GCI MEMO to UNFCCC with Support
http://www.gci.org.uk/UNFCCC_Submission_Co-Signatories.html

Re Decisions at COP-17 for ‘increased ambition.’

Negotiating UNFCCC-compliance globally, *Accelerating the rate of Convergence relative to the rate of Contraction* provides *"the Main International Equity Lever."*

“C&C has the virtue of simplicity. Equal per capita emissions is a natural focal point. Contestable computations based on economic variables do not need to enter the allocation formula.”

Review of Climate Change Economics to the Australian Government by Ross Garnaut - 2008

“Since the principle of ‘contraction and convergence’ was first proposed by the Global Commons Institute in 2000, it has been widely embraced by some industrialised countries. Under contraction and convergence, each country will start out with emission entitlements equal to its current real emissions levels, and then, over time, converge to equal its per capita entitlements, while the overall global budget contracts to accommodate the emissions reduction objective. The convergence principle should be applied immediately rather than later as the ‘converged point’ in the future. ‘Real emissions’ is a different concept to ‘emissions entitlement’. A country’s high/low per capita real emissions cannot justify its high/low emission entitlements. In the process of convergence, the rights and interests of country B are really infringed by country A. In the National Emissions Account-based solution, the concept of convergence can still be incorporated, but it now merely means ‘convergence of real emissions’ rather than ‘convergence of emission entitlements’. Each country’s gaps between its emission entitlements and real emissions need to be balanced by the traded emissions quotas.”

Development Research Council to the Chinese Government - 2009

“We believe that it is difficult to imagine a global deal which allows the developed countries to have emissions per capita which are significantly above a sustainable global average.”

UK Government’s ‘Committee to the Climate Change Act’

Save this file as an Adobe Acrobat File [pdf] and read in the current ‘Adobe Acrobat Reader’. The animations on page 11 and the Movie on page 12 become ‘active’ when ‘mouse-clicked’.

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To have an agreement that resolves ‘Historic Responsibilities’, Negotiate Accelerated International Convergence of *Per Capita Emissions Entitlements* [as distinct from Per Capita Emissions per se] by 2010 or 2020 or 2030 or 2040 or 2045 or by 2050.
1. Decides to extend the Ad Hoc Working Group on Long-term Cooperative Action under the Convention for one year in order for it to continue its work and reach the agreed outcome pursuant to decision 1/CP.13 (Bali Action Plan) through decisions adopted by the sixteenth, seventeenth and eighteenth sessions of the Conference of the Parties, at which time the Ad Hoc Working Group on Long-term Cooperative Action under the Convention shall be terminated;

2. Also decides to launch a process to develop a protocol, another legal instrument or a legal outcome under the Convention applicable to all Parties, through a subsidiary body under the Convention hereby established and to be known as the Ad Hoc Working Group on the Durban Platform for Enhanced Action;

3. Further decides that the Ad Hoc Working Group on the Durban Platform for Enhanced Action shall start its work as a matter of urgency in the first half of 2012 and shall report to future sessions of the Conference of the Parties on the progress of its work;

4. Decides that the Ad Hoc Working Group on the Durban Platform for Enhanced Action shall complete its work as early as possible but no later than 2015 in order to adopt this protocol, legal instrument or legal outcome at the twenty-first session of the Conference of the Parties and for it to come into effect and be implemented from 2020;

5. Also decides that the Ad Hoc Working Group on the Durban Platform for Enhanced Action shall plan its work in the first half of 2012, including, inter alia, on mitigation, adaptation, finance, technology development and transfer, transparency of action, and support and capacity-building, drawing upon submissions from Parties and relevant technical, social and economic information and expertise;

6. Further decides that the process shall raise the level of ambition and shall be informed, inter alia, by the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, the outcomes of the 2013–2015 review and the work of the subsidiary bodies;

7. Decides to launch a workplan on enhancing mitigation ambition to identify and to explore options for a range of actions that can close the ambition gap with a view to ensuring the highest possible mitigation efforts by all Parties;

8. Requests Parties and observer organizations to submit by 28 February 2012 their views on options and ways for further increasing the level of ambition and decides to hold an in-session workshop at the first negotiating session in 2012 to consider options and ways for increasing ambition and possible further actions.
Inclusive global rationale for UNFCCC-compliance needed now.

