Hang Together or Separately?

How global co-operation is key to a fair and adequate climate deal at Copenhagen

We must all hang together, or assuredly we shall all hang separately.

Benjamin Franklin, at the signing of the United States' Declaration of Independence, 1776

A fair and adequate global climate regime requires a massive effort across the board to reduce the risks to lives and livelihoods that poor people face first and most. Rich countries must reduce greenhouse gas (GHG) emissions first and fastest, with ambitious targets at home. High levels of rich-country pollution over the last century mean that even ambitious emissions-reductions targets will not be enough to avoid catastrophic climate change. Deep emissions reductions in rich countries are still critical, but climate security will now be won or lost as a result of co-operative efforts in which rich countries finance large-scale reductions in emissions in developing countries. Establishing a Global Mitigation and Finance Mechanism could achieve these reductions while respecting principles of equity, and delivering tangible development gains for poor people. This must be a centrepiece of the Copenhagen deal in December 2009. But much greater political attention and support is needed for this vital part of the deal to be developed in time.

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Oxfam International

Summary

Climate change offers humanity no second chances. An agreement struck at the UN climate conference in Copenhagen in just six months' time could pave the way for a post-2012 climate regime that staves off catastrophic climate change. Delay or failure risks locking in runaway climate change, and will certainly multiply the costs of responding to its negative impacts – costs that are already being borne mostly by poor people.

A climate deal in Copenhagen will only be achieved if world leaders are prepared to acknowledge – and act on – the deep injustice at the heart of climate change. The victims of this injustice are the hundreds of millions of poor people who now bear the consequences of more than a century of rampant carbon emissions largely from the industrialised world. Whether they are Pacific Islanders forced from their homes due to storms and sea-level rise, or rural African communities who face ever-worsening droughts and food shortages linked to climate change, the people affected first and worst are all amongst those least responsible for ongoing emissions. Any deal that does not redress this injustice is no deal at all.

A fair deal means one that both keeps global warming as far below 2°C over pre-industrial temperatures as possible, and that delivers sufficient resources so that poor people can avoid the worst impacts of already inevitable climate change. Fairness also means that those countries most responsible for past emissions and most able to assist, take a lead in cutting emissions first and fastest.

Oxfam's assessment is that negotiations towards a fair and low-risk agreement in Copenhagen are seriously off-track. The emissions-reductions targets of rich, industrialised countries are, rightly, a leading focus in both domestic and international debates. Across the board these targets still fall far short of what is required. But an even bigger challenge lies hidden in the depths of the UN climate talks.

Even the most substantial levels of mitigation action in rich countries – emissions cuts adding up to 40 per cent below 1990 levels or more – fall short of what's needed to stay below 2°C, let alone their fair contribution to the global effort. If Annex I countries achieve this level of reduction, an equivalent reduction (in tonnes of CO_2) in developing countries will still be required. This can only be achieved through co-operative efforts involving both rich and developing countries – an ambitious joint venture founded on fairness. Unless a mechanism is designed and agreed to achieve this scale of additional emissions cuts – now – a fair and low-risk agreement in Copenhagen is highly unlikely. How would such a mechanism operate, and what would it take?

Oxfam proposes a Global Mitigation and Finance Mechanism which aims to enable developing countries to achieve development and poverty reduction goals, whilst contributing to global mitigation efforts.

This Mechanism would match reliable flows of financial support from Annex I countries[1] with real emissions reductions from developing countries. Under this scheme, Annex I countries would provide enough money to incentivise emissions reductions in developing countries to keep global warming as far below 2°C as possible. Developing countries may use these resources to implement strategies with specified emissions reductions and consistent with national priorities. Depending on their 'available economic capability' (above a 'development threshold') they would receive up to 100 per cent financing for the full incremental costs of emissions reductions.

Relative to their vital importance, emissions cuts achieved through such co-operative mitigation action have received rather little political attention or support. Although delegates to the UN climate negotiations are preoccupied with so-called 'measurable, reportable and verifiable' mitigation action and support, national debates in most rich countries focus overwhelmingly on the limits to, and potential of, emissions cuts within their borders. At best, rich countries simply assume that international mitigation opportunities are cheap, plentiful and easily attained as a means of 'offsetting' emissions at home.

Based on studies to date, Oxfam estimates that at a very minimum, $150bn in public investment will be required each year to facilitate the necessary mitigation and adaptation action in developing countries. Though this is a large sum, it is many times less than the $4 trillion spent by developed countries on the financial crisis so far, or the $1.3 trillion of annual global military spending. Proposals to date fall well short of generating the financing required in this area, and do not sufficiently incorporate the key principles of responsibility (for historic emissions) and capability (to pay) in determining who pays what.

Developing countries must be assured of predictable flows of finance to embark on global mitigation actions. This would require financing the Global Mitigation and Finance Mechanism from the sale, auction or levy of allowances industrialised countries need to meet their mitigation obligations (Assigned Amount Units, or AAUs), or from other reliable sources. By stimulating investment in low carbon development in developing countries, rich countries both ensure that the biggest sources of future emissions are addressed, and help develop markets for their own low carbon technology solutions.

Making such a mechanism possible will require industrialised countries to assume a so-called 'double duty'. First, Annex I countries must reduce their combined emissions by at least 40 per cent below 1990 levels by 2020. Oxfam's analysis of fair shares of the overall Annex I target suggests that more than 95 per cent of this Annex I target falls to just six countries and groups, which should adopt emissions targets (in relation to 1990 levels) as follows: Australia (40 per cent), Canada (43 per cent), the EU (44 per cent), Japan (56 per cent), Russia (20 per cent), and the USA (45 per cent) by 2020. All of these countries must achieve a majority of these reductions within their domestic economies.

Secondly, industrialised countries must provide funding – $150bn per

year at the very least – through the sale, auction, or levy of AAUs – to finance a Global Mitigation and Finance Mechanism that can incentivise large-scale emissions reductions in developing countries and finance adaptation. And what of the fair share of developing countries in this venture?

Oxfam's view is that calls for developing countries to take on commitments in Copenhagen equal to the scale or nature of those required from rich countries are misguided and deeply unfair. This is due to a legacy of broken promises; a long history of excessive GHG pollution; and substantially greater levels of wealth. If rich countries deliver on their double duty, then developing countries can be reasonably expected to 'hang together' and co-operate. This should entail contributing what they are able to pay (in line with available economic capability) towards mitigation actions that limit overall emissions by 2020, consistent with minimising risks of catastrophic climate change.

All countries agreed the Bali Action Plan in 2007, but rich countries have yet to provide a clear signal that they are willing to deliver on its provisions. The extent and means of rich-country financing for mitigation actions in developing countries is central to a fair deal in Copenhagen. The lack of progress in this area, both on amounts and means of financing, now seriously threatens to undermine any future deal. Developing countries have shown they are prepared to do their part. It is now up to rich countries to provide the means.

1 Dancing with disaster

This paper argues that for the Copenhagen UN climate conference to succeed, all governments must move quickly to agree arrangements that guarantee developing countries a predictable flow of resources at scale in order to deliver a major portion of the global mitigation action required. Section 2 outlines the central importance of equity to the agreements expected in Copenhagen, and defines fair shares. Section 3 outlines the details of a proposed Global Mitigation and Finance Mechanism that Oxfam believes is required to fill the gap. Section 4 discusses the financial and political requirements of this proposal, and Section 5 concludes with recommendations. To begin, Section 1 outlines the consequences of inaction that poor people already suffer, and the available scientific guidance on what's needed to minimise the risks they face.

I found a flaw in the model that… defines how the world works… I had been going for 40 years or more with very considerable evidence that it was working exceptionally well.

Alan Greenspan, former Chair of the US Federal Reserve Board, in testimony on the financial crisis before the US Congressional Committee on Oversight and Government Reform, 23 October 2008

Climate change offers humanity no second chances – no room for flawed models. The economic crisis now changing the fortunes of billions of people will be studied for decades and centuries to come, in particular the way that systemic risk was hidden under the noses of the most powerful decision-makers. The history of climate change may go down as the most well documented collapse of human civilisations. Or, it may be the story of how leaders changed their perception of risk and mobilised the political will to lead their countries through rapid economic and policy reforms unprecedented in human history but necessary for survival.

Typhoon Reming blew away Alma Bredin's house in 2006, leaving only the concrete floor (see Box 1, below). Credit: Stanley So / Oxfam Hong Kong

Either way, surprising and sudden changes will feature strongly in the narrative. If the risks now in plain view are ignored, rapid changes in

the Earth's environment will become irreversible. The choice between these two futures will hinge in part on whose lives and livelihoods are considered in the assessment of risk.

With less than a 1°C global temperature increase since 1850, climate impacts are already a clear and present danger for millions, with almost all the people at risk living in poverty across the developing world. Oxfam is projecting that by 2015 – the target date for the Millennium Development Goals – the average number of people affected by climate-related disasters each year will grow by more than 50 per cent to 375 million.[2]

People are being forced to relocate from their homes due to rising sea levels. Hunger and malnutrition are being driven in part by a growing number of floods and droughts, and lives and livelihoods are at risk from an increase in extreme events.

Box 1: More intense typhoons devastate Philippine coastal villages

Alma Bredin (40, pictured above) and her family (9 in total) live in the coastal area of Subok in Barangay Angas on San Miguel Island.

The island experiences frequent typhoons. But, in recent years, Alma says they have been more frequent and much stronger than before. Typhoon Reming in 2006 blew away her house, and only the concrete floor was left. She said that the ocean waves were up as high as the top of the palm tree.

'The weather is getting more serious. There are more heavy rains and more flooding, and they're causing more calamities on the island.' Says Bredin.

Her family relies on fishing for food and money. However, she has seen changes in the ocean too. There are fewer and smaller fish in the sea. It is also getting more difficult to catch fish, because of strong winds. At this time, her family have been unable to catch fish for five months and because of this, they try to catch shrimp instead. Sometimes they do not have enough and have to borrow food from neighbours.

If given a choice, she would like to live on the high land and then go to the sea for fishing. However, her family does not have any savings, and could not afford to buy land. It costs around 7,000 Peso ($147).

Now her family is using whatever is available – palm leaves and wood – to slowly rebuild their house on the original concrete ground. The photo shows that it is not a very strong shelter for protecting her family. If there was another big typhoon, then the house might easily fall down.

Since typhoon, fewer households live along the coast. Bredin says tree planting along the coast may help protect against the typhoon. Sand bags are also another option to prevent the ocean waves from hitting their fragile houses.

Stanley So, Oxfam Hong Kong, June 2008

Non-negotiable science

Already, rapid changes in the way our planet works are surprising the experts. Greenhouse gas (GHG) emissions are growing faster than scientific models predicted just ten years ago. Ice sheets are melting faster, suggesting that feedback mechanisms, which could lead to runaway climate change, are already in motion. While policy makers continue to assume that a halving of global emissions by 2050 can avoid catastrophic levels of climate change, the recent scientific findings suggest this goal falls far short of what is needed.[3] The International Energy Agency (IEA) projects a 6°C temperature increase on current trends.[4] This would result in unimaginable human suffering and socio-economic collapse.

In 2007, the Intergovernmental Panel on Climate Change (IPCC) presented its review of emissions pathways. The lowest scenarios available then, however, did not indicate emissions levels consistent with staying within 2°C of warming, widely considered to represent the threshold of irreversible climate change[5] (see Table 1).

As the current concentration of GHGs in the atmosphere today exceeds 430 parts per million (CO_2e – Carbon Dioxide Equivalent), we are already in the danger zone. 'Tipping elements' such as the reduction in Arctic summer sea ice are already evident, underlining the urgent need to reduce emissions, starting now.

Table 1: Expanded IPCC scenarios and emissions reductions

Atmospheric concentration of GHGs (ppmv CO_2-e)	Global mean temperature increase above pre-industrial level (°C)	Change in global CO_2 emissions in 2050 (% of 2000 emissions)	Corresponding emissions in Annex 1 region in 2020 (% change from 1990 emissions)	Corresponding emissions in Non Annex 1 region in 2020 (% change from business-as-usual)
350 to 400	1.5 to 2.0	Needed*	Needed*	Needed*
445 to 490	2.0 to 2.4	-85 to -50	-25 to -40	-15 to -30
490 to 535	2.4 to 2.8	-60 to -30	-10 to -30	
535 to 590	2.8 to 3.2	-30 to +5	0 to -25	0 to -20

Source: Columns 1–4: Intergovernmental Panel on Climate Change. Fourth Assessment Report (AR4), Contribution of Working Group III. Column 5 from Michel den Elzen and Niklas Hohne, (2008) "Reductions of greenhouse gas emissions in Annex I and non-Annex I countries for meeting concentration stabilisation targets: An editorial comment in*Climatic Change*, Vol. 91, pp. 249–274.
*Row 1 ('Needed') Oxfam addition referring to the need for elaboration and review of emissions scenarios consistent with stabilisation goals lower than 2.0°C.

