

Notions of Fairness and Global Negotiations over Climate Policy

Graham Boyd¹

The Rationale for Action

A Cambridge University project initiated in 2012, *The Cambridge Project for Existential Risk* has been established to examine developments that threaten the very existence of humanity. These have been singled out as artificial intelligence, climate change, nuclear war and biotechnology.

The importance of climate change as a problem worth tackling is becoming less controversial. Lately, scientists have been revising up their assessment of the probability of significant climate change². Concomitantly, however, economists have tended to revise downwards their estimates of the economic costs of the likely damage occasioned by future climate change and also lowered their estimate of the costs of achieving abatement of carbon emissions. This is in no small measure due to later studies incorporating agents' behavioural adaptation to climate change as a variable³. Studies which show impacts over time depict a pattern of modest overall economic gains from climate change initially, which evolve into more substantial losses as climate change progresses, with the turning point occurring at about 1.1°C warming (Tol, 2009). That abatement is turning out to be cheaper to effect than once feared suggests that the optimal level of abatement of CO₂ emissions has increased. But there is little evidence of this being manifest in progress achieved in global negotiations. Dispiritingly, neither the promotion of renewable energy, nor the massive effort involved in the establishment of trading systems for CO₂, has achieved much thus far in decoupling the path of emissions from that of economic growth.

While substantial uncertainties in the science abound, it appears that the climate is on course for one where at least 2°C of global warming is very likely. Indeed, the IEA⁴ has contended that unless quite drastic action is taken, by 2017 the rise in atmospheric concentrations of CO₂ to 450 parts per million from around 400ppm currently, that seems to be consistent with 2°C of global warming, will be *locked-in* by the emissions set to be produced by the already extant infrastructure encompassing coal-fired power stations, buildings, and vehicles. What is most important is that the uncertainty in the estimates is skewed towards negative shocks and encompasses "fat tails" where uncomfortably high probabilities can be attached to catastrophic events. The uncertainty this encapsulates argues for greater effort in reducing carbon emissions on grounds of insurance than would be indicated by a narrowly focused cost benefit analysis.

The view of climate change as an existential threat accords with Stern's (2007) thinking in applying a tiny rate of pure time preference in discounting the future (0.1 percent) to capture only the

¹ Visiting lecturer in Energy and Climate Change Economics at Warwick University, and member of the SBE. The author was previously head of energy and climate change economics at BIS. An earlier version of this paper has been published on the Gemini Environmental blog, <http://www.blog.geminienvironmental.co.uk/home/2012/4/12/think-piece-fairness-and-global-negotiations.html>

² (*New Scientist*, 17 November, 2012, p34, see also Richard A. Muller in the *Wall Street Journal*, 21 October 2011, on the conversion of a former climate sceptic (himself).

³ See Tol op cit, page 36.

⁴ International Energy Agency, *World Energy Outlook 2011*, Paris: OECD, 2011

possibility of the complete extinction of the human race as the only ethically legitimate basis for discounting the future. Even such a low number implies a surprising high likelihood of extinction; that the possibility of the human race surviving the next century is fractionally better than 90 percent. In the context of Stern's Review, the discount rate is applied to assess the impact on welfare of measures taken today to combat climate change in the distant future; the threat to existence coming from a source exogenous to the climate issues under discussion, whilst in the Cambridge endeavour, climate change is itself one of the threats to existence.

The political dimension to tackling climate change is rendered particularly intractable by the nature of the public goods problem posed by climate change. In respect of many public goods problems, the issue arises and can be remedied within the boundaries of a nation state. But since any country's GHG⁵ emissions affect the climate of the planet as a whole, little purpose is served by any individual country taking measures to counteract climate change if others do not follow suit.

McKinsey⁶ has been influential in propagating the notion that the abatement problem itself, of curbing carbon emissions sufficiently to restrain and cap the stock of carbon in the atmosphere, is solvable, even given current technologies and not assuming any major innovation or technological breakthrough. Nevertheless, abatement opportunities are shown to be hard to capture in that they are fairly evenly dispersed around the globe, and to the extent that they are not diffuse, they are concentrated in China, Developing Asia, Latin America, and North America. Abatement options in Latin America are largely concentrated on forestry and land use change, while in the other regions the power generation sector plays a key role. There is a high degree of overlap between the economics of climate change and energy economics. Put simply, there is no obvious single silver bullet.

