



**Global Climate
Network**

Closing the Mitigation Gap

The challenge facing a shared vision for action
to avoid dangerous climate change

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Incorporating analysis by Dr Paul Baer, Stanford University's Woods Institute for the Environment

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The Global Climate Network

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The Global Climate Network is a collaboration of independent and progressive research and policy organisations in countries key to tackling climate change. Together, members of the Network are committed to addressing the constraints faced by sovereign governments in agreeing international action.

The Network aims to help governments clear a pathway towards an effective and fair international post-2012 agreement for avoiding dangerous climate change and subsequently help countries meet their obligations. In particular, the Network aims to:

- Address the political (economic, social and cultural) constraints barring the way to action by bridging the divide between domestic and international policy
- Promote equitable solutions that take into account the huge development, financial and energy challenges countries face
- Champion ideas and innovations to help construct a new political narrative that links action on climate change with enhanced economic and social well-being.

Alone, each Global Climate Network member has significant credibility and influence. By producing joint research, staging events together and seeking to influence policy, the Network can help bridge the dangerous divide that exists and is currently widening between international negotiations and national politics.

The following members of the Networks have contributed to this paper:

- **Institute for Public Policy Research (ippr)**, UK, also acting as the secretariat for the Network: The UK's leading progressive think tank with a strong, 20-year track record on research and policy.
- **Center for American Progress**, USA: Founded by John Podesta, former Chief of Staff to President Clinton.
- **Research Centre for Sustainable Development**, China: An independent institute of the Chinese Academy of Social Sciences. Dr Jiahua Pan, its director, is one of 12 members of the Chinese Experts Committee for Climate Change.
- **Wuppertal Institute for Climate, Environment and Energy**, Germany. Wuppertal Institute's ground-breaking climate change work is led by Dr Hermann Ott.
- **Vitae Civilis**, Brazil. Dr Rubens Born, Vitae Civilis's director, has had significant input into the Brazilian government's recently published climate change plan.
- **International Centre for Energy, Environment and Development**, Nigeria. ICEED Nigeria has expertise in climate change and energy policy.
- **The Climate Institute**, Australia. Set up in 2005, the Institute is a leading Australian voice in climate research and advocacy, pioneering clean technology and investment solutions with government and business.

Network members engage in collaborative research projects and bring forward joint analysis to address the political and policy constraints to cooperative international action on climate change. While often focusing on domestic policy in member countries, each project is linked to the international negotiations and is relevant to one of the five themes of the Bali Action Plan: Shared vision, mitigation, adaptation, technology and finance.

Dr Rajendra Pachauri, chair of the Intergovernmental Panel on Climate Change and Director General of The Energy and Resources Institute in Delhi, and Lord Chris Patten of Barnes, are the Network's first patrons.

Summary

Current proposals from the United States and European Union for reducing greenhouse gas (GHG) emissions by 2020 relative to 1990 levels would result in industrialised countries (known in climate negotiations as ‘Annex 1’ countries) reducing emissions by between 10 and 25 per cent if replicated across this group as a whole. Even at the top end of this range, a significant 2020 ‘mitigation gap’ would have opened up against the reductions necessary to stay on track for a halving of global emissions by 2050.

This paper – the first by the newly formed Global Climate Network – spells out what is perhaps the greatest policy challenge of our age: on the one hand, current proposals for 2020 emissions cuts in industrialised countries are insufficient to ensure that global reductions are kept on track for a halving or better by 2050. Yet on the other, developing (known as non-Annex 1) countries are unlikely to accept the substantial costs associated with closing the resulting mitigation gap while their levels of wealth and per capita usage of energy are still comparatively low.

The ‘shared vision’ part of the ongoing climate change negotiations is due to be discussed at a high-level ministerial meeting in Poznan, Poland, on Thursday 11 December 2008. We conclude that this discussion needs to go beyond the setting of targets and focus on enabling actual reductions, which are only possible through new technology, with new finance and by equitably sharing the global costs.