The increased ambition called for at COP-17 by the UNFCCC Parties requires we now quantify and demonstrate an inclusive global rationale to achieve UNFCCC-compliance. This was recognized by India, China, the USA and the Africa Group at COP-3 in Kyoto in 1997. [See note 0].


The objective of the UNFCCC is safe and stable Greenhouse Gas concentration in the global atmosphere. As the cost of failure is incalculable, in a measured and time-dependent way, we must ‘do-enough, soon-enough’ to quantify, arrange and then achieve compliance’ with that objective. C&C is a rational calculating model, but also a ‘negotiating mechanism’ to do just that. However, before it is a ‘flow-process’, C&C is a ‘stock-concept’. It is non-random, non-deterministic and logical. As such it has been called ‘An Incontestable Truth’ by an All-Party Group of UK MPs [See note 0]. The UNFCCC Executive took the position at COP-9 in 2004 saying C&C is ‘inevitably required’ for UNFCCC-compliance [See note 1].

C&C integrates two primary issues needed for this; it now has much support.

C&C was first proposed to COP-2 UNFCCC in 1996 by GCI. The purpose is to help UNFCCC negotiators integrate, quantify and reconcile the two primary issues they are still faced with, to achieve ‘climate-justice without vengeance’. It is offered again now, along with some of the support that it has generated since then. The depth and diversity of this support is now very considerable [See note 6].

1. Contraction: The 1st issue is to quantify the full-term global greenhouse emissions contraction-event that is inevitably required for UNFCCC-compliance. For reasons of ‘urgency’, the question is what ‘path-integral’ [full-term, rate, carbon-weight, date] of the global emissions contraction-event do we jointly need to estimate and agree is needed for UNFCCC-compliance? Another way of asking this, is how much carbon consumption is still ‘safe’ globally, if dangerous rates of climate change are to be avoided? We must be guided by the need to solve this problem faster than we are creating it. Empirically, estimating the global emissions contraction-event is primarily a science-based judgement. Shares are largely dependent on the IPPC’s estimate of the contraction-event needed and global monitoring of source, sinks and stocks of Greenhouse Gases [GHG] that are active in the Earth’s climate system. As all we can control are GHG from human sources, C&C pays particular attention to those.

2. Convergence: The 2nd issue is to resolve the question arising as to how we integrate and internationally share that contraction-event in a rational and transparent manner. An international convergence of shares under a global contraction-event is inevitable. So the key question here is how will this sharing arrangement of permissible future ‘emissions-rights’ come about?

Will it result from [a] a random guesswork [b] a better-intentioned network [c] a continuing aspirational right principle prescribing wrong rates at COP-15: negotiate rates at COP-18.

Right principle prescribing wrong rates at COP-15: prescribe rates at COP-18.

This was the right principle but prescribing the rates was a mistake. Moreover, it was prescribed at rates that were unacceptable to the majority [see note 5] & it was rejected by the non-annex One countries. Understanding this reason for that failure and correcting it is key to any future success. Already in July 2009 the Chinese Government wrote that those rates of C&C were acceptable for per capita emissions rights at COP-15. The Chinese Government has stressed, since global carbon-trading requires that the ‘emissions rights’ allocated to developing countries be based on what ‘path-integral’ [full-term, rate, carbon-weight, date] global emissions contraction-event were to be avoided? We must be guided by the need to solve this problem faster than we are creating it. Empirically, estimating the global emissions contraction-event is primarily a science-based judgement. Shares are largely dependent on the IPPC’s estimate of the contraction-event needed and global monitoring of source, sinks and stocks of Greenhouse Gases [GHG] that are active in the Earth’s climate system. As all we can control are GHG from human sources, C&C pays particular attention to those. C&C & a negotiating example, based on what happened at COP-15.

At COP-15 in December 2009, the UK was part of a group of Governments that prescribed the rates of C&C that are in the UK Climate Act [see 4]. They prescribed that convergence to globally equal per capita shares should complete by the year 2050, but by when 80% of the available carbon budget was used up.

C&C’s Historic Responsibilities & the ‘Main Equity Lever’.

Inequity attends the ‘historic responsibility’ for causing climate change with emission accumulated in the atmosphere since 1800. To redress this & offset the future opportunity cost to fossil-fuel-based development in developing countries, the ‘main equity-lever’ is negotiating a rate of convergence that is significantly accelerated relative to the rate of contraction [Prof Ross Garnaut].