Minimising poor people's risks

Scientists urgently need to set out what emissions pathways consistent with a high probability of limiting warming well within 2°C (above pre-industrial temperatures) would look like. Until this information is available, the only tolerable strategy is to minimise the risks that poor

people face first on the basis of the most recent scientific findings. Adopting emissions reductions goals that are more ambitious even than the lowest IPCC-reviewed scenarios assessed (Row 2 in Table 1) is not a point for negotiation – it is a starting point from which the negotiations must proceed.

More ambitious emissions reductions targets mean poor people will face fewer risks of hunger, ill health, insecurity, and death. In response to the latest science – and in order to protect their people from irreversible and catastrophic levels of climate change – 92 of the nations most vulnerable to climate change have called for global warming to be kept within 1.5°C.[6] Together with most organisations dedicated to humanitarian causes, Oxfam's concern lies in avoiding a reverse in human development – and preserving a climate that makes poor people's efforts to escape poverty possible.[7]

To minimise risks associated with a greater than 2°C temperature rise, GHGs in the atmosphere must be reduced to below 400ppm CO_2e as a matter of urgency, decreasing to a concentration of 350ppm as soon as possible thereafter. Scientists have calculated this level as 'very likely' to keep the temperature increase within 1.5°C.[8]

At Bali in 2007, the world's governments set December 2009 as the deadline to agree a global deal on climate change.[9] To fend off disaster, the agreement in Copenhagen will need to ensure that global emissions peak by 2015 at the very latest[10], and that total global emissions in 2020 fall back to 1990 levels – or even lower.[11]

While even this ambitious level of mitigation action cannot guarantee a 'safe' climate, it is the minimum requirement for an adequate mitigation goal – one that minimises risks to poor people around the world, and preserves their options for a better life.

'The costs of stabilising the climate are significant but manageable; delay would be dangerous and much more costly.'

Stern Review[12]

Delaying action, by substituting ambitious near-term targets with more ambitious action in the long term (post-2020) is to dance with disaster: analysis has shown that a delay in emissions reductions of ten years almost doubles our chance of exceeding 2°C of warming.[13]

Time is running out. We face a small and shrinking window of opportunity to put ourselves on a pathway to prevent catastrophic climate change. The Copenhagen UN climate conference in December 2009 represents a last chance to change course.

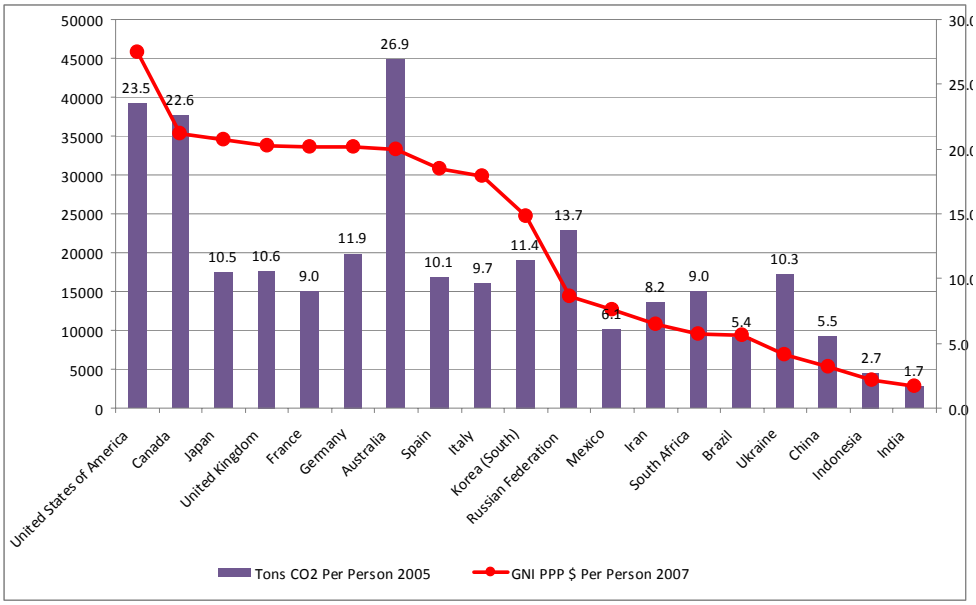
2 Fair deal or none

Equity is a vital and instrumental part of any agreement to be reached in Copenhagen. No country will agree to a post-2012 climate regime it perceives to be unfair. An agreement that simply maintains, or worse increases, existing injustice and inequality, is unacceptable.

The existing inequalities of climate change are stark:

- Developed countries are responsible for approximately 76 per cent of the GHG emissions already released into the atmosphere;[14]
- Per capita rates of GHG emissions are significantly higher in developed countries than developing countries. For example an average Australian emits nearly 5 times as much as an average Chinese, and the average Canadian emits 13 times as much as the average Indian;
- About 100 countries, with a total population of nearly a billion people but less than 3 per cent of the global emissions, will have to suffer the effects of climate change impacts in the near term;
- Developed countries have greater economic capability to make the adjustments that are needed to reduce emissions. For instance, the US GDP per person is about 10 times that of China and about 19 times that of India.[15]

Figure 1: Top 20 world emitters: per capita pollution and income



Top 20 world emitters in absolute (total emissions across economy) terms. Source: Climate Analysis Indicators Tool (CAIT) Version 6.0. (Washington, DC: World Resources Institute, 2009). Total GHG emissions in 2005, excluding land use change. World Development Indicators (2008), GNI per capita, PPP (December 2008 international $). Diagram created by Oxfam.

Compounding these injustices there are a host of other facts that undermine confidence that the richest, most powerful countries are committed to greater global economic justice. A partial list:

- Despite repeated pledges and international obligations in the UN

Climate Change Convention and its Kyoto Protocol to assist the most vulnerable countries in their most urgent climate adaptation needs, rich-country contributions to the Least Developed Countries Fund add-up to less than 10 per cent of these urgent needs;[16]

- Several Annex 1 countries remain off course to achieve their modest reductions targets under the Kyoto Protocol[17], and Canada has even suggested it will not bother;
- Progress by the G8 countries towards their commitment at the Gleaneagles Summit in 2005 – to provide an additional $50 billion in development aid by 2010, and make steady progress towards achieving the 0.7 per cent GNI target set in 1972 – has stalled in most countries, and even threatens to roll backwards overall;
- The Doha Development Round has now all but lost any promise of delivering for development, and, despite warm words, rich countries are yet to deliver more than a fraction of the $13 billion needed by the tens of millions of people suffering from the food crisis.

A fair deal in Copenhagen has several dimensions including: resources for adaptation in developing countries; a means to redress damages from climate impacts; and policy responses that do not themselves harm poor people's lives and livelihoods. Of all the dimensions of equity, agreeing fair shares of an adequate global mitigation goal is central. Without a fair division of the global mitigation effort, there is no deal.

What's fair?

Responsibility and capability for fair shares

The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof.

United Nations Framework Convention on Climate Change (1992), Article 3.1[18]

The principles of responsibility and capability are enshrined in the United Nations Framework Convention on Climate Change (UNFCCC), and in the Kyoto Protocol (see sidebar). But although this principle is the most widely quoted passage from the Convention, governments are further than ever from defining what it means in concrete terms.[19]

As indicated in Table 1 in Section 1, the IPCC correlated reductions of 25–40 per cent below 1990 levels by 2020 in Annex 1 countries to stabilisation of temperatures between 2.0–2.4°C.[20] If we are to keep warming as far below 2°C as possible, it follows that Annex 1 countries must adopt the most stringent target proposed by the IPCC at the very least – and accept substantial additional obligations to finance mitigation in non-Annex 1 countries (see next section). Accordingly, the Copenhagen agreement must enshrine aggregate reductions of at least 40 per cent below 1990 levels by 2020 for Annex 1 countries, and guarantee their delivery through binding, individual country targets for Annex 1 countries, a majority of which must be achieved through domestic action.[21],[22]

Within the Annex 1 group there is a wide range of responsibility for climate change and the harm it causes, and the capacity to take action to reduce emissions. In accordance with the key principles of responsibility and capability, and on the basis of principles of fairness and social justice, Oxfam believes that an explicit, principle-based framework for determining the mitigation targets and other obligations of Annex 1 countries is the most transparent and objective way to determine what is fair. Together with several other Parties and observers, Oxfam proposes that a responsibility-capability index be agreed as a reference point for the negotiations.[23]

Oxfam has analysed what represents a fair share of emissions reductions for each Annex 1 country taking into account both their history of past emissions and their current levels of income. Based on an indicator constructed using cumulative emissions, 1990–2005, for responsibility, and total income above a 'development threshold' for capability, Oxfam's analysis of Annex I fair shares suggests that more than 95 per cent of this Annex I target falls to just six countries and groups. (For more detail, see Appendix 1.) These figures do not represent an analysis of specific mitigation policy options in these countries.

For these six, the 2020 emissions targets (in relation to 1990 levels) are as follows: Australia (40 per cent), Canada (43 per cent), the EU (44 per cent), Japan (52 per cent), Russia[24] (20 per cent), and the USA (45 per cent). Appendix 3 sets out the emissions targets for all Annex 1 countries. These targets are substantially higher than any currently contemplated by Annex 1 countries so far, and show the extent of the political challenge Annex 1 countries must rise to if we are to secure the future of our planet.

Table 2: 2020 Mitigation targets (See Appendix 2 for more detail)

	2020 mitigation targets derived from fair shares, expressed as:		
	Fair shares (RCI)	*Reduction below 1990 level (CO_2e excl. LUC)*	*Reduction below 2005 level (CO_2e excl. LUC)*
	%	%	%
Australia	2.29	39.7	51.6
Canada	3.51	43.0	54.7
European Union	33.93	44.4	39.6
Japan	9.71	56.2	59.0
New Zealand	0.34	40.6	52.3
Russian Federation	8.21	20.2	-12.0
United States	37.80	44.6	52.4

Oxfam calculation: see Appendix 2, Table 4 for full list of Annex I countries and groups, and Appendix 1 for methodology.

Fair shares in a global context

Indeed, there are powerful equity arguments, given the history, that for rich countries the allowance should be zero (which would mean that it would have to pay for all the actual greenhouse gases emitted), or even negative.

Lord Nicholas Stern[25]

While the foregoing section allocates equitable shares across Annex I, it does not say that a 40 per cent reduction below 1990 levels by 2020 satisfies the overall responsibility and capability of rich countries in a global context. Indeed, there are many good reasons to conclude that the fair share of Annex I countries involves much more.

Applying measures of responsibility and capability globally, the Greenhouse Development Rights framework assigns more than three quarters of the total, required global effort to developed countries in 2010. Assuming a 2°C pathway, this correlates to obligations for developed countries significantly higher than the often-quoted 25–40 per cent range of rich-country reductions by 2020. For example, under this approach, the EU faces a global mitigation obligation that is equivalent to a reduction of its emissions by almost 80 per cent below 1990 levels by 2020.[26]

Likewise, a recent submission to the UN negotiations by Bolivia outlines a 'carbon debt' approach that calculates historic emissions of rich and developing countries in relation to per capita emissions. Extrapolating into the future and taking account of emissions constraints, the submission concludes: 'To the extent it is not technically possible to repay the full measure of debt in terms of environmental space, some part may need to be repaid by Annex I countries in the form of financing and technology… an ambitious package of financial and technological transfers is clearly required from Annex I Countries to help developing countries reduce their emissions without undermining development. '[27]

Rich countries are unlikely to deliver their fair share of global mitigation action through their own domestic emissions cuts. Assuming 40 per cent reductions by 2020, Annex I countries will still remain well above average global per capita emissions levels, and will therefore owe a large portion of their fair share. Assuming a global carbon budget in 2020 equal to 1990 levels, a 40 per cent reduction for Annex I would translate to an allocation of 11.7 Gigatonnes (Gt), or approximately 9.2 tonnes per person using today's population.[28] The consequences of such an allocation for Annex 1 countries would be that the residual allocation of 24.4 Gt for developing countries adds up to just half, or 4.6 Gt per person – and far less were we to use projected 2020 population data. This would be highly unfair. Such allocations have considerable financial implications. Assuming a 2 tonne per person allowance and a low ($25/tonne) carbon price, Annex I countries would owe some $229bn in 2020 – even after having reduced their emissions by 40 per cent relative to 1990 levels.