New analysis commissioned by the Global Climate Network shows that without such a focus, a ‘mitigation gap’ could open up and undermine the credibility of a post-2012 regime that has the aim of avoiding dangerous climate change. For instance, if all Annex 1 countries were to make emissions reductions comparable in scope with those recently discussed for the US by President-elect Obama – a return to 1990 levels by 2020¹ – then *net* Annex 1 emissions in 2020 would only be around 10 per cent below 1990 levels, leaving a mitigation gap equivalent to a non-Annex 1 deviation from its business-as-usual baseline of at least 24 per cent. (See note 10, page 6.)

Alternatively, if all Annex 1 countries reduced emissions to a level comparable with the EU’s most ambitious proposal – a 30 per cent cut by 2020 – then net Annex 1 emissions reductions in 2020 would be around 25 per cent below 1990 levels. Even this deeper level of Annex 1 cuts would leave a significant mitigation gap, equivalent to a deviation from business-as-usual by non-Annex 1 countries of at least 15 per cent in addition to hosting Annex 1 cuts through offsetting. For instance, the EU’s proposals allow for upward of one-third of emissions reductions to be offset as cuts elsewhere rather than being found in the EU.

Important though long-term goal-setting is, agreement on closing the mitigation gap through a negotiation that hinges on binding commitments outside Annex 1 is currently unlikely. It is inconceivable that developing countries will be prepared to meet the costs of closing the mitigation gap when so much of their development is still pending. Equally, however, while industrialised countries may strengthen their own targets, it is unlikely that they will muster the necessary resources to cover the whole cost of closing the mitigation gap either. Up to this point, political reality has remained immutable in both Annex 1 and non-Annex 1.

Ultimately, the costs of closing the mitigation gap will need to be equitably distributed, with policies to achieve additional emissions reductions through rapid technology development and deployment and significant new funds to drive both being paramount. Since the Poznan meeting will set the tone for a year of intense negotiation, focusing on a shared vision for the equitable mobilisation of new technology and additional finance may pay political dividends in Copenhagen in one year’s time and help reinforce the credibility of the UN climate process.

1. Statement during an international climate change summit recently convened by California Governor Schwarzenegger

Introduction

2. The EU is currently proposing unilaterally to reduce region-wide emissions by 20 per cent by 2020 relative to 1990 levels and by 30 per cent if others (the US, for instance) match this offer. President-elect Obama has suggested a return in 2020 to 1990 levels in the US would be its best offer. However, it is not yet clear whether either proposal is based on 'comparability of effort', for instance a similar rate of annual decline

3. The UNFCCC (1992), for instance, states that combating climate change calls for '...the widest possible cooperation by all countries and their participation in an effective and appropriate international response, in accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions.' Since equitable distribution of costs will inevitably involve significant upfront expenditure for developed countries, it is probable that a proportion of these costs will have to be offset through new government borrowing rather than coming out of consumers' pockets today. See, for instance, Foley *et al* 2007

The Action Plan agreed at the United Nations Framework Convention on Climate Change (UNFCCC)'s 2007 meeting in Bali, Indonesia (the 'Bali Action Plan') calls on countries to 'address' a 'shared vision for long-term cooperative action, including a long-term global goal for emissions reduction' (UNFCCC 2007).

Because the terms 'global goal' and 'shared vision' appear close together in the Bali text, they are often used interchangeably. However, the shared vision is bigger than the setting of emissions targets. It includes critical areas such as technology development and transfer, and finance.

In Poznan, Poland, in December 2008, the shared vision will be the focal point for high level discussions between Ministers. Poznan is the staging post in the UNFCCC process between Bali 2007, when the Bali Action Plan (BAP) was adopted, and Copenhagen in 2009, when the negotiations outlined in the BAP are scheduled to conclude. In this respect, the meeting in Poland has great political significance.

Poznan could signal a turning point. President-elect Obama is on his way to the White House with the promise of domestic climate change legislation to follow and much greater engagement with the UNFCCC. Significant efforts are already underway in developing countries with China, India and South Africa all putting forward frameworks for reducing the carbon intensity of their growth (BBC 2007, *Times of India* 2008, Government of South Africa 2008).

The EU may soon have in place its region-wide climate and energy package² and other Annex 1 countries, such as Australia, are implementing carbon trading albeit with uncertain levels of ambition for emissions reductions. Brazil has also advanced a draft National Action Plan on climate change, although it has drawn criticism from some in Brazil, including the Global Climate Network's Brazilian member organisation, Vitae Civilis (Vitae Civilis Institute 2008).