Accelerated Convergence - ‘Emissions Entitlements’ are not ‘Emissions per se’.

As the Chinese Government has stressed, since global carbon-trading requires that the ‘emissions entitlements’ are tradable these are necessarily different from emissions per se. The faster the convergence rate is relative to the contraction-rate, the more the ‘equity-share’ is transferred from the accounts of those consuming carbon above the global per capita average to the accounts of those consuming carbon below that average. So under-consumers have a mechanism with which to leverage their position ‘at the expense of over-consumers’ while - crucially - all remain subject to the contraction rate, weight & date agreed for UNFCCC-compliance. The question is what rate of convergence [fast/slow] relative to the contraction rate agreed, can the international negotiations bear? Turn Kyoto’s ‘market-based framework’ into C&C’s ‘framework-based-market’.

Integrated this way, C&C turns Kyoto’s aspirational ‘Market-Based-Framework’ into a rational ‘Framework-Based-Market’. Agreeing the rates of C&C is the primary task arising in the current COP cycle and this is primarily the task for UNFCCC negotiators. This approach does not preclude additional side-agreements of any kind. Making Regional Groupings makes negotiating headline rates of C&C easier.

GCI does not presume to prescribe what the rates of C&C must be. GCI’s role has simply been to demonstrate [quantify & visualize] linking the range of contraction-rates examined in the global climate-change to the convergence-rates involved in the international ‘policy-debate’ [see note 3]. However, GCI feels it would certainly facilitate policy negotiations if India and China & others grouped together as regions in the way for example the EU acts as a region, as this would remove the intra-regional negotiations from the UNFCCC and negotiations would be more ‘strategic’.

Negotiating Convergence Rate: 2010, 2020, 2030, 2040, [COP-15 prescribed 2050].

The intervening positions on the rate of convergence, with weight and value [$100/tonne] are: -

| Year | Weight of Carbon Rights transferred to LDCs in Billions of Tonne Carbon (Gt cl) | Value of Carbon Rights transferred to LDCs over 40 years [$100/tonne carbon] |
|------|--------------------------------|
| 2010 | 50 Gt C | $5.0 trillion |
| 2020 | 40 Gt C | $4.0 trillion |
| 2030 | 29 Gt C | $2.9 trillion |
| 2040 | 16 Gt C | $1.8 trillion |
| 2045 | 8 Gt C | $0.8 trillion |
| 2050 | 0 Gt C | $0.0 trillion |
Developing Countries Start Negotiating from Here

Convergence by 2010 to Globally Equal Per Capita Emissions Entitlements

The Yellow Area is equal to 50 Billion Tonnes over 50 years. At a $100 tonne, that is equal to $5 Trillion over 50 years.

Convergence by 2020 to Globally Equal Per Capita Emissions Entitlements

The Yellow Area is equal to 40 Billion Tonnes over 50 years. At a $100 tonne, that is equal to $4 Trillion over 50 years.

Convergence by 2030 to Globally Equal Per Capita Emissions Entitlements

The Yellow Area is equal to 20 Billion Tonnes over 50 years. At a $100 tonne, that is equal to $2.9 Trillion over 50 years.

Convergence by 2040 to Globally Equal Per Capita Emissions Entitlements

The Yellow Area is equal to 16 Billion Tonnes over 50 years. At a $100 tonne, that is equal to $1.6 Trillion over 50 years.

Convergence by 2045 to Globally Equal Per Capita Emissions Entitlements

The Yellow Area is equal to 8 Billion Tonnes over 50 years. At a $100 tonne, that is equal to $0.8 Trillion over 50 years.

Convergence by 2050 to Globally Equal Per Capita Emissions Entitlements

The Yellow Area is equal to 0 Billion Tonnes over 50 years. At a $100 tonne, that is equal to $0.0 Trillion over 50 years.

Developed Countries Start Negotiating from Here
The framework of contraction and convergence provides a flexible methodology to address the problem of allocation of emission rights. The contraction of overall world emissions pursued along with the convergence of countries’ average per capita emissions, allows developing countries to partake of the carbon budget. The per capita entitlements approach is an effective one in that it takes into account historical responsibility and is based on the egalitarian distribution of the commons, within which international justice positions of causal responsibility such as the ‘polluter pays principle,’ come in.”

