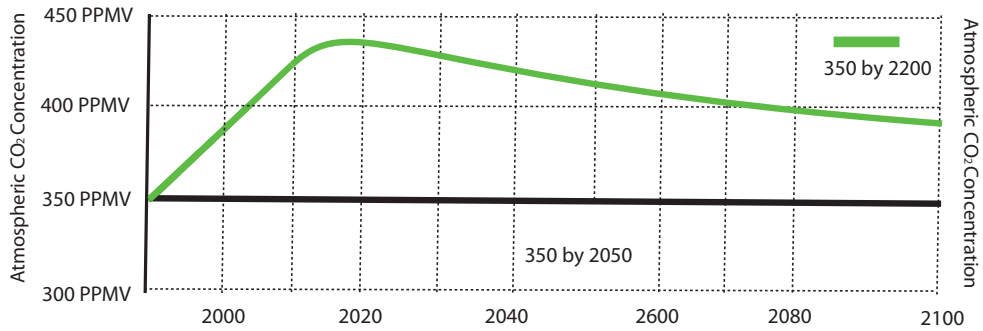
**At this medium rate**

**Emissions** go negative by 2050  
**Budget** weighs 176 Gt C to then followed by - 63 Gt C to 2100  
**Concentrations** fall back to 350 ppmv by 2100  
**Temperature** net-rise 0.8 of a degree by 2100 against 1990

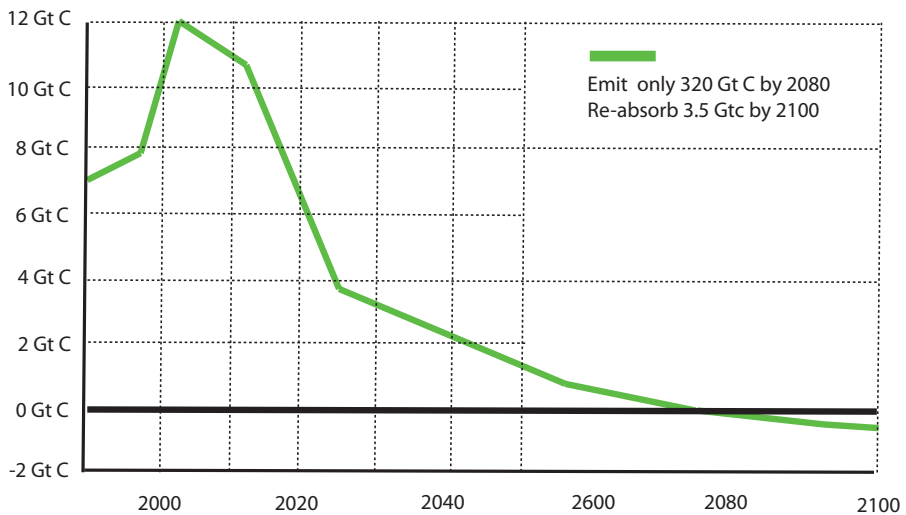
**Global Temperature Averages [1990 = 0]**  
**Following Atmospheric Concentrations & Carbon Budget below**



**CO<sub>2</sub> Atmospheric Concentrations**  
**Following Carbon Budget below**



**CO<sub>2</sub> Emissions Carbon Budget**  
**[in Gigatonnes Carbon - Gt C]**



**Emissions** go negative by 2080  
**Budget** weighs 320 Gt C to then followed by - 4 Gt C to 2100  
**Concentrations** fall back to 350 ppmv by 2300  
**Temperature** net-rise 1.4 of a degree by 2100 against 1990