A global recession may also play a part in the short term by slowing emissions growth, as demand for goods and services and consumption of energy reduce. But without investment in low carbon technologies and policies, this will be a temporary blip. It has even been argued that some of the impacts of tougher economic times, such as higher rates of unemployment, could be avoided by widespread investment in low carbon industrial sectors and technology (see, for example, Pollin *et al* 2008 and DWS Investments 2008).

This paper argues that negotiators and governments converging on Poznan have an opportunity to outline a progressive shared vision. Climate change is a market failure more fundamental even than the current credit freeze in financial markets. It requires intervention on a scale at least as big as is occurring in finance, and the kind of cooperative action that the rescue of the international banking sector – especially through the coordinated lowering of interest rates – has shown is possible.

However, for cooperation to be credible and sustainable, it must be equitable.³ Even as soon as 2020, the task of avoiding dangerous climate change cannot be achieved through existing Annex 1 country emissions reductions proposals even if the US were to participate in a manner comparable to Europe. The implication of this observation is that the 'mitigation gap' must be closed either by more ambitious action in Annex 1 countries or with reductions outside Annex 1. In either case, a focus on technology and finance will be necessary.

4. For a detailed explanation of the assumptions underlying this discussion paper, please see Baer 2008

5. See Box 13.7, Working Group III, IPCC 2007

6. Global emissions are currently around 9.9 GtC. See Global Carbon Project 2008

7. There is an emerging consensus among prominent scientists that a 2°C increase in global average temperatures above pre-industrial levels would constitute a threshold above which dangerous, irreversible and potentially catastrophic global impacts may occur. See, for example Hansen *et al* 2007

8. The G8 communiqué does not state over which baseline year the suggested cuts of 'at least 50 per cent by 2050' should be made and is therefore difficult to quantify in GtC

9. Others reach similar conclusions, see: Sheehan P (2008), den Elzen M, Höhne N (2008) and van Vuuren and Riahi (2008)

Global Climate Network analysis⁴

Whatever Annex 1 targets are proposed or agreed, cuts will be made in non-Annex 1 countries to offset a proportion of these through the Clean Development Mechanism or, in the future, other such schemes. But the analysis outlined below shows how a remaining 'mitigation gap' would need to be closed by other forms of action if the integrity of a post-2012 regime is to be upheld.

Our analysis uses three different long-term (2050) global emissions reduction scenarios in which emissions peak and decline in different ways, but each relative to 1990 levels. Note that these focus solely on CO₂ and the figures referred to are for CO₂ measured in gigatonnes of carbon (GtC). Non-CO₂ gases are today about 30 per cent of total GHG emissions and also need to be reduced, but CO₂ from energy and transportation currently remains at the heart of the problem.

Focusing on 2020, we examine the gap between Annex 1 cuts of between 25 and 40 per cent below 1990 levels (the range described in last year's IPCC report⁵) and the reductions required according to each global goal scenario.

For non-Annex 1 countries, we use two alternative scenarios for emissions growth. The first of these is comparable to the International Energy Agency's (IEA) baseline case. It is likely that this underestimates the growth in emissions in developing countries. The second assumes higher growth in developing country emissions due largely to stronger economic performance, although this baseline represents a slight slowing of emissions growth in relation to recent years (see Sheehan 2008). In both baseline cases, Annex 1 emissions rise gradually after 2012.⁶

'No-regrets' reductions – those that can be made at negative or zero cost – are not included in these two non-Annex 1 emissions growth scenarios. While it can be argued that no-regrets should form part of the baseline assumptions about emissions, it is also clear that many of these reductions cannot be taken for granted. A brief discussion of this can be found in the accompanying technical note (Baer 2008).

Using existing studies, we also estimate in percentage terms the risk each scenario carries of exceeding an average global temperature increase of more than 2°C above pre-industrial levels.

Scenario 1 (yellow curve in Figure 1)

- Global emissions peak in 2017 and reduce by 50 per cent in 2050 (the minimum envisaged by the G8 in its 2008 summit communiqué⁸).
- Annual global emissions would peak at 11 GtC and reduce to 10.7 GtC in 2020.
- Estimated to carry a 25-54 per cent risk of exceeding 2°C.