Ursula Schäefer-Preuss - Vice President of ADB.
Haruhiko Kuroda - President and Chair ADB Board.
Ban Ki-moon - Secretary General of the United Nations.
Rajendra Pachauri - Director of TERI, Chair IPCC.
Yvo de Boer - Former Executive Secretary UNFCCC.
Gloria Macapagal Arroyo - President Philippines.
Zhou Dadi - Chief advisor national energy strategy, People’s Republic of China.

Since the principle of ‘contraction and convergence’ was first proposed by the Global Commons Institute in 2000, it has been widely embraced by some industrialised countries. Under contraction and convergence, each country will start out with emission entitlements equal to its current real emissions levels, and then, over time, converge to equal its per capita entitlements, while the overall global budget contracts to accommodate the emissions reduction objective. The convergence principle should be applied immediately rather than later as the ‘converged point’ in the future. ‘Real emissions’ is a different concept to ‘emissions entitlement’. A country’s high/low per capita real emissions cannot justify its high/low emission entitlements. In the process of convergence, the rights and interests of country B are really infringed by country A. In the NEA-based solution, the concept of convergence can still be incorporated, but it now merely means ‘convergence of real emissions’ rather than ‘convergence of emission entitlements’. Each country’s gaps between its emission entitlements and real emissions need to be balanced by the traded emissions quotas.”

Greenhouse gas emissions reduction - a theoretical framework & global solution
Development Research Centre of the State Council People’s Republic of China 2009

[9] C&C Foundation: -
http://www.candcfoundation.com/index.html

[10] C&C Foundation: -

Full Signatory List to this statement of over thirty eminent people: -
http://www.gci.org.uk/endorsements_UN_Bodies_ADB_Signatories.html

Rates of C&C: -
http://www.gci.org.uk/rates.html

C&C in UK Climate Act
http://www.gci.org.uk/endorsements_UK_Climate_Act.html

C&C - Right Principle & correcting Wrong Rates projected COP-15.
http://www.gci.org.uk/animations/COP_15_C&C.swf
The Global Commons Institute (GCI) was founded in 1990. This was in response to the mainstreaming of global climate change as a political issue. Realising the enormity of the climate crisis, we devised a founding statement on the principle of “Equity and Survival.” [1] In November 1990, the United Nations began to create the framework on climate Convention (UNFCCC). GCI contributed to this and in June 1992 the Convention was agreed at the Earth Summit in Rio. Its objective was defined as stabilizing the rising greenhouse gas concentrations of the global atmosphere. Its principles of equity and precaution were established in international law. Climate scientists had shown that a deep overall contraction of GHG emissions from human sources is prerequisite to achieving the objective of the UNFCCC. In 1995 negotiations to achieve this contraction began administered by the specially created UNFCCC secretariat. Between 1992 and 1995 and at the request of the Intergovernmental Panel on Climate Change (IPCC), GCI contributed analysis highlighting the worsening asymmetry, or “Expansion and Divergence” (E&D) of global economic development. It became clear the global majority most damaged by climate changes were already impoverished by the economic structures of those who were also now causing the damaging GHG emissions. [2]

To create a sustainable basis on which to resolve this inequity, GCI also developed the “Contraction and Convergence” (C&C) model of future emissions. In 1995 the model was introduced by the Indian Government [3] and it was subsequently adopted and tabled by the Africa Group of Nations in August 1997. [4]

Negotiations for the Kyoto Protocol to the UNFCCC ran from 1995 until 1997. In December 1997 and shortly before they withdrew from these negotiations, the USA contributed, “C&C contains elements for the next agreement that we may ultimately all seek to engage in.” [5]

Since then C&C has been widely referenced in the debate about achieving the objective of the UNFCCC. In 2000 C&C was the first recommendation of the UK Royal Commission on Environmental Pollution in its proposals to government. [6] In December 2003 and was adopted by the German Government’s Advisory Council on Global Change in its recommendations. [7] In 2003 the secretariat of the UNFCCC said the objective of the UNFCCC, inevitably requires ‘Contraction and Convergence’: [8] The Latin America Division of the World Bank in Washington DC said, “C&C leaves a lasting, positive and visionary impression with us.” In 2004 the Archbishop of Canterbury took the position that, “C&C thinking appears utopian only if we refuse to contemplate the alternatives honestly.” [9] In 2002, the UK Government accepted C&C authorship of the definition statement of C&C, recognising the need, “to protect the integrity of the argument.” This statement follows and is available in thirteen languages. [10] It has been adopted by the House of Commons Environmental Audit Committee and in part the UN’s forthcoming “Millennium Assessment.” In 2005, the UK Government will host the next G-8 summit. The Government has already committed this event to dealing strategically with the problems of Africa and Climate Change. Numerous civil society and faith groups are now actively lobbying the Government to have C&C adopted as the constitutional basis for avoiding dangerous future climate change.