Overcoming the classic stalemate

A stalemate plagues the UN climate negotiations. One in which rich countries argue developing countries must make emissions-reductions

commitments before developed countries have made good on their commitment to take action first and fastest, and have provided long overdue funding. Developing countries argue, rightly, that they cannot take the same kinds of commitments until these previously made promises from developed countries are met. In light of deep inequalities, past and present, and broken promises, it is neither fair nor realistic for rich countries to expect developing countries to commit to binding national emissions-reductions targets before wealthy developed nations have made deep, lasting cuts and commitment to specific levels of funding. These should be in line with what was agreed in the Bali Action Plan, in order to prevent catastrophic climate change.

Until developed countries take a leadership role consistent with their responsibility for emitting the vast majority of the atmospheric build-up of CO_2 over the last century, and show that economic well-being and welfare can be maintained while drastically cutting emissions, developing countries cannot be expected to take the same level of action as developed countries. Countries such as the UK and Germany have shown that it is possible to maintain economic growth while reducing emissions; other developed countries must also set this example.

Yet even if industrialised countries were to cease all emissions from today, developing-country emissions alone would overshoot the 2°C pathway by 2020 on current trends.[29] We now face a far greater climate challenge than when the Kyoto Protocol was first agreed over 10 years ago. Unbridled emissions growth in developing countries is no longer an option.

A pathway to keep warming well within 2°C demands both that emissions in industrialised countries are reduced, well below the 1990 baseline adopted by the UN Climate Convention, and that emissions growth in developing countries be limited below 'business-as-usual' trajectories.

Too often, the question of fair shares focuses exclusively on what countries – industrialised or developing – must each do to help avoid dangerous climate change. This is critical (as we have seen above) – but is only half the story. Focusing solely on this issue tends to perpetuate the classic stalemate – the 'north-south divide' or impasse – that has characterised international climate talks for years now. Each side calls for the other to move first, and uses intransigence as an excuse for inaction. With every tick of the Copenhagen countdown clock, the cost of this classic stalemate rises.

The agreement struck in Bali in December 2007[30] clearly sets the parameters for the nature of developing-country action and for the support from rich countries required to increase the reductions in emissions that can be made in developing countries. The next commitment period that is agreed in Copenhagen needs to be a trust-building period that, as Stern argues, '…rewards developing countries for reducing emissions, but does not punish them for failing to do so'.[31]

Section 3 explores a model for overcoming this stalemate, and ensuring that we reach a positive outcome from the Copenhagen meeting.

3 The means in the middle

Ultimately, we will only escape the carbon trap as a result of co-operative efforts, in which rich countries take on a double duty to both reduce their domestic emissions, and enable developing countries to undertake a rapid and large-scale transition to a low carbon future.

This is true, not only because of the international politics of climate change in 2009, but also because of the simple maths of the emissions reductions required. A return to 1990 annual emissions levels by 2020 is the very minimum that would reduce the risks of overshooting 2°C below 50 per cent.[32] If Annex I achieves a 40 per cent reduction at home, a reduction of approximately the same scale (in tonnes of CO_2e) in developing countries – achieved by limiting the growth of emissions rather than by reducing emissions in absolute terms – will still be required to keep warming below 2°C.[33] (As discussed above, equity requires that the reductions in emissions growth be paid for largely by Annex 1 countries.)

Box 2: 'Autonomous' action in China

In June 2007, the Chinese Government released 'China's National Climate Change Programme'. It also established the National Climate Change Coordination Committee. Climate change work is led by Premier Wen Jiabao. In November 2008 a white paper, 'China's Policies and Actions for Addressing Climate Change', was published. Highlights include:

Improving energy efficiency

China has reduced the energy intensity of GDP by over 60 per cent since 1980, and has set a target to reduce it by a further 20 per cent by 2010 (against 2005 levels).

Since 2005, the Government has required all new large power plants to use high-efficiency super-critical coal fired technology and, during 2007, 553 smaller inefficient plants with total generating capacity of 14.38GW were shut down.

Increasing investment in renewable energy

Ambitious policy and renewable energy targets: 15 per cent of total energy should come from renewable sources by 2020.

$50bn out of the $580bn economic stimulus package will be invested in environmental protection and low carbon development.

China is the world's second largest investor (in absolute terms) in renewable energy – in 2007 China invested approximately $12bn in renewable energy, behind Germany, which invested $14bn. Every two hours, China installs a wind turbine. By 2012, it plans to be the world leader in wind energy.

There are strong policies to stop deforestation and to promote sustainable forest management. There are also policies to adapt to climate change in agriculture, forest and other natural ecological systems, water resources, as well as to protect ecologically fragile areas.

Compiled by Stanley So, Oxfam Hong Kong, May 2009.

Unilateral, 'autonomous' actions already announced by developing countries (see Box 2 above), can be expected to deliver some of the necessary global reductions, but are not likely to approach the scale required. If Annex I countries commit to, and deliver, a 40 per cent reduction from 1990 levels by 2020, then emissions growth in developing countries as a whole (compared to 1990) will need to be limited to the same amount. This would still result in a doubling of emissions in developing countries compared to 1990 levels).[34] In other words, the amount of emissions reductions that must be achieved in addition to the 40 per cent rich-country target is still very large indeed.

The EU has called for a reduction in developing countries equivalent to a 15–30 per cent reduction below business-as-usual by 2020. This is based on an estimate of the remaining carbon budget after a 25–40 per cent reduction by Annex 1.[35] While estimating 'business-as-usual' emissions trajectories is a tricky business, what is clear is that the size of the reduction that must be achieved in the developing world will depend in large part on what Annex I countries ultimately commit to achieve; if it is greater than 40 per cent below 1990 levels, then the reduction in developing countries required by a 2°C-consistent pathway will be less, as will the financial resources required from developed countries to finance this reduction. Likewise, it will also depend on economic growth rates in developing countries, and the extent to which these are de-coupled from emissions.

A mechanism to match the required finance from rich countries with the mitigation actions from developing countries is not only necessary to achieve the global mitigation requirement, it is also consistent with agreement reached between countries under UN negotiations in Bali in December 2007. Such a mechanism must become a central focus of negotiations and a centrepiece of the Copenhagen deal.

Oxfam proposes a Global Mitigation and Finance Mechanism to ensure that developing countries are provided with support and incentives in line with rich countries' responsibility for historic emissions and their ability to pay. One feature of the proposal is that support should be provided in relation to developing countries' 'available economic capability'. That is, countries with very low capability should be provided with the most support, and countries with higher capability should receive less.

Oxfam analysis suggests that a meaningful way of assessing available economic capability is to count only the portion of a country's gross national income (GNI) above a threshold of $9,000 per person, per year. Research suggests that $6,000 per year can be considered a 'global poverty line' – a level of income that corresponds to what is generally considered poverty in nearly all countries around the world.[36] Many analysts agree that a development threshold should be set well above this poverty line.[37] Our assessment is that a level of income that is 50 per cent greater than the poverty line, or $9,000, serves as a meaningful development threshold – the point at which most people can be considered not only to have escaped poverty, but further to enjoy economic, social, and political rights and freedoms that give rise to

responsibilities for active global citizenship.

Oxfam's approach to determining available economic capability starts by excluding entirely from a country's GNI, the income of all individuals in a country earning less than the equivalent of $9,000 per year. For individuals earning more than $9,000 per year, only the portion above this threshold is considered. Whilst income below the threshold is generally directed to survival and development priorities, income above the threshold is a reasonable proxy for a country's economic capability 'available' for other uses – including contributing to urgent action on global climate change. As it's the amount that needs to provide for the priorities of a society as a whole, we divide this amount by total population to reflect available economic capability in per person terms.

If they wish to receive this support, developing countries (those that are not least developed countries [LDCs] or small-island developing states [SIDS][38] or countries with very low capability, as outlined in Appendix 3), should produce a national mitigation plan, identifying the nationally appropriate mitigation actions that the country proposes; the incremental costs of these actions; and the tonnes of carbon saved as a result of taking the actions.

An important feature of this Mechanism is that, properly implemented, it ensures that there is no double counting of reductions delivered in Annex 1 countries and those delivered in non-Annex 1 countries. Both of these reductions must be achieved in order to keep warming as far below 2°C as possible, and both require leadership from rich countries.

Additionally, this Mechanism ensures that low cost emissions-reductions options in developing countries are accounted for in their national mitigation plans, and their national communications to the UNFCCC (rather than counting towards Annex I obligations and so reducing their costs). It does so by providing developing countries a huge incentive to realise emissions reductions up to a pre-determined target level. After the target reductions are achieved, additional reductions can be sold to firms in rich countries for whom the price is competitive with options they face in their domestic context. The section below describes this proposal in greater detail (see also Figure 2 for a schematic representation).

Global Mitigation and Finance Mechanism

How it would work

Economy-wide nationally appropriate mitigation actions (NAMA)

In order to receive funding, developing countries would create and submit a national mitigation plan, outlining a series of nationally appropriate mitigation actions **(**NAMAs). The national mitigation plan would identify the mitigation actions that the country proposes, the incremental costs of these actions,[39] and the tonnes of carbon emissions that will be avoided (reduced) as a result.

For countries with available, per-person economic capability of $1,000 or higher,[40] in order to receive funding, the national mitigation plan should be economy-wide.

The governing body of the Mechanism should determine the appropriate level of emissions reductions that developing countries should strive to achieve. Once identified, this level of mitigation should be used to determine the amount of mitigation that will be funded through the Mechanism in each developing country, taking into account the levels of incentives provided, as described below. This could be a single percentage reduction (relative to business-as-usual) for all developing countries, or different levels for specific categories.

In any case, the target level for developing-country NAMAs must be determined with reference to the amount of reductions necessary to minimise risks of warming beyond 2°C . The figure of 15–30 per cent below business-as-usual that the EU has proposed, needs further scrutiny for several reasons: more clarity about the level of ambition reflected in rich-country targets is a starting point; assuming rich countries commit to a 40 per cent below 1990 reduction by 2020, a 15–30 per cent reduction from business-as-usual corresponds to levels of warming greater than 2°C; only a handful of experts have published relevant estimates.[41]

The Global Mitigation and Finance Mechanism would assess the technical quality of national mitigation plans that developing countries submit, and – provided agreed standards are satisfied – would transfer funding in line with an incentive schedule agreed by its governing body. Oxfam suggests that available economic capability (as described above and in Appendix 3) is a relevant and meaningful basis for determining the level of financial incentive provided to enable developing-country action, as follows:

- LDCs, SIDS,[42] and countries with available economic capability of less than $1,000 per person receive full (100 per cent) support for the incremental costs of any emissions reductions projects, even if not part of a comprehensive or economy-wide national mitigation plan;[43]

- Countries with per-person available capacity greater than $1,000 and lower than $12,000 receive a proportion of the incremental cost of funding for all actions within their national mitigation plans, depending upon their available economic capability. A sliding scale of support could match the proportion of financed incremental costs. For reference, data for all countries in this category is provided in Table 5, Appendix 3.
- Countries with capacity greater than $12,000 are encouraged to take on economy-wide efforts to reach the emissions reduction level identified by the Mechanism as being necessary to keep warming as far below 2°C as possible.

Premium Reductions

Developing countries may submit plans that deliver emissions reductions above the minimum level of mitigation identified and agreed by the Mechanism. Because these reductions are additional to the level of reductions needed to minimise risks of catastrophic climate change, these additional, or 'premium', reductions may be purchased[44] by Annex I country actors to 'offset' emissions that would be more expensive to reduce at home, or through emissions trading with other Annex 1 countries and carbon markets.

Because these premium reductions are over and above the large scale of incentivised reductions, they are likely to be more expensive. 100 per cent of the cost of these reductions should be funded for all developing countries with capability of less than $12,000. The increased cost should be reflected in the price calculated for premium reductions, as identified below.

Securing new, additional, adequate, and predictable funding

Beginning as soon as possible, the Global Mitigation and Finance Mechanism should provide finance for countries with low levels of capability in order that all developing countries have the capacity to develop:

- national mitigation plans;
- a rigorous emissions inventory and database;
- systems required for participation, including governance systems.

The Mechanism should sell, auction or levy all or a portion of Assigned Amount Units (AAUs)[45] to Annex I countries (up to the total allocation represented by their respective targets) as a primary means of generating a predictable revenue flow (other sources might also be used).