Scenario 2 (orange curve in Figure 1)

- Global emissions peak in 2015 and reduce by 65 per cent in 2050.
- Annual global emissions peak at 10.7 GtC and reduce to 9.7 GtC in 2020.
- Estimated to carry a 20-46 per cent risk of exceeding 2°C.

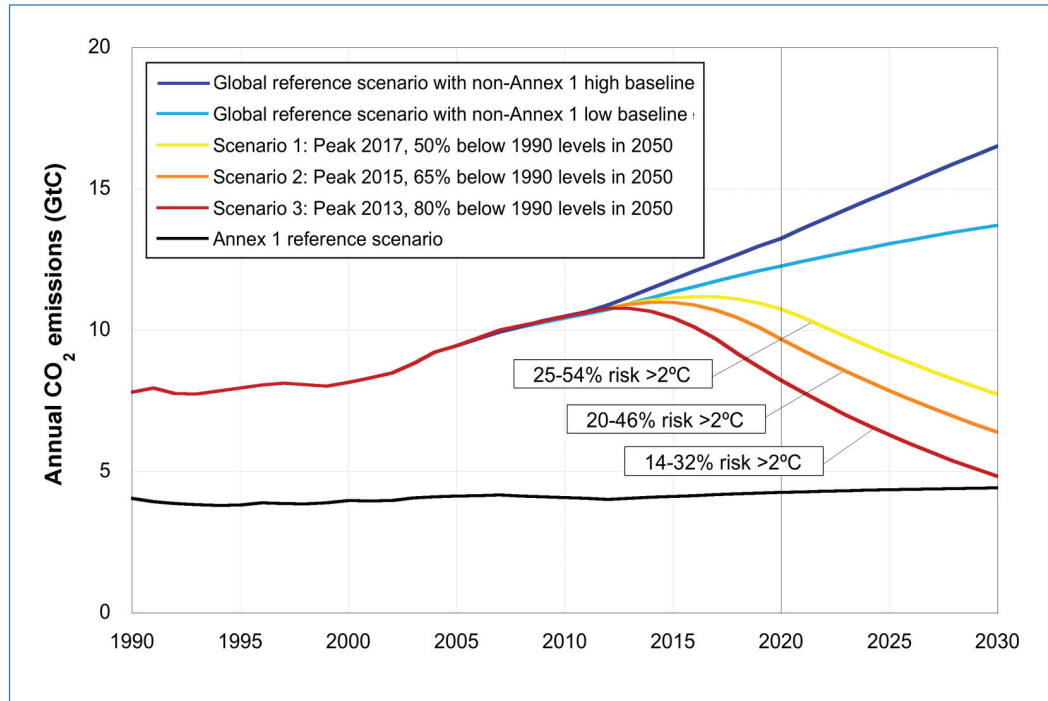
Scenario 3 (red curve in Figure 1)

- Global emissions peak in 2013 and reduce by 80 per cent in 2050.
- Annual global emissions peak at 10.5 GtC and reduce to 8.2 GtC in 2020.
- Estimated to carry a 14-32 per cent risk of exceeding 2°C.⁹

The mitigation gap that exists in 2020 is simply the sum of Annex 1's emissions minus its proposed reduction (for example, between 25 and 40 per cent below 1990 levels) and non-Annex 1's emissions (low growth or high growth) minus the 2020 level of emissions required under each global goal scenario.

In addition, we have looked at the net 2020 reductions Annex 1 as a whole would make if it took on action comparable to the US and the EU's most ambitious existing proposals. Negotiators have yet to

Figure 1: Scenarios 1, 2 and 3 plotted against low (pale blue) and high (dark blue) global emissions reference scenarios. Annex 1 emissions remain constant in both scenarios (black) and emissions growth takes place in non-Annex 1



