## Contraction & Convergence An International Framework for Preventing Dangerous Climate Change

Aubrey Meyer Global Commons Institute





Contraction & Convergence or 'C&C' is a strategic proposal to the United Nations to achieve the objective of its 'Framework Convention on Climate Change' (UNFCCC) based on equalizing per capita emissions at sustainable values globally.

The UNFCCC was created in 1992 to avert the growing trends of damage attending accelerating rates of global climate change. To this end, the objective of the UNFCCC is to stabilise the rapidly rising content of heat-trapping or 'greenhouse' gas (ghg) [principally CO2] in the atmosphere before it reaches a level that triggers dangerous runaway rates of global warming and climate change.

Burning fossil fuels releases CO2 to the global atmosphere where as natural sinks for the gases increasingly fail, it remains indefinitely. To achieve the UNFCCC objective and stabilize the atmosphere requires that we end our dependency on fossil fuels as soon as possible.

The relationship between our emissions of ghg and the atmosphere is like the 'flow' of water from a tap to a bath where as 'stock' they accumulate. The plug in the bath is like the sinks where a fraction of the extra ghg are still to some extent reabsorbed, however these sinks are becoming less active as the plug is increasingly blocked. Technically, C&C accounts for the flow of human ghg emissions that are causing the atmospheric concentrations of ghg to rise. In the analogy, it represents a globally shared effort to turn the tap right off before the bath overflows. A big difficulty is that all the time the effort is made to turn the tap off, the bath level will continue to rise. To address this, the C&C model combines two simple functions. It quantifies the future full-term event of global emissions reduction necessary against posed rates of 'sink-failure', to keep within any given level of atmospheric concentration of greenhouse gas level in the atmosphere [contraction], and it demonstrates under any rate of contraction, all the rates that are possible to pre-distribute the international entitlements to emit so they become equal per capita globally by an agreed date [convergence].

Contraction and Convergence directly addresses the two major obstacles to real progress as the international negotiations on climate change on the UNFCCC came into force in 1995: - the double-jeopardy of asymmetric growth or 'expansion and divergence' in the past and the worsening climate damages we face in the future. To date emissions have been a close proxy for wealth; in a phrase the more money we earned the more fossil fuel was burned; the graphic alongside shows these data as past trends of 'expansion and divergence' since World War 2. Here however, population was divided into 'creditors' and 'debitors'. For example for 1990, the global value of 'US dollars earned per tonne of fossil fuel burned was \$3,000. That year the IPCC said that an immediate 60 - 80% cut in global emissions was need to stabilize the atmosphere, so the \$ per tonnes value was cut to \$1,200 per 0.4 of a tonne. All countries per capita emissions were then assessed as either above or below that value revealing that while one third of people globally were above that value, two thirds were below. Then their incomes gross and per capita in US\$ and in Purchasing Power Parity [PPP] were summed and the procedure was repeated for all years 1955 to 1990. Systemic trends of expansion of divergence were immediately apparent showing that the global majority who had not caused the problem were on the receiving end of structural arrangements made by the minority of people who had. So, while the postwar Washington consensus may have been a structurally beneficial arrangement for the West, despite the inequality of consumption patterns, emissions overall had triggered a global problem of climate change. At the outset the US did not deny the problem, they said it was 'simple sophomore physics' and just asking 'how much climate change and how soon' they simply demanded a global response.



As the Cold war ended, expansion and divergence was not really understood or much talked about. All were encouraged to see that the West had won the Cold War and that the market-system was more prosperous because it was more 'efficient'. How-ever, as the global negotiations on climate change began and the trends of expansion and divergence became apparent, the IMF and the World Bank realized that the issue of Purchasing Power [Dis]-Parity [PPP] between the 'hard-currency' countries of the OECD and the 'soft-currency' countries of the Developing World had to be recognized, not least because the 'local-purchasing-value' of the Chinese Renimbi for example was five times its international purchasing value when traded against the US dollar. The IMF in fact used this as an argument as to why China didn't any longer qualify for Overseas Development Assistance [ODA].

As economists made that argument, they also weighed in on how to assess climate change with cost-benefit analysis and address it with market-mechanisms. They weighed the costs of action to mitigate climate change versus the costs of adapting to it. Asserting that all the assets at risk of damage were proportional to the incomes of the people who owned them, they down-graded developing Country assets [including lives lost in `climate-mortality'] 15:1 against the high income Developed Countries. Predictably their bottom-line `proved' that it was cheaper to adapt than to mitigate. This meant the majority of people on the planet who had not caused climate change and were most vulnerable to it, were too poor to save from it.