Some sort of global geo-political agreement that extends beyond the boundaries of the nation state is therefore required. It is in this arena that passions become really inflamed, because this is all about fairness, who will be worst affected, who should be called upon to bear responsibility for past and future emissions (not at all the same thing), and who should bear the costs of mitigation of future emissions.

Capabilities and a Right to a Basic Level of Emissions

A fundamental principle at the individual level is that everybody is entitled to protection from harm, whether that harm is inadvertent or not. Stern cites asbestos as an example. Asbestos was initially deployed in buildings with the worthy objective of preventing the spread of fire. The harm arising from its use was initially unexpected, but there was still a

⁵ Greenhouse Gas

⁶ See for example McKinsey and Company, Greenhouse gas abatement cost curves, http://www.mckinsey.com/client_service/sustainability/latest_thinking/greenhouse_gas_abatement_cost_curves

legal case to answer and even today claims for compensation continue to be paid. The New Scientist magazine has argued that an increasing feature of the policy landscape may become legally grounded challenges to emitters of GHGs, mounted by vulnerable communities impacted by climate change, against those believed to be perpetrators of climate change through past emissions.

Sen's *Capability Approach* is helpful for exploring the ethical dimensions of climate change. According to Clark (2006), "Amartya Sen's Capability Approach (CA) has emerged as the leading alternative to standard economic frameworks for thinking about poverty, inequality and human development generally".

In Sen's viewpoint, "traditional welfare economics conflates well-being with either opulence (income, commodity command) or utility (happiness, desire fulfilment)", Clark p3. Instead, Sen views this as too narrow and instead identifies a lineage which runs as follows:

Commodity → Capability (to function) → Function(ing) → Utility (e.g. happiness)

Individuals differ in their abilities to translate the availability of commodities or more broadly resources into a capability. Income and wealth are not useful in themselves, but as a means to achieving something else. Crucially, people differ in their abilities to translate income and wealth into valuable outcomes. The range of options for motion available to a champion athlete given a stock of commodities is quite different to those available to a virtuoso musician or even a disabled person.

Sen's approach therefore focuses on the context of human existence and the capability to achieve valuable functions. Capabilities reflect a person's real opportunities or positive freedom to pursue different possible life-styles. The essence of capability is genuine choice in the context of substantial options.

There is a clear overlap between the Capability Approach and Sustainable Development. Viewed through the lens of the Capability Approach, economic growth might be necessary for an expansion of capabilities, but not always sufficient. The range of possibilities available to a society both individually and collectively depends on the capital stock, and the productivity that can be extracted from that capital stock. The capital stock is a multifaceted thing, incorporating stocks of plant and machinery, education, health, buildings, natural resources, as well as the natural environment. It is possible to trade one off against another, but to a limited extent.

One component of the overall stock of wealth that gives rise to capabilities can become depleted or damaged to the extent that the ability to extract outcomes from the other components of the stock of capital is compromised. Such is the worry as it relates to the environment; that environmental degradation broadly, and including climate change specifically, could reach a level at which the quality of life as expressed in capabilities becomes impacted, and people's ability to live valuable lives becomes compromised. At

issue is the capital stock as passed on to the next generation. Viewed through this lens the issue can be seen as one of stewardship of resources, of exploiting resources in the present in such a way as to ensure that the resources remain available for exploitation by future generations.

Emissions can constitute one element to the stock of commodities that gives rise to a capability. Virtually any human action gives rise to the expenditure of emissions of some degree. Therefore, up to a certain level any individual on the planet can be considered to have a right to a certain level of emissions, on a par with rights to basic education, to health, to vote.

Helm, (2012), has interpreted the idea of a certain basic level of per capita emissions, especially if it is coupled to Stern's approach to pure time preference, as an argument in favour of a massive and quite unrealistic redistribution of wealth from developed to developing countries, and depending on future consumption levels, to future generations as well. But the concept needn't be deployed to embrace such an extreme stance as this; more as a point of departure for negotiations in which a certain basic level of per capita emissions is agreed.