In all cases, the price would need to be managed by the Mechanism to ensure that sufficient money is raised to pay for the cost of necessary reductions in developing countries. For example, if an auction is chosen as the preferred approach, a price floor could be set. If a levy were used, the amount of AAUs set aside would need to take account of price risks

in the carbon market. In the case of a managed sale, a country that had emissions of 500 megatonnes (Mt) in 1990 and takes a 40 per cent target by 2020, would buy 300 million tonnes worth of AAUs (60 per cent of 500 Mt) at the price determined by the Mechanism to satisfy the scale of non-Annex I reductions required by the global carbon budget.

On no account should the price of premium reduction units be set low enough to act as a price ceiling within domestic emissions-trading schemes in Annex I countries. This would undermine efforts to reduce emissions in Annex I countries first and fastest. The UNFCCC Mitigation and Finance Mechanism should also take into account the price and forward price for permits within the Kyoto-compliant emissions-trading schemes around the world.

Box 2: A primer on emissions permits and trading

Assigned Amount Units (AAUs) are the measures for targets or 'allowed' emissions from Annex I countries, and represent one tonne of GHG emissions. Under the Kyoto Protocol, Annex I members are currently provided AAUs at no cost by the UNFCCC – up to the level allowed by their agreed target. They can then be traded by sovereign states through country-to-country emissions trading.

Emissions trading schemes within countries or regions do not use AAUs. Instead, they create other units in order to allow trade between firms. Country-to-country carbon trading is currently made up primarily of trade in AAUs, and both countries and companies can purchase credits known as Certified Emission Reductions (CERs) from the Clean Development Mechanism (CDM).

The CDM is a project-based mechanism designed to provide incentives for emissions reductions and sustainable development in developing countries. Many national and regional level emissions-trading schemes, such as the European Emissions Trading Scheme (ETS) currently allow CERs to be traded as credits within the scheme.

Oxfam proposes that all or a portion of AAUs should be sold, auctioned or levied in the post-2012 period by the Global Mitigation and Finance Mechanism – instead of allocated to countries for free. Under this proposal, CERs would effectively be replaced by premium reductions, available for purchase by both states and firms to meet national targets (under the international regime) or cover emissions under domestic cap-and-trade programmes.

The target amount of financing required should include funds for the incremental cost of national mitigation plans of developing countries to the assessed mitigation level; the costs of any required capacity-building (for eligible countries); and a small transaction levy in order to fund the functioning of the Mechanism and its governing body. Because other financing needs in developing countries also require new additional, adequate, and predictable financing, arrangements for generating revenues from the sale, auction or levy of AAUs will also need to account for the costs of adaptation to the impacts of climate change in developing countries. See Table 3, below for an indication of the scale of funding required, in the order of at least $150 billion per

year.

Finally, the Global Mitigation and Finance Mechanism will require a strong governance structure, with majority representation of developing-country stakeholders (like the current Adaptation Fund).[46] It will also require high-level expertise (for technical assessments), immunity rules similar to those of the CDM Executive Board, and sufficient resources for administration. It should report to the relevant meeting of the Conference of the Parties to the UNFCCC.[47] The IPCC and other expert bodies as well as subsidiary bodies to the Convention should provide advice to the UNFCCC Mitigation and Finance Mechanism.[48]

Options for Annex 1 countries

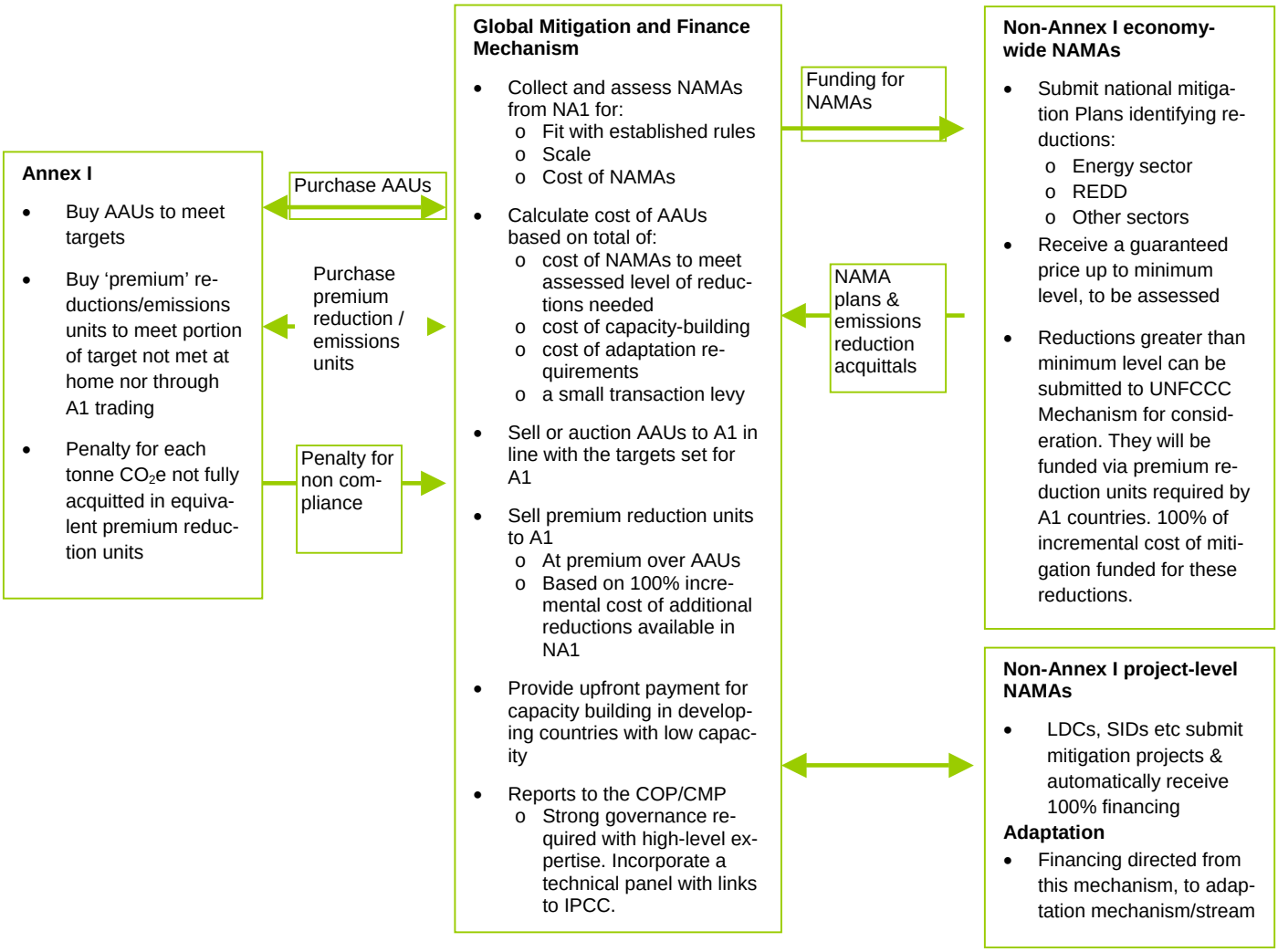
Under the proposed Mechanism, Annex 1 countries would acquire their AAUs from the Mechanism at the determined rate (as above). In the event that an Annex I country has reduced emissions beyond its target, and therefore has surplus AAUs, it may sell those AAUs to another Annex 1 country (just as under the Kyoto Protocol).

The majority of Annex I targets must be met through domestic action. In the event that an Annex 1 country is not able to meet its target domestically or through emissions trading amongst Annex 1 countries, it will have the option of buying premium reduction units from the Global Mitigation and Finance Mechanism.

Corporations would also able to buy premium reduction units from the Mechanism, provided this is allowed within the relevant national or regional emissions trading scheme.

Each year Annex I countries would provide an accounting to the UNFCCC that shows they have sufficient AAUs and (if required) premium reduction units to cover their annual emissions levels. Any discrepancy must be made up with the equivalent amount of premium reduction units.

Figure 2: Schematic of Global Mitigation and Finance Mechanism



Schematic key:

AAUs Assigned amount units (AAUs) are the unit by which Annex 1 countries receive their GHG allowance, or budget. One AAU = one tonne of GHG emissions. For example if a country who has emissions levels of 500Mt in 1990, receives a target to reduce emissions by 40 per cent by 2020, it would have an allowance of 300Mt of GHG emissions and would receive 300 million AAUs.

COP The Conference of the Parties (COP) is the annual meeting of the UNFCCC at which all Governments who have ratified the UNFCCC and are therefore Parties to the Convention attend and can speak. It is typically held for two weeks in December each year, and the CMP is held concurrently.

CMP The Conference of the Parties acting as the Meeting of the Parties of the Kyoto Protocol (CMP or COPMOP) is held in conjunction with the COP. It is a meeting for countries who have ratified the Kyoto Protocol.

NAMA Nationally appropriate mitigation action

REDD Reduced emissions from deforestation and degradation in developing countries (REDD) is an area of the climate negotiations that deals with how developing countries will reduce deforestation and degradation (logging) and therefore reduce their emissions of GHGs.

4 What would it take?

To achieve a deal in Copenhagen, richer countries must facilitate mitigation efforts in developing countries by contributing finance, technology, and capacity-building support. This is not aid; rather it is part of rich countries' fair share of the global mitigation effort. The extent of mitigation actions by developing countries will be directly related to, and largely contingent upon, such support.

Reliable finance is required for both mitigation and adaptation – they are equally important. Estimates of the costs of mitigation and adaptation, listed in Table 3 below, indicate that a range of between $110–180bn per year of public finance will be required in order for developing countries to reduce emissions and adapt to the unavoidable impacts of climate change.

The majority of these estimates are based on assumptions that will lead to warming higher than 2°C, in some cases up to 3°C. Because keeping warming as far within 2°C as possible is a matter of life or death for poor people, we can expect that mitigation costs will be at the high end of the estimates in the table – and likely even far greater. Oxfam believes that rich-country governments need to plan on making at least $150 billion per year in public finance available to the international climate regime by 2013. Because adaptation resources are needed now, the negotiations towards an agreement in Copenhagen should further ensure that arrangements for large-scale funding are put in place even sooner.

For comparative purposes, developed-country governments have spent more than $4 trillion in the last year (at the time of writing) on bailouts of financial services companies,[49] and in 2007 the world's governments spent $1.3 trillion on military expenditure, with approximately $1 trillion spent by developed countries.[50]

Table 3: Estimates of the cost of mitigation and adaptation in developing countries

	Concentration stabilisation of CO_2e	**Year for which cost estimate made**	**Area of use of funding**	**Low-end estimate in $billion**	**High-end estimate in $billion**
McKinseys, Project Catalyst[51]	450ppm	2010–2020	Mitigation and adaptation	85	131
EC Joint Research Centre, Economic Assessment of Post-2012 Global Climate Policies[52]	450ppm	2020	Mitigation	68	
UNFCCC, Investment and Financial Flows to Address Climate Change[53]	450–550pm	2030	Mitigation	92	97

UNFCCC, Investment and Financial Flows to Address Climate Change[54]	550pm	2030	Adaptation	28	67
Africa Group Submission to the UNFCCC[55]		2020	Mitigation		200
Africa Group Submission to the UNFCCC[56]		2020	Adaptation		67
Stern, The Global Deal[57]	500ppm	Next decade	Mitigation	65	
Stern, The Global Deal[58]	500ppm	Next decade	Adaptation	50	100
UNDP (2007): Human Development Report[59]		2015	Adaptation	86	
Oxfam (2007): Adapting to climate change[60]		immediately	Adaptation	50	

Estimates compiled by Oxfam.

There have been several suggested approaches to raising these funds. Few of these proposals raise enough, however. The approaches that are gaining the most currency in the international negotiations are:

- The Mexico Proposal includes establishing a World Climate Change Fund, to which countries contribute, based on criteria such as their GHG emissions, population, and GDP. It aims to raise $10bn in the initial phase. All countries could withdraw money from the fund for mitigation activities, such as deforestation and reforestation, energy efficiency, and renewable energy. Eligible activities would range from the project level to the sectoral level.[61]
- Norway has suggested auctioning a percentage of the AAUs that countries are currently given for free from the UNFCCC. Two per cent auctioning could raise $15–25bn per year.[62] Oxfam has previously estimated that auctioning 7.5 per cent of allowances would generate $52bn per year.[63]
- Tuvalu has proposed an emissions trading scheme for international aviation and maritime emissions. This could raise $28bn per year.[64] Oxfam has previously estimated that contributions from international aviation and maritime emissions could raise $29bn per year.[65]
- The group of developing countries in the climate negotiations (G77/China) has called on developed countries to provide 0.5–1 per

cent of their Gross National Product for adaptation and mitigation action in developing countries, additional to official development assistance (ODA).[66] This equates to approximately $201–402 bn.[67]

The proposals by Mexico and Norway incorporate some elements of the key principles of responsibility and capability, but (as currently envisioned) do not raise enough money. The group of developing countries' proposal raises the scale of funds required, but has an emphasis on capacity over responsibility, and lacks a mechanism to reliably generate the funds (thus being in danger of not providing the predictability of funds required to allow developing countries to undertake mitigation plans). Whether or not any specific proposal now on the negotiating table is perfect, what is clear is that there are options that can reliably generate the scale of resources required.