1. “Contraction and Convergence” (C&C) is the science-based, global climate-policy framework, proposed to the United Nations since 1990 by the Global Commons Institute (GCI). [1,2,3,4]

2. The objective of safe and stable greenhouse gas concentrations in the atmosphere and the principles of precaution and equity, as already agreed in the “United Nations Framework Convention of Climate Change” (UNFCCC), provide the formal calculating basis of the C&C framework that proposes:

- A full-term contraction budget for global emissions consistent with stabilising atmospheric concentrations of greenhouse gases (GHGs) at a pre-agreed concentration maximum deemed to be safe, following IPCC WG1 carbon cycle modelling. (See Image Two on page two - C&C sees rises higher than 450 parts per million by volume [ppmv] CO2 equivalent as ‘not-safe’).

- The international sharing of this budget as ‘entitlements’ results from a negotiable rate of linear convergence to equal shares per person globally by an agreed date within the timeline of the full-term contraction/concentration agreement. (GCI suggests [a] between the years 2020 and 2050, or around a third of the way into a 100 year budget, for example, for convergence to complete (see Image Three on page two) and [b] that a population base-year in the C&C schedule is agreed).

- Negotiations for this at the UNFCCC should occur principally between regions of the world, leaving negotiations between countries primarily within their respective regions, such as the European Union, the Africa Union, the US, etc. (See Image One on page one).

2. [http://www.gci.org.uk/articles/Nairobi.htm]
The UK’s Royal Commission on Environmental Pollution

4. GHG emissions have so far been closely correlated with economic performance (See Image Four Page Three). To date, this growth of economies and emissions has been mostly in the industrialised countries, creating a global pattern of increasingly uneconomic expansion and divergence (E&D), environmental imbalance and international insecurity (Image 4 p 3).

5. Climate Change "inevitably requires Contraction and Convergence" (C&C) (Image 3 p 2). This helps to compare some of what is known about existing rates of system change with an underlying assumption in favour of a C&C arrangement being put in place. A new feature shown is the rate of economic damages from increasingly 'unnatural disasters' (measured as 'unsured economic losses' by Munich Re) now rising at 7% per annum, twice the rate of global growth. Another is the devastating and worsening economic asymmetry of "Expansion and Divergence" (E&D). This shows a persistent pattern of increasingly dysfunctional economic growth. One third of population have 94% of global purchasing power and a 7% per annum, twice the rate of global growth. Another is the devastating and worsening economic asymmetry of "Expansion and Divergence" (E&D). This shows a persistent pattern of increasingly dysfunctional economic growth. One third of population have 94% of global purchasing power and a 10% share of GHG pollution. [We call these 'creditors']. The other two thirds, who live on less than 40% of the average global per capita income, collectively have 6% of global purchasing power and cause 90% of GHG pollution. [We call these 'debitors']. The other two thirds, who live on less than 40% of the average global per capita income, collectively have 6% of global purchasing power and cause 90% of GHG pollution. [We call these 'creditors']. The other two thirds, who live on less than 40% of the average global per capita income, collectively have 6% of global purchasing power and cause 90% of GHG pollution. [We call these 'debtor']. The other two thirds, who live on less than 40% of the average global per capita income, collectively cause 90% of GHG pollution. [We call these 'creditors'].

A 5% per annum exponential increase in the path of growth is starkly asymmetric and unsustainable. Adhering to economic orthodoxy based on this is a measure of an increasing danger of "growth illusion" when climate damages are added, it is already clear that the growth is uneconomic. When damages are subtracted from this growth, it is clear that the growth is increasingly negative. Asymmetric and damaging growth is a recipe for conflicts. The bottom line is that there is no sustainable energy source that can really support this ‘Expansion and Divergence’.