10. Although 'comparable action'¹⁰ is a feature of the Bali Action Plan, negotiations have yet to determine the methodology by which reductions in countries with different levels of emissions relative to 1990 and other factors will determine different absolute reductions from country-to-country. In this paper, we base our comparison on the percentage decline between 2010 and 2020 relative to 1990 levels that would be required for the proposing country or region (i.e. the US and EU) to achieve its target (i.e. a return to 1990 levels by 2020 in the US is a 13 per cent reduction against estimated US 2010 emissions). This reduction is then applied to all Annex 1 countries relative to estimates of what each would be emitting in 2010 and taking into account other assumptions. There is more information in Baer 2008, the technical note that accompanies this paper.

define precisely what 'comparable action'¹⁰ means, although this appears likely to be an important debate. We have therefore assumed that comparability will be based on cumulative reductions between 2010 and 2020 rather than reductions relative to 1990 levels. Other assumptions would change the numerical value of the conclusions, but probably not the overall picture.

A technical summary paper prepared for the Global Climate Network by Dr Paul Baer of Stanford University's Woods Institute for the Environment contains full details of all assumptions made and all resulting data (see Baer 2008).

Findings

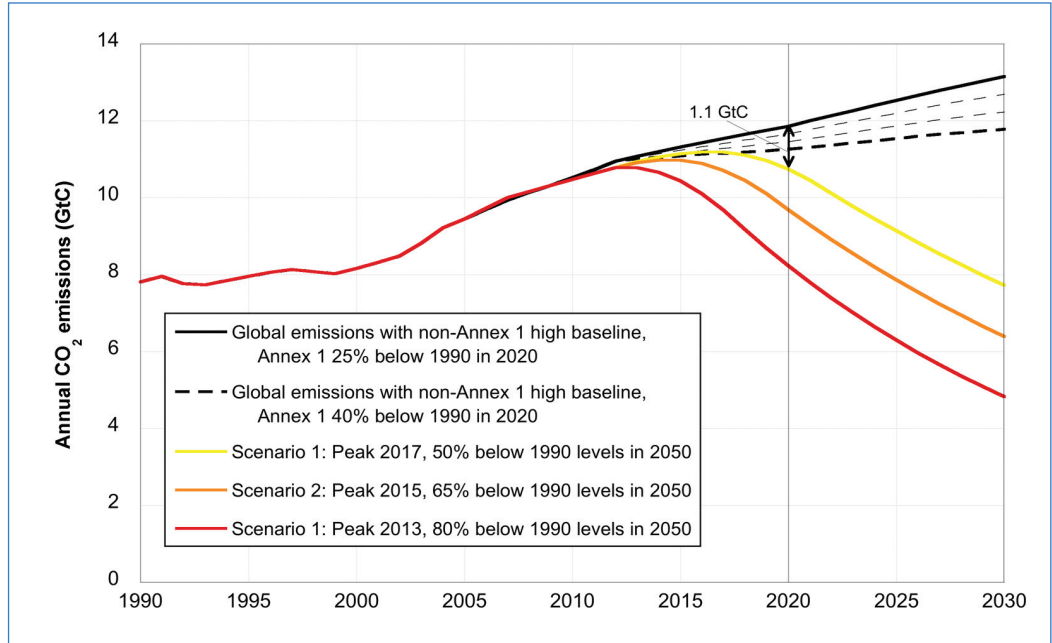
The Global Climate Network's analysis shows that in all but the most ambitious of cases (i.e. high Annex 1 reductions, low non-Annex 1 emissions growth and least stringent global goal) there is a mitigation gap in 2020. As ambition is reduced (i.e. Annex 1 reductions are lower, non-A1 emissions growth is higher and the global goal more stringent) the mitigation gap grows.

Even the low end of the IPCC's 25-40 per cent range appears ambitious in the current political climate. If Annex 1 countries were to take on reductions comparable with the EU's proposed, conditional 30 per cent cut across Europe, net Annex 1 emissions would be around 25 per cent below 1990 levels.

This is politically tough, but were it to be agreed and non-Annex 1 emissions increased according to the lower growth baseline, global reductions would be broadly on track in 2020 to meet 2050 cuts of 50 per cent relative to 1990 levels. However, soon after 2020, without deeper cuts, a mitigation gap would open up.