A related consideration is the extent to which revenue-generation mechanisms, structure incentives to ensure global emissions reductions are achieved through one means or another. The proposed Global Mitigation and Finance Mechanism has the virtue of ensuring that the polluter pays; those countries with low emissions-reductions targets would need to acquire more AAUs. Whether through sale, auction or levy, tying the scale of resources required to the volume of AAUs acquired helps ensure that sufficient resources are raised to provide the incentives and support the developing world needs to step-up contributions to global mitigation efforts. For rich countries, this could mean flexibility – to either increase the ambition of emissions reductions-targets or pay for more emissions permits (AAUs).

Another appealing feature of the Global Mitigation and Finance Mechanism is that it reverses the current incentive structure for mitigation action (under the Clean Development Mechanism), which results in large incentives for countries with higher capability, and few if any incentives for the poorest countries. By ensuring that the poorest countries are provided with full support for any mitigation actions they undertake, the Mechanism proposed helps ensure a low carbon future with less, rather than more, economic inequality.

Most importantly, every proposed model is academic until, and unless, rich countries take up the leadership role they committed to when the UN climate convention was signed more than 15 years ago. With many models to choose from, rich countries are clearly lacking the will, rather than the way, to make progress in the current negotiations and ensure that all countries hang together in confronting the climate challenge.

5 Recommendations

It always seems impossible until it's done.
Nelson Mandela

2009 is a make or break year for climate change. We have the opportunity to set in place a new deal to ensure that we prevent catastrophic climate change while not exacerbating existing global inequalities. Acting now will be less costly than delaying action.

The new deal proposed in this paper has two core components: deep emissions cuts from developed countries; and financial assistance from developed countries for developing countries to reduce their emissions and to adapt to the unavoidable impacts of climate change. Oxfam calls for the following recommendations to form part of an effective global climate plan to be agreed in December 2009 at Copenhagen:

- The negotiations should establish the objective of keeping global warming well within 2°C above pre-industrial temperatures, and acknowledge that with as little as a 1.5°C increase, the survival of many vulnerable countries and poor communities will be threatened.

- The target for GHGs in the atmosphere needs to be set below 400ppm CO_2e as a matter of urgency, decreasing to a concentration of 350ppm as soon as possible thereafter.

- A deal must reflect countries' historical responsibility for emissions and their economic capability.

- Binding individual Annex 1 country targets must be set, based on principles of responsibility and capability. These binding targets must deliver at least 40 per cent reductions below 1990 levels by 2020 for Annex 1 countries as a group. The majority of these reductions must be met through domestic action.

- A Global Mitigation and Finance Mechanism must be established to ensure the required finance from rich countries – $150bn per year as an absolute minimum – enables necessary mitigation and adaptation actions in developing countries.

- Annex I countries must agree to provide sufficient and reliable funding for capacity-building, mitigation, and adaptation (at least $50 billion per year), through the sale, auction or levy of all or a portion of their emissions allowances (AAUs).

- Developing countries – apart from least developed countries, small island developing states[68] and countries with available economic capability of less than $1,000 per person – should agree to create and submit a national mitigation plan in return for financial incentives for mitigation action.

- A national mitigation plan should identify the nationally appropriate mitigation actions that the country proposes; the incremental costs of the actions; and the tonnes of carbon saved

as a result of taking the actions.

- Countries with available capacity of more than $1,000 per person that wish to receive funding, should ensure their national mitigation plan is economy-wide and delivers reductions up to the agreed target threshold as a minimum.

- LDCs, SIDS,[69] and countries with available capacity of less than $1,000 per person should not be required to submit a national mitigation plan, but should receive 100 per cent of the incremental cost of funding for specific mitigation projects submitted.

- Developing countries must receive funding for their national mitigation plans, adaptation, and capacity-building proportional to their economic capacity as outlined in Section 3.

Appendices

Appendix 1: Using responsibility and capability to calculate national shares of Annex I mitigation effort

Oxfam has used a responsibility-capability index (RCI) to estimate a fair distribution of the aggregate target of 40 per cent below 1990 levels by 2020, between Annex 1 countries. The RCI, and the subsequent targets, are based on a country's respective responsibility for GHG emissions and its capability to help. Results are presented in the table in Appendix 3.

Responsibility

Responsibility is based on emissions of all six GHGs included in the UNFCCC, from 1990, when the first IPCC assessment report was published, to 2005, the most recent year of internationally comparable data. The measure includes emissions from land use change and forestry. Responsibility is measured as cumulative emissions over the period 1990–2005.[70]

Capability

Capability is based on the absolute value of a country's GNI that accrues to the population living above a per capita income threshold of $9,000 per year. This amount is derived by estimating each country's log normal income distribution using its GNI per capita and its Gini coefficient (a measure of income inequality).[71]

GNI is favoured as a measure of capability over GDP as it includes receipts of primary income from abroad, thereby capturing some of the wealth produced by an economy overseas. GNI is measured in terms of purchasing power parity (PPP) using 2007 data, the most recent year of internationally comparable data. Consistent with the first edition of the Greenhouse Development Rights (GDRs) framework,[72] $9,000 per person is defined as a universally applicable development threshold that represents the point at which people can be considered to have fully escaped poverty and adopted middle-class consumption patterns.

Creating the index

Responsibility and capability are given equal weighting in calculating each country's fair share.

% Responsibility (Rx) = country X's responsibility / all included countries' responsibilities

% Capability (Cx) = country X's capability / all included countries' capabilities

Responsibility-capability index = (Rx + Cx) / 2

= percentage share of total mitigation target that should be provided by country X

As with any index, the results would change in line with changes to key parameters. The index could be adjusted by altering the base year (1990), development threshold, and/or the weight given to responsibility and capability. For reasons of data availability, awareness (of the deleterious effects of GHG emissions), and consistency with the base year adopted in the UNFCCC itself, Oxfam believes the 1990 base year is a conservative and highly defensible selection. This choice does not detract from the legitimacy of earlier base years, which can reasonably go as far back as 1850.[73][74]

Similarly, for capability there are arguments for development thresholds both lower and higher than the $9,000 selected, which is well above (50 per cent higher than) the $6,000 per person per year standard global income poverty line supported by relevant research.[75]

The variables selected can likewise be changed. One alternative measure of responsibility would consider only CO_2 instead of all gases, and exclude emissions from land use change and forestry (which would make an earlier base year more feasible). The most comprehensive measure possible was included here to recognise the combined impact of all gases, sources, and sinks.

A critical choice

One critical choice that marks a considerable difference with other treatments of responsibility and capability is the consideration of all cumulative emissions under responsibility (instead of only those associated with the population above the development threshold as in GDRs, or only those which are not 'survival emissions', to give two examples). This is justified by the fact that every tonne of GHG emissions matters equally from an environmental integrity perspective (applying a threshold to emissions effectively discounts the impact of emissions below the threshold). Furthermore, the most meaningful approach to determining a threshold for survival emissions is complicated by both different technology contexts around the world and population dynamics. Although two tonnes CO_2e per person may be a 'sustainable' level of global emissions given today's population, this will become deeply unsustainable in future as population increases by as much as 50 per cent. The alternative approach, as used by GDRs, equates a country's emissions distribution with its income distribution. This becomes increasingly problematic, the further back the emissions baseline is taken since today's income distribution may be a poor proxy for historical emissions distributions.

Appendix 2: Annex I Mitigation targets per responsibility, capability, and mitigation potential

The table below presents fair shares of any aggregate Annex I mitigation target for individual Annex I countries (Column 1), based on application of a responsibility-capability index (RCI – see Appendix 1). For reference, it includes:

- per capita emissions in 2005 – Column 2;
- 2020 emissions-reductions targets for individual Annex I countries (based on respective fair shares of the total combined minimum reductions target of 40 per cent below 1990 levels for Annex I as a whole) are presented in terms of per capita reductions relative to 2005 levels – Column 3;
- total reductions relative to each country's 1990 emissions – Column 4;
- total reductions relative to each country's 2005 emissions – Column 5;

In Columns 2–5, relative rankings of countries are presented to show where countries stand in comparison to others.

Table 4: Fair shares of overall Annex I mitigation target (40% below 1990 levels by 2020)

	1	2		3		4		5	
	RCI (fair share of Annex I target)	Emissions per capita (2005)		2020 mitigation targets, expressed as: Reduction per capita, relative to 2005 levels		Reduction below 1990 level (CO_2e excl. LUC)		Reduction below 2005 level (CO_2e excl. LUC)	
	%	tCO2e	Rank	tCO2e	Rank	%	Rank	%	Rank
Australia	2.29	25.9	1	13.4	1	39.7	9	51.6	8
Belarus	0.34	7.7	13	-2.7	15	19.7	16	-35.4	16
Bulgaria	0.31	9.0	10	-3.0	16	19.8	15	-33.6	15
Canada	3.51	23.4	3	12.8	3	43.0	7	54.7	4
Croatia	0.15	6.9	16	2.3	11	35.9	10	33.6	11
EU *	33.93	10.6	9	4.2	10	44.4	6	39.6	10
Iceland	0.03	14.2	6	7.6	6	48.9	4	53.8	5
Japan	9.71	10.6	8	6.3	7	56.2	3	59.0	3
Liechtenstein	0.00	8.6	12	4.4	9	27.1	11	51.4	9
Monaco	0.00	3.1	17	0.7	12	21.2	13	21.2	12
New Zealand	0.34	18.7	4	9.8	4	40.6		52.3	7
Norway	0.48	11.7	7	8.6	5	71.4	2	73.7	2
Romania	0.72	7.1	15	-1.9	14	21.4	12	-27.1	14
Russian Federation	8.21	14.9	5	-1.8	13	20.2	14	-12.0	13
Switzerland	0.59	7.2	14	6.0	8	82.3	1	82.6	1
Ukraine	1.67	8.8	11	-8.3	17	13.3	17	-94.3	17
USA	37.80	24.5	2	12.8	2	44.6	5	52.4	6
Total: Annex 1	**100.00**	**14.2**		**5.46**		**40.0**		**38.4**	

*EU includes EU-25 due to data limitations; the EU-27, including Bulgaria and Romania is expected to negotiate a single target under the UN negotiations.

Note: Rankings are relative only to the other countries listed in the table.

Source: Oxfam GB, based on data from WRI CAIT UNFCCC v2.0. and World Bank World Development Indicators (WDI)

Appendix 3: Global Mitigation and Finance Mechanism – capability-based incentives for non-Annex I action

Oxfam proposes development of a Global Mitigation and Finance Mechanism to channel new, additional, adequate, predictable, and sustainable financial resources provided by Annex 1 as positive incentives for nationally NAMAs in developing countries. The responsibility within this Mechanism lies with Annex 1 countries to provide sufficient levels of financing in order to facilitate mitigation in non-Annex 1 countries. This responsibility exists because the wealthy developed countries within Annex 1 have become wealthy by causing the climate change experienced to date, and using up the world's 'carbon budget' in the process.

The proposal includes the provision of financial support in line with the respective capabilities of countries, measured by dividing the absolute value of a country's GNI that accrues to the population living above a per capita income threshold of $9,000 per year, by its total population. As with the responsibility-capability measure (see Appendix 1), GNI above the development threshold is derived by estimating each country's log normal income distribution using its GNI per capita and its Gini coefficient (a measure of income inequality).

