

CONTRACTION & CONVERGENCE

CLIMATE CHANGE: CRISIS AND OPPORTUNITY

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Recorded surface temperature from 1860 until 2000 shows an overall rise of 0.9°C. The future projections are following CO₂ emissions and atmospheric greenhouse gas concentrations in parts per million by volume (ppmv). The red lines here and below, show Business-As-Usual (BAU) where the underlying emissions grow at 2%/yr. The blue line here shows the lowest possible climate sensitivity - a total rise of 1.5°C - assuming a contraction by 2100 of 60% of emissions against a 1990 baseline.

Recorded atmospheric CO₂ concentration from 1860 until 2000 shows an increase of 34% over pre-industrial levels. This is a rise both higher and faster than anywhere in the ice-core sampling up to 440,000 years before now. Concentrations are rising as the result of accumulating emissions. In future, the worst case is the red line (BAU). The blue line shows this concentration stabilised at 70% above pre-industrial levels due to the 60% contraction in the underlying emissions by 2100 shown below.

Damages here are the global economic losses (Munich Re) for the four decades past for all natural disasters projected at the observed rate of increase of 10% a year in comparison to global \$GDP at 3%. If the global trends continue BAU, damages will exceed GDP by 2065! The risks will soon rise beyond the capacity of the insurance industry and even governments to absorb. Damages will rise for the century ahead even with emissions contraction, but this rate can be retarded with early adoption of contraction & convergence with trade (see below).

For the past four decades, the output of CO₂ and GDP from global industry have been correlated nearly 100% (referred to here as 'lockstep'). Breaking the lockstep is essential. Future GDP is projected here at 3% a year. Future CO₂ goes to -2% with the retreat from fossil fuel dependency shown below, that limits CO₂ concentrations to 70% above pre-industrial levels (shown above). If the traded area (below) is also converted to zero-emissions supply the carbon retreat might achieve up to -4% a year.

The red line shows BAU CO₂ emissions. The solid segments show C&C with trading to reduce emissions by at least 60% within a given time frame (here by 2100) within an agreed 'contraction budget' (here 680 billion tonnes of carbon). The internationally tradable shares of this budget (here, 100 billion tonnes) result from convergence to equal per capital emissions by an agreed date and population base year (here 2020). If this is invested in zero-emissions technologies, risk and damages are lowered further as the budget is then net of these emissions as well. The renewables opportunity is the difference between C&C with trading and BAU. It is worth trillions of dollars per annum - the biggest market in history.