Asymmetric Growth & Climate Damages

A 5% per annum exponential in the path integral of growth is starkly asymmetric and unsustainable. Adhering to economic orthodoxy based on this is a measure of an increasing danger of "growth illusion" when climate damages are added, it is already clear that the growth is uneconomic. When damages are subtracted from this growth, it is clear that the growth is increasingly negative. Asymmetric and damaging growth is a recipe for conflicts. The bottom line is that there is no sustainable energy source that can really support this ‘Expansion and Divergence’.

Contraction and Convergence can help cope with the limiting growth and structure and stabilise the transition to an equilibrium-state based on:

- [3] renewable energy and

The charts on page four are stacked one above the other on the same horizontal line to compare some of what is known about existing rates of system change.

Scientific understanding of the relationship between an emissions-free economy and concentrations develops, so rates of C&C can evolve under periodic revision.


The purpose of C&C is to make it possible. It enables scenarios for safe climate to be calculated and shared by negotiation so that policies and measures can be internationally organised at rates that avoid dangerous global climate change.

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UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

GLOBAL DAMAGE COSTS/DEVELOPMENT BENEFITS of CLIMATE CHANGE

OBJECTIVE
Contraction & Concentrations

PRINCIPLES
Precaution Equity

DANGEROUS CLIMATE CHANGE
Damage Costs & Insecurity

UN/SUSTAINABLE DEVELOPMENT
Contraction & Conversion

This entire animation is on-line at: www.gci.org.uk/images/Final_presentation.exe
Touch buttons to advance within scenes and logos to advance between scenes
Contraction and Convergence: The Proportionate Response to Climate Change

The United Nations Framework Convention on Climate Change (UNFCCC) was agreed in 1992 with the objective to halt the rising concentration of greenhouse gas (GHG) in the atmosphere. In 2007, efforts to this end remain insufficient and the danger of ‘runaway’ rates of global climate change taking hold is increasing. The science-based, global climate policy framework of Contraction and Convergence (C&C) offers an equitable solution to curbing carbon emissions in the hope that global collective efforts to reduce emissions can be successful. Three elements are at the core of the C&C campaign: the constitutional concept of Contraction and Convergence (C&C); the techniques and processes developed to focus the debate on rates of C&C that are relevant; the sustained effort to present C&C as the basis of the proportionate response to climate change.

The UNFCCC makes C&C generically true, but C&C specifically embodies a calculation built on this truth that strategically focuses the negotiations at the Climate Convention on two necessarily finite, global assumptions:

» A trajectory to a safe and stable atmospheric GHG concentration limit, allowing for a range of calculations of the global emissions contraction limit to carbon consumption consistent with that.

» The calculation of equal rights to the global total of emissions permits to the global total of people consuming within that limit, again allowing for different rates of convergence and even a population base-year to be considered. This is in preference to the irreducible complexity of assuming any inequality of rights.

With this calculation, C&C captures the goal focus of the UNFCCC process in a structure of reconciliation. It is a universal first order numeraria. From this it becomes possible to go beyond the merely aspirational character of the current debate around the UNFCCC, to communicating the rationale and constitutional calculus of C&C.

The BASIS of C&C
Technically, the C&C model is a coherent and mathematically stable framework. It holds the science-policy content together as a unity: science-based on the contraction side of the argument and rights-based or constitutional on the political side of the argument. C&C is in effect a bill of rights; it simply plots a full term event for achieving equal per capita emissions rights globally (Convergence) but governed by the overall emissions limit over time that stabilises the atmosphere concentration of GHG at a ‘safe’ value (Contraction).

‘It becomes possible to go beyond the merely aspirational character of the current debate around the UNFCCC, to communicating the rationale and constitutional calculus of C&C.’

The LONG TERM PAST

Figure 1 shows data from ice cores for half a million years before industrialisation. Throughout this period, with natural sinks for CO₂, such as the oceans and the forests in balance with the natural sources, the level of atmospheric CO₂ concentration varied between 180 and 280 parts per million by volume (ppm) averaging at 256 ppm. Since 1800 with the onset of industrialisation and fossil fuel burning, human emissions have caused the concentration of CO₂ to increase by over 40 per cent to 380 ppm. This rise in ppm CO₂ is higher and faster than anywhere in the historical record. This rise is because CO₂ emissions from human sources, particularly CO₂ from fossil fuel burning, are going to the atmosphere and accumulating. Furthermore, for the past 200 years, on average 50 per cent of any year’s human emissions has remained in the atmosphere while the remaining 50 per cent has returned to the natural sinks.