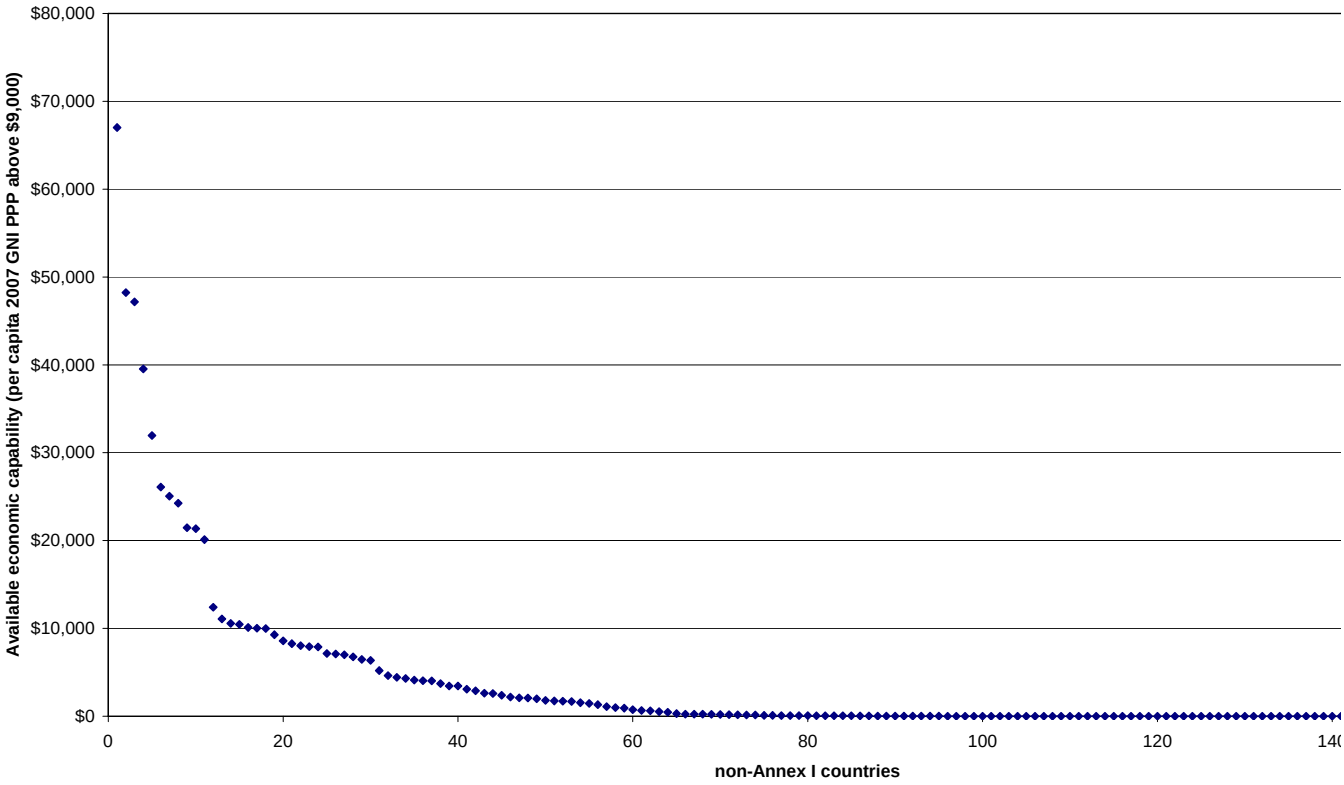
This approach assumes that GNI above the development threshold of $9,000 per person per year is a reasonable proxy for the amount of income available to a country's entire population for purposes other than poverty reduction and development – its available economic capability. Dividing this amount by a country's total population gives a per capita measure of capability that is relevant to a country's ability to contribute towards action on mitigation of climate change. The higher the per capita capability, the more is available to contribute.

Oxfam suggests that the proportion of the full incremental cost of national mitigation plans financed through the Global Mitigation Finance Mechanism should relate to available economic capability (as defined above), which provides a meaningful measure of the extent to which countries have the ability to contribute to global emissions-reductions goals. This could be achieved through an indexed, sliding scale (so that the exact incentive amount for each country is determined individually according to its capability), through groupings that comprise a range of capabilities, and/or through other relevant considerations. The representative governing body of the Mechanism should be empowered to determine an appropriate methodology for defining the level of incentive support provided.

There are strong arguments both for full financing of countries' mitigation action at the bottom of the distribution (but above zero available economic capability) and for no financing incentives for

countries at the top. At the top end, Oxfam suggests that countries with more than $12,000 of available economic capability (per person, per year) should finance economy-wide action on their own. Above this threshold, available economic capability jumps to $20,000 or more (see Figure 3), and virtually all countries have available economic capability equivalent to developed country members of Annex II.[76] With the exception of some five countries, all Annex I countries currently have capability greater than $12,000. All countries above the $12,000 threshold are classified as 'high human development' countries by the United Nations. There is little doubt these countries are capable of developing and implementing national mitigation plans without international financing.

Figure 3: Distribution of available economic capability across non-Annex I countries



Likewise, at the bottom of the distribution, countries with no available economic capability ($0) should clearly receive full (100 per cent) support for any mitigation actions. Moreover, because elaboration of mitigation plans has considerable transaction costs for every country, it is reasonable to assume that many countries with low levels of capability will not be able to justify actions unless incremental costs are fully funded. Oxfam suggests that full (100 per cent) support should be provided to all countries below $1,000 of available economic capability. This is the point at which capability begins to rise significantly (see Figure 3, above).

Table 5, below, lists non-Annex I countries together with a corresponding financial incentive scale based on the parameters outlined above. [77] (As stated in the paper, the LDCs and SIDS below a threshold of available economic capability of $12,000 per person should not be expected to submit a mitigation plan, but would receive funding

for all of the full incremental costs of the mitigation actions they take – regardless of their available capacity per person value. These countries are not included in Table 5.

Table 5: Non-Annex I available capability and financial incentive

Country	GNI above threshold (2007 PPP)	Population (2007)	Available capability / person	Financial incentive (% full incremental costs financed)
Qatar*	56,030,252,722	836,082	$67,015	No support
Singapore	221,361,200,848	4,588,600	$48,242	
Kuwait**	125,642,319,482	2,662,966	$47,181	
United Arab Emirates**	172,535,673,628	4,364,746	$39,529	
Bahrain**	24,051,970,582	752,789	$31,950	
Cyprus	20,522,869,559	786,633	$26,090	
Israel	179,586,539,666	7,172,300	$25,039	
Korea, Rep.	1,176,575,307,145	48,530,416	$24,244	
Saudi Arabia	519,175,049,476	24,195,950	$21,457	
Trinidad and Tobago	28,445,995,947	1,333,050	$21,339	
Malta**	8,224,981,007	409,198	$20,100	
Libya	76,301,591,543	6,156,488	$12,394	
Malaysia	294,483,466,879	26,549,518	$11,092	Support corresponding to available economic capability
Gabon	14,045,897,572	1,330,182	$10,559	
Argentina	413,626,694,586	39,503,466	$10,471	
Chile	167,582,025,200	16,594,596	$10,099	
Botswana	18,874,708,939	1,881,432	$10,032	
Mexico	1,051,571,499,845	105,280,515	$9,988	
Venezuela, RB	254,684,535,625	27,467,021	$9,272	
Uruguay	27,420,886,134	3,318,592	$8,263	
Panama	26,837,553,682	3,340,605	$8,034	
Costa Rica	35,358,263,645	4,462,193	$7,924	
Iran, Islamic Rep.	559,413,965,704	71,021,039	$7,877	
Lebanon	29,221,326,000	4,097,076	$7,132	
Serbia	52,360,648,304	7,385,826	$7,089	
South Africa	333,186,638,296	47,587,543	$7,002	
Brazil	1,297,071,732,927	191,601,284	$6,770	
Kazakhstan	100,034,363,812	15,481,263	$6,462	
Macedonia, FYR	10,608,082,244	2,037,032	$5,208	
Thailand	295,597,100,772	63,832,135	$4,631	
Peru	123,336,710,394	27,898,182	$4,421	
Ecuador	57,329,995,142	13,339,580	$4,298	
Bosnia and Herzegovina	15,571,065,271	3,772,964	$4,127	
Algeria	136,812,450,069	33,852,676	$4,041	
Colombia	185,897,501,764	46,117,464	$4,031	
Tunisia	38,041,449,627	10,248,173	$3,712	
Namibia	7,145,235,705	2,073,624	$3,446	
El Salvador	19,926,363,702	6,853,143	$2,908	
Azerbaijan	22,478,664,735	8,570,966	$2,623	
Albania	8,230,902,204	3,181,326	$2,587	
China	3,145,664,732,148	1,319,982,596	$2,383	
Swaziland	2,503,624,204	1,144,872	$2,187	

Paraguay	12,852,368,235	6,120,496	$2,100	
Armenia	6,256,585,562	3,000,874	$2,085	
Bolivia	18,819,911,636	9,517,537	$1,977	
Guatemala	23,948,397,914	13,348,222	$1,794	
Jordan	10,006,986,083	5,718,855	$1,750	
Egypt, Arab Rep.	126,450,500,533	75,466,539	$1,676	
Georgia	6,775,303,478	4,395,770	$1,541	
Syrian Arab Republic	29,008,052,530	19,890,585	$1,458	
Honduras	9,306,809,216	7,091,481	$1,312	
Sri Lanka	21,760,689,106	19,944,739	$1,091	
Philippines	85,905,012,602	87,892,094	$977	
Morocco	28,116,648,452	30,860,595	$911	
Indonesia	149,029,744,523	225,630,065	$661	
Congo, Rep.	2,300,443,513	3,766,751	$611	
Nicaragua	1,678,244,812	5,604,596	$299	
Mongolia	605,824,840	2,612,295	$232	
India	240,934,192,510	1,123,318,991	$214	
Cameroon	3,709,288,775	18,532,799	$200	
Moldova	678,252,446	3,792,142	$179	
Vietnam	14,244,349,525	85,140,414	$167	Full support (100%)
Uzbekistan	3,614,497,692	26,867,800	$135	
Nigeria	15,087,679,324	147,982,941	$102	
Cote d'Ivoire	1,510,578,835	19,268,303	$78	
Pakistan	11,352,806,370	162,389,013	$70	
Kenya	1,943,792,816	37,530,726	$52	
Ghana	495,871,028	23,461,523	$21	
Tajikistan	94,177,565	6,740,085	$14	
Kyrgyz Republic	62,355,714	5,242,827	$12	
Rwanda	113,409,623	973554	$12	
Niger	106,788,569	14195085	$8	
Benin	66,727,502	9025402	$7	
Burkina Faso	106,390,049	14777431	$7	
Mali	73,402,431	12334168	$6	
Guinea	55,053,361	9380197	$6	
Mozambique	115,381,835	21372202	$5	
Bangladesh	486,906,341	158571814	$3	
Eritrea	14,662,409	4841773	$3	
Tanzania	105,299,863	40432163	$3	
Guinea-Bissau	1,546,095	1694653	$1	
Malawi	10,702,140	13920062	$1	
Sierra Leone	3,170,209	5848320	$0	
Congo, Dem. Rep.	15,388,471	62399224	$0	
Liberia	907,936	3753067	$0	
Burundi	209,840	8495915	$0	
Ethiopia	740,532	79086894	$0	

* 2007 GNI PPP data unavailable; 2005 GDP PPP used instead.

** 2007 GNI PPP data unavailable; data reflects most recent available year (2004 at earliest).

Note: Comparable data unavailable for those countries not presented.

Source: Oxfam GB, based on data from UN Population Division and World Bank World Development Indicators.

Appendix 4: Selected Annex I mid-term targets: indications and requirements

Many Annex I countries have indicated the scale of mid-term emissions reductions they would be willing to commit to under a post-2012 climate regime. At the Bonn UN climate negotiations in April 2009, developing countries indicated the level of emissions reductions they expect from Annex I countries. These are presented in Table 6 below. Also presented is the IPCC's projection of the expected temperature rise if other countries were to follow suit with proportionate pledges. None of the current indications from Annex I countries is sufficient to keep global warming as far within 2°C as possible, and some would commit the world headlong into runaway climate change with disastrous consequences for all life on the planet.

Table 6: Voluntary pledges made by countries

Country / region	2020 reduction target (relative to 1990)	Status	Likely consequence (temperature)
Norway	30% below[78]	Adopted by parliament	2.0–2.4°C
EU	20% below	Adopted by legislation	2.8–3.2°C
EU	30% below[79]	In context of global deal	2.0–2.4°C
US	14% below	Under consideration	2.4–2.8°C
Australia	4% below	Officially announced	3.2–4.0°C
Australia	24% below[80]	In context of global deal	2.0–2.4°C
Canada	3% below	Officially announced	4.0°C+
Japan	8% below[81]	Under consideration	2.8–3.2°C

Oxfam calculation based on government announcements, and recalculated for 1990 base year where relevant.

Rich countries face a massive challenge to reduce emissions first and fastest at home. Many countries have done little to reduce their emissions in the last decade, resulting in significantly increased emissions compared to 1990. Notable among them are: Australia, whose emissions excluding land use change and forestry have increased by 29 per cent since 1990; New Zealand's, whose emissions have increased by 26 per cent; Canada with a 22 per cent increase; and the USA whose emissions have increased by 14 per cent. Notable European increases are: Spain at 53 per cent, Portugal at 43 per cent, Greece at 28 per cent, Ireland at 26 per cent, and Italy at 12 per cent.