The idea of rights to emit links rather neatly to principles of fairness involved in global negotiations on how best to rectify climate change. The issue of fairness is rendered particularly acute by the fact that those populations most vulnerable to the worst effects of climate change are shown by careful studies to be those that inhabit the countries that are presently the poorest, and which derived scant benefit from historic emissions⁷.

A Quantitative Approach to Questions of Fairness in International Negotiations

Important work on issues of ethics and fairness at the level of global negotiations has been performed by the Oko-Institut in collaboration with ZEW, and Lange, Löschel, Carsten, and Ziegler(2010). They show that the following four understandings of fairness have come to dominate the political debate on international climate policy:

- The Egalitarian Rule: This is the one most obviously linked to the right to emit under the Capability Approach, and posits that all countries, rich and poor, should enjoy equal per capita rights to emit. For current high emitters, generally rich countries, equal per capita emissions around the globe would imply drastic cuts in emissions from current levels, and radical changes in lifestyle from the current air-conditioned, appliance-rich, private transport one that is pervasive in the West. However, most of the world also aspires to such a life-style!

⁷ Tol, op cit, p36.

- The Sovereignty Rule: This is perhaps the least intuitive of the approaches. It implies that countries and regions should undertake to lower emissions in proportion to their existing emissions, with all countries lowering emissions by the same proportion. This rule effectively takes the existing status quo distribution of emissions as given, implying no relative change in rankings. If adopted, it would benefit countries and companies who had a rather cavalier approach to emissions in the past. It is implicit in the grandfathering of permits under CO₂ trading schemes.
- The Polluter-pays Rule: This has such appeal in certain policy making circles that it is bandied about almost as a slogan, as if its veracity is self-evident without any need to establish its validity. Its appeal vests in economic efficiency; of internalising an externality, costs that are inflicted on the broader society but not born by the emitter. The rule implies that as a country's emissions are higher in proportion to those of other countries, so should its contribution to global abatement costs rise, by the same proportion. This can apply to historic or combined historic and future emissions, which do not imply the same cost liability⁸ at all. A distinction is drawn between those countries shown to have been large emitters in the past, and those projected to be high emitters in the future.
- The Ability-to-Pay Rule: This rule posits that the payments a country makes to achieve necessary global abatement should be scaled in proportion to its GDP in relation to global GDP. .

These equity principles have been advocated within the context of the UNFCCC's overarching principle of "common but differentiated responsibilities and respective capabilities". These different ideas of what constitutes equity in relation to climate policy derive from the space where economic and psychological analyses converge, where departures from the rational economic man of standard economic theory are considered, and the possibility of self-serving biases in judgements of fairness – which might well be subconscious – are admitted.

⁸ CO₂ which is abundant in nature is not itself a pollution on the same level as say mercury or SO₂ in that it is not in itself harmful to human health or to plant life. Indeed, under certain circumstances abundant CO₂ can act as a fertiliser and promote plant growth.

In practice these principles of fairness are not as neatly delineated as they seem. Much uncertainty attaches to efforts to estimate past emissions, and which entities were responsible for those emissions. Global trade enters the picture; a portion of a country's emissions are likely to have been generated in the production of goods destined for consumption in a quite different region and country; in such an eventuality who is the polluter that should be made to pay, the producer or consumer?

Carbon leakage is the displacement of energy intensive activities as a consequence of measures to curb CO₂ intensive activities through policies such as the absolute cap on emissions imposed by a carbon trading scheme. Such measures divert the production of some energy intensive goods to countries with low labour and energy costs (that impose no or a very low carbon price). The goods produced continue to be consumed as intermediate goods by manufacturers and as final goods predominantly by consumers in the affluent west, who retain a taste for such products. The shifting locus of production of such goods to formerly poor countries⁹ drives up incomes in those countries, but also GHG emissions. These rules may also be supplemented by rules that seek to limit the problem of free riding, and measures to limit the contribution to abatement by the poorest countries.

A case can and has been made that any one of these four main ethical principles should hold sway in global negotiations. So just as in Sen's Capability Approach, global negotiations are not merely about the apportionment of economic costs and benefits in a narrow sense, but encompass broader perspectives as well.