The bathos of this discreditable effort was capped by the realization that the PPP dollar earned per tonne of fossil fuel burned gave 'efficiency' values for Developing Countries that were more 'efficient' for them than the Industrial Country values. The graphic alongside, shows data for all countries for the year 1990. PPP dollars income per capita are shown alongside fossil fuel impact per capita from low values on the left to high values on the right. They are clearly increasingly closely correlated as the values rise. However, the 'efficiency' point is that from high values on the left to low values on the right [the flags] the 'efficiency' value of the Developing Countries is very significantly higher than it is in the Industrial Country group. In a phrase Developing Countries may have been too poor to save, but in respect of economic performance on climate change, they were much more 'efficient'. These are the very countries who had argued in response to the call from the United States for a global response, that a globally equitable response to global climate change was one based on equalizing per capita emissions at sustainable values globally. It was a proposition which already intuited that the dichotomy between 'equity' and 'efficiency' was false and that in terms of the real conservation of energy needed to avoid dangerous rates of climate change, the gap between 'equity' and 'efficiency' does not widen, it closes. It recognizes no-one is saved unless we're all saved.

This is Contraction and Convergence, the model first proposed to the UN by GCI at the Second World Climate Conference in 1990. This was within 5 months of their publication of the First Assessment Report [FAR] of the Intergovernmental Panel on Climate Change [IPCC] who had said that a 60 to 80% cut in emissions was immediately necessary if the rise in the atmospheric concentration of CO2 was to be halted at 353 parts per million by volume [ppmv], the value recorded for that year. Ahead of any notions of trading mitigation off against adaptation, C&C is a model founded on prevention. As the Kyoto Protocol comes into effect in 2008, the concentration of CO2 has now reached 387 ppmv, the idea of prevention is increasingly urgent. Moreover, as sinks fail, the concentration of CO2 is rising faster than ever.

The Kyoto Protocal has not significantly addressed this. Unless we now become really committed to achieving the objective of the UNFCCC as soon as possible with a full-term C&C arrangement, the double-jeopardy of asymmetric development and climate damages takes the Mutually Assured Destruction of the Cold War to the new and more lethal Mutually Assisted Suicide of doing too little too late on climate change.



A detailed animation of this analysis is on-line at http://www.gci.org.uk/Animations/BENN\_C&C\_Animation.exe

With full participation, a full-term global emissions contraction event in the future is required to stabilize the rising concentrations in the atmosphere. As the graphics on the left show, it is no longer reliable assume that the sinks for the CO2 will continue to remove on average 50% of any years' emissions. If they continue to fail at rates that are suggested by recent data, the atmosphere may over time come to retain 100% of emissions or more. This means that a contraction event that is too slow, will fail to prevent concentrations, temperature and damages rising out of control. Contraction needs to be fast enough to do enough soon enough to avoid this. With risk classified as C1 'Acceptable', C2 'Dangerous' and C3 'Impossible', three scenarios of contraction-concentrations futures are shown. Within the contraction rate chosen, the examples also show convergence to equal per capita emissions entitlements globally by 2020 for C1 and 2040 for C2 and C3. By making future emissions entitlements proportional to populations, rather than income, convergence progressively assigns the bulk of the future 'rights-to-emit' to developing countries where per capita emissions have consistently been below the per capita average globally. As this transfers the bulk of the tradable equity share to Developing Countries, this gives negotiators a device with which to correct for the historic inequity. As a strategic framework that corrects the double-jeopardy, C&C is in principle the only numerate way of projecting our energy future, transparently and globally. It focuses political leaders and their negotiators at the UN on the two key guestions: -What is the overall concentration limit that we must not exceed? And how do we share and use resources globally under that limit? C&C integrates the scientific and constitutional requirements of the UNFCCC with the political and economic challenges of making sustainable development inclusive and just in a proportionate and market-friendly way. Developing Countries have the opportunity to seize the moment with C&C as it demonstrates how we can and must now organise to solve the climate problem faster than we are causing it while achieving international reconciliation with each other within this global limit. The whole renewable agenda is fundamentally dependent on this integrated strategy. Without it, asymmetric growth and damages will deepen and compromise economic development everywhere and overwhelm us as rates of climate changes become 'self-accelerating' and 'runaway'. Doing too little too late creates a default where an economics of triage and conflicts will emerge as systems fail and vulnerable communities become discards.

This C&C argument has been developed for twenty years with considerable success. Emerging over many years within the political debate, C&C is now seen as 'pragmatic' and the 'favoured option'. Unlike other proposals, it in the words of Professor Ross Garnaut, "adds up to its stated outcome. Proposals that don't should be rejected immediately." Indeed some have said that, "anyone who thinks it Utopian, simply hasn't looked honestly at the alternatives."

As it puts people first, C&C is certainly the most widely cited approach in the literature and arguably the most widely supported. However, now is the critical period in the political calendar of climate negotiations to transform this support into acceptance at the UN by the end of 2009. This is the date by when the so-called post-Kyoto 'global climate deal' must be agreed. Our common destiny hinges on this. Article for ZAYED 'Future Energy Magazine', December 2009.

Some support for C&C is here: -

http://www.gci.org.uk/Support/support.pdf