‘Instead of 100 years, we now realise that to reduce human CO₂ emissions and other GHGs in the atmosphere to zero globally, we have only the next 50 years.’

A slowly increasing fraction of these emissions in the atmosphere remain there, accelerating the rise in concentrations even more. Column one in Figure 2 (see overlay) demonstrates that the average retention over the past decade has increased from 58 per cent to 60 per cent. This recognises that the capacity of the natural sinks for CO₂ capture is now gradually declining. If this continues unchecked as the graphics suggest, the rise in the concentration of atmosphere GHG will accelerate towards the level at which dangerous rates of rise translate to a climate change crisis that becomes unavoidable. To be UNFCCC-compliant, we need to enact C&C now to prevent the crisis that is otherwise inevitable.

The SHORT TERM PAST and FULL TERM FUTURE LIMITS

The UNFCCC objective is to avoid dangerous rates of climate change by stabilising concentrations and we are all both circumstantially and legally bound by this. Compliance is governed by the need for a finite answer to the questions: what is a safe GHG concentration value for the atmosphere? and what is the scale of the full term emissions contraction event required to achieve it?

Without answers, traditional evaluation of the economics of abatement and the social consequences is not possible. Because of weakening sinks, analysis now shows that to stabilise GHG concentration in the atmosphere below the level that prevents dangerous rates of climate change taking hold, requires a rate of overall emissions control that is faster than was previously assessed. Instead of 100 years, we now realise that to reduce human CO₂ emissions and other GHGs in the atmosphere to zero globally, we have only the next 50 years (IPCC AR4 and Hadley Centre, 2007). As activities under the Kyoto Protocol show, unless we are visibly organising globally by a shared commitment not to exceed that safe concentration number, the probability increases that our collective efforts to avoid dangerous rates of climate change will be too little too late.

Already under Kyoto, the slight gain of CO₂ emissions avoided has been more than negated by more carbon accumulating in the atmosphere at an accelerating rate as the result of changes in the climate system as a whole. Consequently, a global arrangement for emissions control in future that is sufficient in the light of this is sine qua non for success. As the original authors of the UNFCCC understood at the outset, embracing this primary question of the sufficient, and indeed the proportionate response, is fundamental to the whole global engagement.
CARBON RATIONING

Columns one and two address the objective and principles of the UNFCCC. Columns three and four compare the development benefit of growth with the growth of climate damage and costs. The left hand side of each graph shows:

- Expanding fossil fuel emissions of CO₂, measured in billions of tonnes of carbon between 1800 – 2000.
- Rising concentration of atmospheric CO₂ as parts per million by volume (ppmv) between 1800 – 2000.

The key questions for integration are in four columns:

Column 1: Contraction and Concentrations: what is a safe level of concentrations and, in the light of sink failure, how rapid must contraction be to avoid GHG concentration going too high in future?

Column 2: Contraction and Convergence: what is the internationally equitable agreement necessary to ensure this level is not exceeded?

Column 3: Contraction and Conversion: what is the rate at which we must convert the economy away from fossil fuel dependency?

Column 4: Damage costs and insecurity: what is the environmental and economic damages trend associated with this analysis?

Figure 2: Charting the UNFCCC Objective & Principles, the Development Benefits of Growth versus the growth of Climate Change Related Damage Costs. (http://www.gti.org/images/Proportionally_Responsibility.pdf)

Each row has a different level of Risk projected across the four columns:

- C1 (bottom row) Acceptable risk: global GHG emissions contraction complete by 2050 so concentrations and up around 450/500 ppmv with damages potentially still under control.
- C2 (middle row) Dangerous risk: global GHG emissions contraction complete by 2100 so concentrations keep going up through 550/750 ppmv with the illusion of progress maintained, while damages are going out of control.
- C3 (top row) Impossible risk: global GHG emissions contraction complete by 2200 so concentrations keep going up through 500/700 ppmv while the illusion of progress is being destroyed, damages costs are destroying the benefits of growth very quickly and all efforts at mitigating emissions become futile.