Notes

[1] The developed countries and economies in transition are listed in 'Annex I' of the 1992 UN Climate Convention and commonly referred to as such.

[2] Oxfam International (2009) 'The Right to Survive' campaign report, Oxford: Oxfam

[3] The IPCC's 4th Assessment Report indicated that global emissions reductions of between 50 and 85 per cent below 2000 levels by 2050 would likely lead to warming of between 2 and 2.4°C, the 30 April 2009 volume of Nature explored the cuts required to keep warming below 2°C, including an article by M. Meinshausen et al, 2009, Greenhouse-gas emissions targets for limiting global warming to 2°C which indicated that 'If emissions in 2050 are half 1990 levels, we estimate a 12–45 per cent probability of exceeding 2°C. Further scientific articles supporting the need for greater than 50 per cent reductions by 2050 include J. Hansen, M. Sato, P. Kharecha, D. Beerling, V. Masson-Delmotte, M. Pagani, M. Raymo, D. Royer, J. Zachos (2008) 'Target Atmospheric CO2: Where Should Humanity Aim?', *Open Atmos. Sci. J.*, vol. 2: 217-231;M. Meinshausen (2006) 'What Does a 2ºC Target Mean for Greenhouse Gas Concentrations?', in HJ. Schnellnhuber (ed.), *Avoiding Dangerous Climate Change*, Cambridge: Cambridge University Press: 265-280; P. Baer and M. Mastrandea (2006) 'High Stakes: Designing emissions pathways to reduce the risk of dangerous climate change', Stockholm: IPPR; Potsdam Institut for Climate Impact Research (2008) 'Report of the First Assessment of Low Stabilisation Scenarios', Potsdam: PIK.

[4] 'The projected rise in emissions in the Reference Scenario, in which no change in government policies is assumed, puts us on a course of doubling the concentration of those gases in the atmosphere to around 1,000 parts per million of CO_2-equivalent by the end of this century. This would lead to an eventual global temperature increase of up to 6°C.' See: International Energy Agency (2008) 'World Energy Outlook 2008 Fact Sheets: Global Energy Trends'. Paris: International Energy Agency: 2.

[5] 'More than 100 countries have adopted a global warming limit of 2°C or below (relative to pre-industrial levels) as a guiding principle for mitigation efforts to reduce climate change risks, impacts and damages.' See supplementary material for M. Meinshausen et al. (2009) 'Greenhouse-gas emissions targets for limiting global warming to 2°C', *Nature*, Vol 458: 1158-1162.

[6] The Association of Small Island States and the Least Developed Countries have called repeatedly for warming to be limited to 1.5°C, notably at a meeting of the UNFCCC's Ad Hoc Working Group on Long Term Cooperative Action under the Convention (AWG-LCA) in Bonn in March 2009, available here: http://www.iisd.ca/download/pdf/enb12398e.pdf.

[7] It is important to note that warming of 2°C will exceed the adaptive capacity of many industrialised countries, even with their substantially greater ability to apply technology and other adaptive strategies. Increased intensity and frequency of droughts, bushfires and deaths from heat stress, and stronger cyclones and hurricanes are just some of the impacts already evident.

[8] M. Meinshausen (2006) '2°C trajectories: A brief background note', *KyotoPlus – Escaping the Climate Trap Conference*, Berlin, 28–29 September 2008.

[9] The outcomes of the 'Bali Action Plan' are intended to support renewed efforts to deliver on the objective of the UN Climate Convention now, up to, and beyond 2012, when the first commitment period of the Kyoto Protocol expires.

[10] The IPCC AR4 Working Group on Mitigation (Working Group III) found that 'For the lowest mitigation scenario category assessed, CO_2 emissions would need to peak by 2015' See: IPCC (2007) *Climate Change 2007: Synthesis Report, An Assessment of the Intergovernmental Panel on Climate Change*. Geneva: IPCC: Footnote 20.

[11] According to Climate Analysis Indicators Tool 6.0 (CAIT - http://cait.wri.org/), total global emissions in 1990 were 30.1Gt CO_2e (excluding emissions from land use change (LUC)) or 38.0Gt CO_2e (including LUC). 'A Copenhagen Climate Treaty, Version 1.0: A Proposal for a Copenhagen Agreement by Members of the NGO Community,' June 2009, mimeo, refers to total 1990 emissions of 36.1Gt CO_2e (including LUC), and this corresponds to a 14–48 per cent probability of exceeding 2°C, with an illustrative default of 31 per cent (using supplementary data spreadsheet from M. Meinshausen, N. Meinshausen, et al. (2009) 'Greenhouse-gas emissions targets for limiting global warming to 2C', *Nature,* 458(7242): 1158-1162). For reference, in 2009 global emissions exceed 50 Gt CO_2e.

[12] N. Stern (2007) 'Stern Review of the Economics of Climate Change, Summary of Conclusions' London: The Office of Climate Change: vii.

[13] 'Higher emissions in 2020 resulting from delayed action by Annex I countries, degrades the ability to meet the 2°C warming limit. If global emissions were to return to the level of 1990 by the year 2020, the chance that 2°C warming is exceeded is estimated as roughly 1 in 6' 'Delaying emission reductions by the Annex I group by 10 years, from 2020 to 2030, results in significantly higher cumulative greenhouse gas emissions and increases the rate of emission reduction in future decades. The probability of exceeding 2°C warming is increased by about 15% for such a delay, from a base probability for the two non-delay scenarios of 14% (6% to 32%) and 27% (14% to 48%), respectively. A delay thus results in an increased risk that is not compensated for by steeper reductions in later years.' 'This analysis shows that a delay in reducing greenhouse gas emissions by ten years causes a higher overall level of emissions in 2020 and converts an emission pathway with about a 1 in 7 chance of exceeding 2°C to a 1 in 4 chance.' Bill Hare, M. Schaeffer, M. Meinshausen (2009) 'Emission reductions by the USA in 2020 and the risk of exceeding 2°C warming' Washington DC: Union of Concerned Scientists.

[14] 76 per cent of cumulative emissions since 1850, excluding land use change and forestry. See: K.A. Baumert, T. Herzog, J. Pershing (2005) 'Navigating the Numbers, Greenhouse Gas Data and International Climate Policy', Washington DC: World Resources Institute: 31; J. Hansen, et al. (2007) 'Dangerous human-made interference with climate: A GISS model E study', *Atmos. Chem. Phys.*, 7:2287-2312.

[15] Calculated using 2005 GDP per capita in international $. Source: CAIT (2009) 'Climate Analysis Indicators Tool Version 6.0', Washington, DC: World Resources Institute.

[16] According to the most recent Global Environmental Facility (GEF) report (May 2009), available at http://www.gefweb.org/uploadedFiles/Documents/LDCFSCCF_Council_Documents/LDCFSCCF6_June_2009/LDCF.SCCF.6.Inf.2.pdf, only $176m have been pledged to meet the at least $2bn required.

[17] Including Spain who is currently on track for their emissions to increase by 49.5 per cent (compared with an increase of 15 per cent they received under the EU burden sharing agreement as part of the EU Kyoto target) http://www.eea.europa.eu/themes/climate/ghg-country-profiles/tp-report-country-profiles/spain-greenhouse-gas-profile-summary-1990-2020.pdf ,and Italy who is currently on track for their emissions to increase by 10 per cent (compared with the decrease of -6.5 per cent they received under the EU burden sharing agreement as part of the EU Kyoto target) http://www.eea.europa.eu/themes/climate/ghg-country-profiles/tp-report-country-profiles/italy-greenhouse-gas-profile-summary-1990-2020.pdf.

[18] UNFCCC (1992) United Nations Framework Convention on Climate Change, New York: UN, available at: http://unfccc.int/resource/docs/convkp/conveng.pdf

[19] When asked, one negotiator recently quipped: 'It's like pornography – you know it when you see it.'

[20] Note the allocation corresponding to a 40 per cent cut across Annex I countries does not correspond to its fair share of the global mitigation effort – see 'Fair shares in a global context', below. Any fair global emissions allocation would result in substantially larger obligations for Annex 1 countries, which would be exceedingly difficult for these countries to discharge through mitigation actions at home.

[21] Clearly, environmental integrity and historical responsibility arguments demand emissions-reduction targets from industrialised countries that are considerably higher than 40 per cent below 1990 levels by 2020. Nonetheless, in the context of a Copenhagen agreement and current political realities, achieving commitment to a 40 per cent mid-term reduction objective would represent a substantial shift in rich countries, and a very substantial start in the direction of what's needed longer term. As made clear in Section 2 (Fair shares in a global context), Oxfam takes the view that rich countries 'fair shares' include obligations not only for their direct, quantified emissions-reductions commitments (targets), but also very substantial financing requirements to support emissions reductions required by a low-risk global mitigation trajectory – as well as massive financial contributions for adaptation, and the consequences of unavoidable climate impacts they are largely responsible for. While it is possible to express all these obligations in terms of reduction commitments, Oxfam believes change is more likely to come about by splitting them out individually as this paper has done.

[22] Oxfam takes the position that the agreement on post-2012 climate action needs to be designed so as to ensure that a majority of quantified emissions-reduction obligations that industrialised countries commit to are achieved within their domestic economies. The arguments for such a requirement are many, and include: the need to reduce per capita emissions in rich countries, so providing 'emissions space' for developing countries; the importance of investing in emissions-reduction technologies needed globally – industrialised countries are best able to mobilise the capital and technological expertise now necessary to sustain their economies in a rapidly reducing carbon space; the 'early mover' advantage – economies that delay restructuring will quickly be left behind: the importance of demonstrating that 'low-carbon development' is possible, so delivering on rich-country pledges to lead by example.

[23] EcoEquity has developed a 'responsibility and capability index' (RCI) as part of its Greenhouse Development Rights framework (see P. Baer, T. Athanasiou, S. Kartha, and E. Kemp-Benedict (2008),'The Right to Development in a Climate Constrained World: The Greenhouse Development Rights Framework,' Revised Second edition (Berlin: Heinrich Boll Foundation, Christian Aid, EcoEquity and Stockholm Environment Institute, available here: http://gdrights.org/wp-content/uploads/2009/01/thegdrsframework.pdf), which has been influential in the thinking in this report. Within the UN climate negotiations, South Africa and the Philippines have put forward separate proposals for Annex 1 country targets based explicitly on responsibility and capability measures, and whilst the proposed reductions in their submissions are not identical to those used in this report, the methodology used in all cases follows the RCI developed by EcoEquity and resulting emissions-reduction targets are similar in scale.

[24] Using responsibility and capability calculations results in a target of 20 per cent below 1990 levels by 2020 for Russia. However, like many of the economies in transition (EITs), Russia's emissions in 2005 were far (approximately 24 per cent) below 1990 levels. (See: WRI (2009) 'Climate Analysis Indicators Tool (CAIT) Version 6.0.', Washington, DC: World Resources Institute). Recognising this 'hot air' effect, full participation global mitigation efforts would involve Russia and other EITs adopting even more stringent targets, and achieving all of the corresponding emissions reductions domestically.

[25] N. Stern (2009) *The Global Deal: Climate Change and The Creation of a New Era of Progress and Prosperity*, New York: Public Affairs: 153.

[26] EcoEquity (2008) 'A Call for Leadership – A Greenhouse Development Rights analysis of the EU's proposed 2020 targets', Stockholm: Stockholm Environment Institute.

[27] 'Commitments for Annex I Parties under paragraph 1(b)(i) of the Bali Action Plan: Evaluating developed countries' historical climate debt to developing countries,' Submission by the Republic of Bolivia to the AWG-LCA, http://unfccc.int/resource/docs/2009/awglca6/eng/misc04p01.pdf.

[28] Based on 1990 estimate of 36.1 Gt CO_2e used by 'A Copenhagen Climate Treaty, Version 1.0: A Proposal for a

Copenhagen Agreement by Members of the NGO Community,' June 2009, mimeo.

[29] See P. Baer, T. Athanasiou, S. Kartha, and E. Kemp-Benedict (2008), 'The Right to Development in a Climate Constrained World: The Greenhouse Development Rights Framework,' Revised Second edition (Berlin: Heinrich Boll Foundation, Christian Aid, EcoEquity and Stockholm Environment Institute, available here: http://gdrights.org/wp-content/uploads/2009/01/thegdrsframework.pdf),

[30] UNFCCC (2008), 'Report of the Conference of the Parties on its 13th session', Bali, Indonesia, 3–15 December 2007, available at: http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf#page=3

[31] Nicholas Stern (2008), 'Key Elements of a Global Deal on Climate Change,' working paper (London School of Economics).