Analysis and Results

Each of the principles of fairness has different cost implications for different regions and countries. This is where the possibility of self-serving biases comes in: Lange, Löschel, Carsten, and Ziegler(2010) have illuminated the cost implications of the allocation of abatement burdens according to different equity criteria. The exploration of costs was done rigorously in the context of a global model, the POLES model, which captures abatement opportunities around the globe, and the analysis was conducted from the vantage point of four different regions involved in climate negotiations:

- the European Union (EU)
- the Group of 77 including China (G77/China)
- Russia
- United States of America (USA)

⁹ Helm, op cit, p69 has been prominent in highlighting this angle; his calculations for Britain for example show that while carbon *production* fell by 15 percent between 1990 and 2005, over the same period carbon *consumption* rose by over 19 percent.

Drawing upon projections of GDP, population and BAU¹⁰ emissions for 2020 that were made in 2005 by the Washington based Department of Energy, the authors compared the costs for the different regions that result from distributing the burdens of abating carbon emissions according to the four different equity rules outlined above, given an overall abatement objective for the planet, and a carbon trading system that equalises marginal costs of abatement across all regions, and allows abatement to take place at lowest possible marginal costs¹¹.

For the “polluter pays” calculations, two different measures were used: A measure of historic emissions for each region was estimated spanning 1860 to 2002. Another measure was derived by combining these data with projected emissions out to 2020. One feature of the results is the substantial difference BAU emissions through to 2020 make to the overall results.

Although the simulations were calibrated on 2005 data, available at the time the authors conducted the study, the results are likely to remain valid in qualitative terms. The main difference since then is the “lesser depression” recession of 2008/09 and the fact that economies are unlikely to return to economic trends extant prior to the recession implies that both GDP and emissions are likely to be lower in 2020 than was projected for the purposes of the study.

The results of the simulations are depicted on Table 1 below: What is immediately apparent is that there are marked and apparently irreconcilable differences between the four regions with respect to which equity principle is the least costly and hence the preferred abatement arrangement. The EU is now a relatively energy efficient region with the increasing uptake of renewable energy and a still significant share of nuclear, so that a polluter pays arrangement works out as most cost effective for the EU, but only if the measure that combines historic and future emissions is used. A polluter pays rule based exclusively on past emissions would be relatively costly for the EU, and an egalitarian rule in which per capita emissions would be reduced to the same as the average level around the globe would be least desirable, and entail major adjustments in lifestyle. The ability to pay rule may be rendered increasingly attractive in this ranking if the outlook for growth in the Eurozone remains bleak. For the US, the ability to pay measure would be most preferred on cost grounds, but this is in the context of projected slower growth in GDP out to 2020 than is likely to prevail in many developing countries. Like the EU, the US would prefer the application of a polluter pays principle if it combines projected emissions with past emissions, to one which focuses solely on past emissions. Russia, which is a relatively energy inefficient economy given its abundance of energy sources and its role as an energy exporter, would find the sovereignty principle preferable. This is because there remain

¹⁰ Business as usual.

¹¹This property, of ensuring abatement occurs at lowest possible marginal cost by enabling agents to trade off their carbon emission rights with one another, lends CO₂ trading systems their appeal relative to carbon taxes.

certain easily exploitable and low cost abatement opportunities available in Russia, so if each region agrees to lower emissions in proportion to existing emissions, Russia will be a relative beneficiary. Russian industry has emitted with relative impunity in the past, so a polluter pays principle based exclusively on historic emissions emerges as one of the most costly options for Russia.

Global negotiations tend to reveal the big schisms as emerging between the China/G77 block and the US and EU, and the table reveals why. China in particular with its large share of global population would be a relative beneficiary from an allocation of emissions in proportion to its population, as would many other members of the G77. However, for other countries this would rank as the worst possible outcome from global negotiations! It is also noteworthy that despite the preference of many economists and technocrats for arrangements governed by the polluter pays principle, versions of these rank relatively low down the cost hierarchy for many regions and countries and are unlikely to be preferred as shaping the overall solution.