In each graph, different futures are projected on the right-hand side as scenarios or rates of change that are linked to the objective of the UNFCCC where three levels of risk for stabilising the rising concentration of CO₂ are understood in the light of the rising fraction of emissions that stays airborne.

United Nations Framework Convention on climate change

OBJECTIVE PRINCIPLES

Contraction & Concentrations

Contraction & Convergence

Global damage costs/development benefits of climate change

DAMAGES

We are still locked into causing global climate change much faster than we are mitigating it. Treating climate change as a global emergency is now long overdue and responding proportionately is vital. Unless the risk analysis is focused by this understanding, our best efforts will be in vain.

According to the reinsurers, the weather-related damages trend is growing at twice the rate of the global economy, see Figure 2, column four. To prevent this damage trend from running out of control, emissions need to contract to zero globally by 2050 if it is to be fast enough to stabilise atmospheric GHG concentrations at a level that prevents change accelerating uncontrollably.

This is corroborated by the latest coupled climate modelling results from the UK Government’s Hadley Centre, published in the IPCC Fourth Assessment. While the notion of global emissions control is certainly heroic, the only vector of the problem over which we can still post direct control, is our GHG emissions and thereby the level to which GHG concentrations will rise in the future.

With this integrated approach we can more clearly visualise the challenge within a finite calculus of collective responsibility, and so keep focused on the imperative of solving the problem faster than we are creating it. Communicating and implementing this remains the primary challenge.

A FRAMEWORK-BASED MARKET

With the C&C operational framework, we can compare how much must be achieved globally to avoid dangerous climate change, with the widening margins of error in which we are becoming trapped.

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There are more complicated ‘alternatives to’ and ‘derivatives from’ C&C. While defending the evolutionary nature of the politics, these have also attempted to be non-chaotic. They include for example the Kyoto Protocol, which seeks to interpose a partial and random market-based framework in support of the Convention. But such an evolutionary response to its objective and principles is guesswork by definition, and there is no evidence...
C1, C2, C3 Compared

The social equity as the equal per person claim on the same 100 per cent throughout that event but softened by convergence.

The commercial equity is the shares pre-distributed this way sum to the same 100 per cent and are tradable so as to accelerate the positive sum game for the emissions-free economy that must emerge if we are to prosper in the future.

In a nutshell, this integration puts rational principle ahead of stochastic practice in order that the former guides the latter. In practice this arrangement is flexible and will create a lucrative framework-based market for the zero emissions industries within a future structure that corrects and compensates for the asymmetric consumption patterns of the past while saving us all from dangerous rates of climate change.

In this context C&C overcomes the stand-off where a one sided agreement is not an agreement and where half an argument is not, nor will ever become, a whole solution. It recognises that separate development is not sustainable development.

In September 2007, the German Government recognised this when mediating between supporters and opponents of the Kyoto Protocol with C&C as the basis of the post-Kyoto agreement. Their urgent call for a whole and proportionate solution should be supported vigorously.

Author
Aubrey Meyer is the Director of the Global Commons Institute (GCI) responsible for the formulation of Contraction and Convergence (C&C) framework. For his work he has won several prestigious awards including the Andrew Lees Memorial Award, 1998, the Schumacher Award in 2000, the Friedheim Fellowship in 2004, a City of London Lifetime’s Achievement award in 2005 and was made an Honorary Fellow of the Royal Institute of British Architects in 2007. In a recent edition of the New Statesman, he was listed as one of the 10 people in the world most likely to affect climate change.

Organisation
The Global Commons Institute (GCI) is an independent body based in the UK, concerned with the protection of the global commons. GCI was founded after the UN’s Second World Climate Conference in 1990 and since then has contributed to the work of the United Nations Framework Convention of Climate Change and the Intergovernmental Panel on Climate Change.

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C&C Foundation Movie - What is C&C? [click the above to activate]

This movie from the C&C Foundation shows this strategic approach to negotiating international agreement for achieving UNFCCC-compliance.

[1] The ‘convergence-rate’ is the ‘main equity lever’: faster rate of convergence, compensates more for ‘historic responsibilities’.

[2] Per capita emissions-entitlements’ are necessarily different from per capita emissions per se.“

[3] Regional grouping between countries: -
   for example if India & China regionalised, the greater is their bargaining power for a result with ‘convergence accelerated relative to contraction’.