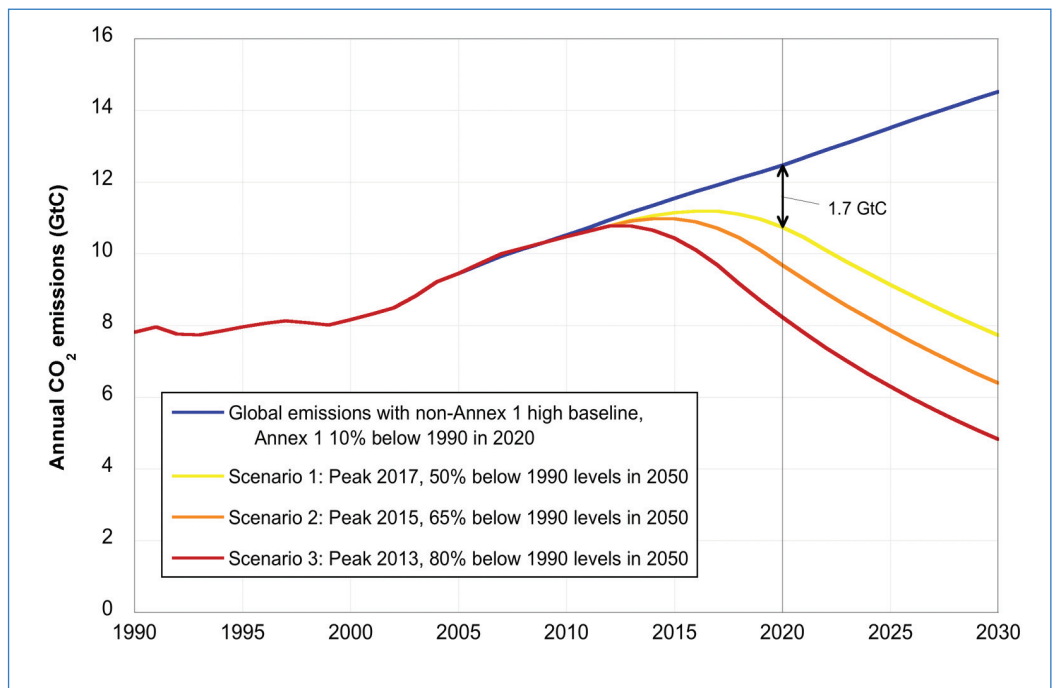
Under the same set of circumstances but compared to the non-Annex 1 higher growth baseline there would be a mitigation gap in 2020 of 1.1 GtC (almost the same as the annual emissions of the EU); equivalent to a deviation from the non-Annex 1 higher growth baseline of 15 per cent (see Figure 2). Where Annex 1 reductions are 25 per cent by 2020, non-Annex 1's emissions growth is strong and the global goal is ambitious, as may need to be the case to minimise climate risk, the mitigation gap could be as large as 3.6 GtC (more than twice the annual emissions of the US). This is equivalent to a 52 per cent deviation from non-Annex 1 higher growth baseline in 2020.

Figure 2: If non-Annex 1 emissions grow strongly (high global emissions reference scenario) and Annex 1 cuts its emissions by 25 per cent, then there would be a mitigation gap of 1.1 GtC in 2020 against a global goal pathway towards 50 per cent of 1990 levels by 2050



If all Annex 1 countries take on cuts which compare in scope to the US proposal of a return to 1990 levels by 2020, then net Annex 1 emissions may be reduced by as little as 10 per cent below 1990 levels by 2020 (see Figure 3). Compared to the high emissions growth scenario and with a global emissions reduction pathway that is heading for 50 per cent reductions in 2050, this would leave a 2020 mitigation gap of 1.7 GtC (more than the entire annual emissions of the US and equivalent to a non-Annex 1 deviation from baseline of 24 per cent). The 2020 mitigation gap against global emissions scenario 3 is 4.2 GtC, equivalent to a non-Annex 1 deviation from the higher growth baseline of 60 per cent.

Figure 3. Global emissions compared to the three scenarios if Annex 1 emissions reach 10 per cent below 1990 levels in 2010, based on effort comparable to the US proposal that it returns to its 1990 levels in 2020



Conclusions

The Global Climate Network exists to address the political – economic, social and cultural – obstacles to effective global action to avoid dangerous climate change. The above analysis exposes perhaps the most fundamental of these: that a mitigation gap will open up rapidly under current proposals for action.