[32] See endnote 11, above.

[33] The emissions reduction in Annex I, and emissions growth limit in non-Annex I amount to approximately 7.4Gt CO_2e (excluding LUC) in both cases (CAIT UNFCCC 2.0). The amount is equal because, if emissions are held constant between 1990 and 2020, the emissions growth in non-Annex I countries cannot exceed the emissions reduction in Annex I. Representing the non-Annex I emissions growth limitation as a reduction (from business-as-usual projections) is highly problematic due to the necessary assumptions about economic growth scenarios, and corresponding energy and emissions intensities. Nonetheless, useful approximations are possible as indications of the scale of reductions required. One reference point is the '2° Emergency Pathway' (P. Baer) used by the Greenhouse Development Rights approach. Based on the IEA's business-as-usual emissions scenarios and the GDRs' 2° Emergency Pathway' (both CO_2 only), the reduction from business-as-usual would be approximately 6.9 and 8.0 Gt CO_2 for Annex I and non-Annex I, respectively. Adding the assumption that '...so-called non-CO2 "Kyoto gases" will constitute roughly one-third of total CO_2 equivalent (CO_2 equiv.) emissions based on 100-year global warming potentials over the 2000-49 period,' (M. Meinshausen, N. Meinshausen, et al. (2009) 'Greenhouse-gas emissions targets for limiting global warming to 2°C', *Nature*, 458(7242): 1158-1162), similar estimates for CO_2e of approximately 10 and 12 Gt CO_2e, respectively. In other words, a return to 1990 levels by 2020, reductions of at least 40 per cent below those levels by Annex I, and a moderation of emissions growth in non-Annex I to stay within the remaining space represents a reduction in business-as-usual terms that is slightly higher for non-Annex I, but of roughly equal scale in both cases. Note these estimates say nothing about the inequity represented by the allocations assumed.

[34] The calculations presented in Note 32 (above) result in 2020 emissions in non-Annex I countries of 211 per cent of 1990 levels.

[35] M.den Elzen and N. Hohne (2008) 'Reductions of greenhouse gas emissions in Annex I and non-Annex I countries for meeting concentration stabilisation targets: An editorial comment', *Climatic Change*, Vol. 91: 249-74.

[36] L. Pritchett (2006), 'Who is Not Poor? Dreaming of a World Truly Free of Poverty.' The World Bank Research Observer. Vol. 21, No. 1: 1-23.

[37] For extended discussion of the development threshold see P. Baer, T. Athanasiou and S. Kartha (2007), 'The Right to Development in a Climate Constrained World, The Greenhouse Development Right Framework', First edition, Berlin: Henrich Boll Foundation, pp. 27-30.

[38] Small island developing states who have capability less then $12,000 per person, as outlined in Appendix 3, are eligible for support.

[39] Incremental costs are those that are on top of the base costs that would otherwise exist in making an investment with traditional technology. For example if a country required a new 1,000MW power station, a coal-fired power station might be the cheapest option. The cost of building the coal-fired power station would be considered the base cost. If, instead, renewable energy was used to create 1,000Mw of electricity, the cost gap between the cost of building the coal power station and the cost of building the renewable energy option is the incremental cost.

[40] For details on the methodology underpinning the assessment of capability in non-Annex I countries, see Appendix 3.

[41] M.den Elzen and N. Hohne (2008) 'Reductions of greenhouse gas emissions in Annex I and non-Annex I countries for meeting concentration stabilisation targets: An editorial comment', *Climatic Change*, Vol. 91: 249-74.

[42] Excluding those countries with available capacity measured over $12,000 per person, using the method identified in Appendix 3.

[43] However, countries with sufficient institutional capacity are encouraged to compile and submit national mitigation plans, with financial and capacity-building support as required. One indicator of institutional capacity might be the available gross available economic capability in the economy; those countries with more than $200bn, for example, clearly have sufficient institutional capacity to deliver such plans.

[44] Through the Global Mitigation and Finance Mechanism to mediate purchase and issuance. Annex I countries would not buy their Premium Reductions directly from non-Annex I countries, but would instead buy them from the proposed Mechanism, which would help smooth the price for Premium Reductions across all of the Premium Reductions identified as available by non-Annex I countries.

[45] Assigned Amount Units (AAUs) are the measures for targets or 'allowed' emissions from Annex 1 countries, which are currently provided for free to Annex 1 countries – up to the amount of emissions specified under its target inscribed in the Kyoto Protocol.

[46] For a detailed proposal for a renewed financial mechanism under the UNFCCC that could serve as a basis for structuring the proposed Global Mitigation and Finance Mechanism see the submission of the Group of 77 and China (G77/China), 'Financial Mechanism for meeting financial commitments under the Convention,' available at: http://unfccc.int/files/kyoto_protocol/application/pdf/g77_china_financing_1.pdf.

[47] The Adaptation Fund is accountable to the Conference of the Parties to the UNFCCC serving as the meeting of Meeting of the Parties to the Kyoto Protocol (COP/MOP).

[48] Specialised technical panels could be established to provided dedicated support in assessment and guidance on NAMAs and design and management of funding sources and mechanisms to guarantee 'measurable, reportable and verifiable' financial contributions by Annex I countries.

[49] S. Anderson, J. Cavanagh, J Redman (2008) 'Skewed priorities: How the Bailouts Dwarf Other Global Crisis spending' Washington DC: Institute for Policy Studies.

[50] Stockholm International Peace Research Institute (2008) *Armement, Disarmements and International Security: Yearbook Summary*, Stockhold: SIPRI.

[51] According to McKinseys' Project Catalyst (June 2009) reaching 450ppm will require significant financing. In total, developing countries' require financing flows of €65-100bn per year on average between 2010 and 2020 for mitigation and adaptation.

[52] Annual global abatement costs, mainly in the energy and industrial sectors, are about €150 bn in 2020. Approximately 55 per cent of those costs arise in developed countries. Those figures do not include the financial flows generated by international carbon emissions trading. In terms of aggregated costs, the study reports that, for the central mitigation scenario, most countries would face costs amounting between 0.4 and 1.2 per cent of their respective GDPs: 450ppm derived from a 50 per cent chance of limiting temperature increase to 2 °C. P. Russ, J-C. Ciscar, B. Saveyn, A. Soria, L. Szábó, T. Van Ierland, D. Van Regemorter, R. Virdis (2009) *Economic Assessment of Post-2012 Global Climate Policies*, Luxembourg: European Communities.

[53] 'It is estimated that global additional investment and financial flows of $200–210bn will be necessary in 2030 to return global greenhouse gas (GHG) emissions to current levels." UNFCCC (2008) 'Investment and Financial Flows to Address Climate Change' Bonn: UNFCCC, 6. On stabilization of atmospheric concentration of between 550 and 450ppm the report states: 'Investment and financial flows for mitigation in developing countries are likely to be particularly cost effective. While investment flows in non-Annex I Parties are estimated at about 46 per cent of the total needed in 2030, the emissions reductions achieved by the countries amount to 68 per cent of global emission reductions.' (*Ibid*, 7) Therefore estimated investment flows to NA1 countries for mitigation = $92– 97bn.

[54] For adaptation financing of between $28–67bn which will be required by 2030, of which a 'significant share' will be needed in NA1 countries. See UNFCCC (2009) 'Investment and Financial Flows to Address Climate Change', Bonn: UNFCCC.

[55]Algeria on behalf of the Africa Group (2009) 'Key elements of the LCA negotiation text' (8 April 2008). See: http://unfccc.int/files/meetings/ad_hoc_working_groups/lca/application/pdf/african_group_submission_lca_april_2009.pdf.

[56]*Ibid.*

[57] N. Stern (2009) *The Global Deal: Climate Change and The Creation of a New Era of Progress and Prosperity*, New York: Public Affairs.

[58] Sir Nicolas Stern assumes 0.2–0,3 per cent of world GDP in 2030 – which is approximately $130-260bn annually – is required to meet a mitigation target of 500ppm. P178 public funding required for deforestation = $15 billion, technology = $10– $50 billion and $50 – 100 billion for adaptation in developing countries. See: N. Stern (2009) *The Global Deal: Climate Change and The Creation of a New Era of Progress and Prosperity*, New York: Public Affairs: 50.

[59] $86bn adaptation financing in developing countries by 2015. See: Human Development Report (2008), *Fighting climate change: Human solidarity in a divided world*, New York: UNDP.

[60] At least $50bn required each year for adaptation financing in developing countries. See: Oxfam International (2007), 'Adapting to climate change: What's needed in poor countries, and who should pay' Briefing paper 104, Oxford: Oxfam.

[61] J. M. Gomez Robledo (2008), 'World Climate Change Fund', paper presented at an AWG-LCA workshop on Investment and Financial Flows, Bonn, 5 June 2008.

[62] See Table 3, Summary of proposals for increased financial proposals, in UNFCCC (2008) 'Investment and financial flows to address climate change: an update', Bonn: UNFCCC Technical Paper.

[63] This concept is explored further in Oxfam International (2008), 'Turning Carbon into Gold, Briefing Paper 123. Oxford: Oxfam.

[64] See Table 3, Summary of proposals for increased financial proposals, in UNFCCC (2008) 'Investment and financial flows to address climate change: an update', Bonn: UNFCCC Technical Paper.

[65] This concept is explored further in Oxfam International (2008), 'Turning Carbon into Gold, Briefing Paper 123 Oxford: Oxfam.

[66] G-77 and China, Proposal Financial Mechanism for Meeting Financial Commitments under the Convention

http://unfccc.int/resource/docs/2008/awglca3/eng/misc02a01.pdf

[67] See Table 3, Summary of proposals for increased financial proposals, in UNFCCC (2008) 'Investment and financial flows to address climate change: an update', Bonn: UNFCCC Technical Paper at: http://unfccc.int/resource/docs/2008/tp/07.pdf

[68] Excluding those countries with available capacity measured over $12,000 per person, using the method identified in Appendix 3.

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[70] CAIT UNFCCC (2009), Climate Analysis Indicators Tool, Washington: World Resources Institute. Available at http://cait.wri.org.

[71] For a justification of using lognormal income distributions see: J. Humberto Lopez and L. Servén (2006) 'A Normal Relationship?: Poverty, Growth, and Inequality', World Bank Policy Research Working Paper 3814.

[72] P. Baer, T. Athanasiou and S. Kartha (2007) *The Right to Development in a Climate Constrained World, The Greenhouse Development Right Framework*, First edition (Berlin: Heinrich Boll Foundation, Christian Aid, EcoEquity and Stockholm Environment Institute), http://www.ecoequity.org/docs/TheGDRsFramework-first.pdf

[73] As examples, proposals submitted by South Africa (http://unfccc.int/resource/docs/2009/awg7/eng/misc07.pdf at p. 29) and Bolivia (http://unfccc.int/files/kyoto_protocol/application/pdf/bolivia250409.pdf) consider emissions as far back as 1850 and 1900, respectively.

[74] If this index were being used to compare effort across both Annex 1 and non-Annex 1 countries it would not be appropriate to incorporate emissions from deforestation (by including the LULUCF sector) and the relatively recent base year of 1990. The majority of Annex 1 countries undertook vast deforestation activities, emitting GHGs into the atmosphere, well before 1990. In order to make a fair comparison either LULUCF would need to be excluded, or an earlier base year and estimates of earlier emissions would need to be included. As this analysis is only comparing effort between Annex 1 countries it is legitimate to use a 1990 base year and include LULUCF emissions.

[75] For extended discussion of the development threshold see P. Baer, T. Athanasiou, and S. Kartha (2007) *The Right to Development in a Climate Constrained World, The Greenhouse Development Right Framework*, Berlin: Henrich Boll Foundation, pp. 27-30. http://www.ecoequity.org/docs/TheGDRsFramework-first.pdf.

[76] Annex II countries are listed in the UNFCCC as countries that shall provide financial resources to developing countries.

[77] Comparable GNI PPP data unavailable for those countries not presented in this table.

[78] Reuters (2009), 'Rich nations' 2020 greenhouse cuts: 9-16 pct', www.alertnews.org (last checked by author June 2009).

[79] 20 per cent is the unilateral commitment the EU is already taking action on; 30 per cent is the commitment it's willing to achieve in the context of a global deal in Copenhagen.

[80] 4 per cent is Australia's current pledge; 24 per cent is the commitment it's willing to achieve in the context of a global deal in Copenhagen (5 per cent and 25 per cent against a 2005 base year).

[81] Figure officially announced by the Japanese Government, 10 June 2009.

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