Table 1: Ranking of Equity Preferences by Cost

EU	US	China/G77	Russia
Polluter Pays (projected and historic)	Ability to Pay	Egalitarian	Sovereignty
Ability to Pay	Polluter Pays (projected and historic)	Polluter Pays (historic)	Ability to Pay
Sovereignty	Sovereignty	Sovereignty	Polluter Pays (projected and historic)
Polluter-Pays (historic)	Polluter Pays (historic)	Ability to Pay	Polluter Pays (historic)
Egalitarian	Egalitarian	Polluter Pays (projected and historic)	Egalitarian

The message to emerge is therefore a relatively discouraging one – there appears to be no widely accepted ethical principal that could form the overarching principle underlying a global agreement to tackle climate change. This seems to cast doubt on the possibility of arriving at a stable equilibrium solution. Indeed, countries have previously displayed a tendency to want to renege on agreements if they turn out to have conferred an unexpected advantage on other countries, to the detriment of the competitiveness of their own industries.

Avenues for Progress

Instead, hopes that the climate agenda may progress currently vest in hopes for a succession of more modest bottom-up developments and technological innovation in the sphere of renewable energy and perhaps even geo-engineering. And although clean tech and developments in renewable energy appear to be occurring apace despite the daunting odds posed by the absence of a credible mechanism that would enable developers to internalise more of the social benefits accruing from their actions in their long-run business models, hoping for such a blossoming of a thousand flowers to occur is to ignore the free-rider problem. In similar vein, many of those active in seeking to curb emissions are gravitating towards approaches based on the observation that environmental awareness begins at home and radiates out towards local communities; people don't identify with global accords to anything like the same extent.

All the above is focused on the cost dimension of steps to mitigate climate change. The implicit assumption is that there is also some universally agreed benefit to humanity from tackling climate change. But here too the notion of a comfortable consensus dissolves upon examination. Some countries stand to benefit from global warming to a significant extent. Mineral deposits currently locked away under frozen wastes in Russia and Canada would, given significant warming, become amenable to exploitation. Helm (2012, p26) observes that "(t)he arctic may contain perhaps a quarter of the earth's undiscovered conventional oil". Tol's review, p34 shows that "all studies published after 1995 have regions with net gains and net losses due to global warming". Hence, whether they do or not, these countries and regions that benefit from warming may have an incentive to resist *any* global solutions to combat climate change.

There are also those who contend that costs aren't the issue: That embarking on the massive investments required to tilt the global economy onto a low carbon growth path will be to effectively nudge the economy in the direction of the industrial revolution of the future, a utopian future capitalising on free renewable energy sources, the creation of abundant green jobs, with populations inhabiting quieter cleaner cities. However, given that carbon is the lifeblood of so many economic activities currently, it is unrealistic to suggest that such a future can be created at minimal or even negative economic cost, without significant sacrifice to current consumption.

A further assumption underlying the discussion above is that the preferred way to combat the worst effects of climate change in both developed and developing countries is at source; mitigation of carbon emissions. But in the case of developing countries at least, adaptation has at least a valid claim as a serious option. Richer countries, with stronger infrastructures have been shown time and again to weather natural disasters with relative impunity compared to the mayhem that tends to be inflicted on poorer countries with more fragile infrastructures. For some developing countries, economic growth, though it contributes to the climate problem by raising emissions, may be the preferred approach in rendering them

better equipped to withstand the *effects* of climate change. If this were to be the route followed, then geo-engineering approaches to counteract the effect on the earth's atmosphere of rising stocks of CO₂ would be seen as complimentary and have more widespread appeal.

References:

David A. Clark: *The Capability Approach: Its Development, Critiques and Recent Advances*, Global Poverty Research Group, Manchester 2006

<http://economics.ouls.ox.ac.uk/14051/1/gprg-wps-032.pdf>

Dieter Helm: *The Carbon Crunch. How we're getting climate change wrong – and how to fix it*. Yale University Press, 2012

Andreas Lange, Andreas Löschel, Carsten Vogt, Andreas Ziegler: *On the self-interested use of equity in international climate negotiations*, *European Economic Review* 54 (2010) 359–375

Nicholas Stern, *The Economics of Climate Change: The Stern Review*, Cabinet Office - HM Treasury, January 2007

Richard Tol, *The Economic Effects of Climate Change*, *Journal of Economic Perspectives*, Spring 2009, pages 29-51