The message intrinsic to this analysis is a challenging one for negotiations and re-affirms the importance of a shared vision that goes beyond the global goal. However, since a common understanding of the level of mitigation required is an important part of any shared vision, it is clear that countries must take heed of the implications of the likely opening of a mitigation gap.

The current net ambition of Annex 1 countries may yield a cut of as little as 10 per cent or little more than 25 per cent by 2020 compared to 1990 levels. A mitigation gap or shortfall of between 1.1 and 3.6 GtC could open up by 2020 even if Annex 1 emissions reductions were at the upper end of this range.

The implication of this conclusion is that further action must be considered that goes beyond what is currently proposed by Annex 1. It is hard to conceive of either more ambitious reductions in Annex 1 or significant deviations from baseline in non-Annex 1 without technology development and transfer and finance – two other pillars of the Bali Action Plan.

Annex 1 countries still tend to talk narrowly about targets and focus on domestic physical emissions reductions, even though it is implicit within their assumptions that a proportion of these would be offset outside Annex 1. It may be useful as negotiations develop to look upon Annex 1 emissions reductions rather as *allocations*,¹¹ which means that Annex 1 countries could, over time, take on deeper targets and make more of these outside of non-Annex 1 through technology and financing arrangements. This could be looked upon as a ‘dual Annex 1 obligation’; physical emissions reductions made domestically and additional reductions made abroad through transfers of technology and finance and through project-based emissions trading.

There are two alternatives to this approach. The first, put bluntly, is a higher likelihood of dangerous climate change as the mitigation gap grows. The second is that non-Annex 1 countries finance domestic reductions to close the gap; but with relatively low levels of per capita income and high levels of poverty, development is likely to remain their top priority.

There are nevertheless significant moves already underway in some developing countries – notably China and India – to reduce carbon intensity as they grow. This approach could provide the foundations on which a clearer understanding can be built of how non-Annex 1 emission reductions can be supported by finance and technology from Annex 1 countries that is measurable, reportable and verifiable.

Measures of equity, such as the UNFCCC’s principles of ‘common but differentiated responsibilities and respective capabilities’, will be also be important in determining which countries meet what costs.¹² Such measures could in the future help determine how emissions reductions are allocated and undertaken internationally, through technology development and transfer, and finance.¹³

Countries at different levels of development are rightly concerned about costs falling onto taxpayers or consumers as a result of climate change policies, especially during an economic downturn. This fear can only be allayed if finance is available and the case is made that investment in clean energy and energy efficiency can trigger further innovation, provide growth opportunities and bring about a demonstrable reduction in the price and accessibility of low carbon technology.

The Global Climate Network notes that while the global recession is a considerable threat to the international negotiations and to climate change policy in general, it also presents opportunities. An increasing number of economists and policymakers are arguing for a variety of fiscal stimuli to help boost economic activity. Use of government debt and other financial instruments to invest in the wide

11. In some countries, the word ‘allocation’ has been used to describe the grandfathering of emissions permits under a cap and trade scheme. In this context, though, allocation is used to describe the quantity of emissions that a country must reduce. We distinguish this here from a domestic ‘target’ which describes only what a country will reduce within its own borders. An allocation could be larger than a country’s target; bigger allocations in countries with binding commitments could help drive emissions reductions in countries with no binding commitments.

12. See for instance the Greenhouse Development Rights proposal, which pursues a highly stringent global goal through a system of weighted allocations based on historical emissions and existing capacity to act. See: www.greenhousedevopmentrights.org

13. While we do not discuss technology and finance to support adaptation in this report, for many countries and regions, it will be essential for adaptation strategies to be incorporated into national planning and for international funds and financial mechanisms, such as insurance, to be available to support those plans, especially in the most vulnerable and poorest countries.

application of existing low carbon technologies and in rapid innovation could help meet other key objectives, such as job creation and supplying energy from sources with less price volatility than oil and gas.

The Global Climate Network is committed to investigating solutions to the problems the shared vision poses, especially in the areas of technology and finance. In the coming months, we will jointly publish the results of research and analysis in each of the key areas of the Bali Action Plan, beginning with work on technology development and transfer in March 2009.

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