



Statement by the Climate Change Task Force

**Action to Face the Urgent Realities
of
Climate Change**

**June 18, 2012
Rio de Janeiro, Brazil**

June 11, 2012, Geneva - Appeal for Urgent Action on Climate Change

President Mikhail S. Gorbachev has convened a high-level Task Force to stimulate an urgent and profound international response to the increasing risks and threats of climate change. The Task Force brings together scientists, practitioners and experts from developed and developing countries to focus attention on the crucial issue of climate change within a broad economic, social and political context. Institutional support for the Task Force is provided by Green Cross International. A detailed Statement "Action to Face the Urgent Realities of Climate Change" that sets out the scientific and expert analysis supporting this Appeal was prepared by a number of international leaders, experts and organizations, and will be launched on June 18, in Rio de Janeiro. The Statement summarizes the scientifically-verifiable realities and risks of climate change and the benefits of early action to secure a stable climate and a viable global environment.ⁱ

The impacts of climate change are intensifying across the world: unprecedented temperatures, glacier melt, changing rainfall patterns, droughts, floods, storms, fires and widening desertification are degrading the fragile ecosystems of the planet. They are devastating the lives and livelihoods of millions of people today and undermining prospects for progress, stability and peace in the future.

The destabilization of the world's climate will affect the security and lives of all peoples, rich and poor. But the vast majority of those who are suffering the most bear no responsibility for its cause. Basic principles of self-preservation, justice and human rights demand immediate action to avert the risks of irreversible climate change, to mitigate the impacts of climate destabilization on the poor and vulnerable and to assist them in adapting to those climate-driven changes which are now inevitable.

The alarming effects being observed today across the world are the result of the rise of only 0.8°C in global average temperature above pre-industrial levels. But humanity is currently generating CO₂ emissions at a rate which could cause an average rise of over 6°C by 2100 (Intergovernmental Panel on Climate Change 2007). This would imply double this increase in polar regions and would have dramatic consequences for the climate, for food and water security, for the temperature, level and acidification of the oceans and for the survival of the vital web of ecosystems which are the life-support systems of humanity.

It is increasingly recognized that we do not simply face a process of gradual atmospheric warming but that we run the risk of sudden, non-linear changes in the climate systems of the planet with unforeseeable consequences. Simple prudence demands that precautionary action be taken now. To continue on the present "business as usual" course would have devastating consequences. In the interests of both present and future generations we must cut emissions of greenhouse gases into the atmosphere drastically and quickly to preserve a stable climate and a viable environment.

We, the Members and Associates of the Climate Change Task Force appeal to leaders across the world in all walks of life to face their historic responsibilities by taking strong, urgent and concerted action to face the realities of climate change and to avert its potentially devastating consequences. In a spirit of international solidarity, we call on them to engage public support in defining and implementing a vision and strategy for human progress that is sustainable, inclusive and just.

We face a world emergency that now demands transformative, radical action on a global scale within a clear and predictable framework of governmental policies. Yet, despite many Government statements acknowledging this need, the current global situation can be summarized by three facts:

- (i) far from declining, global emissions continue to rise at an alarming rate - by 5.9% in 2010 and cumulatively by 49% since 1990 (International Energy Agency);
- (ii) the risks of destabilizing the climate are increasing; we may be approaching a point of no return and an irreversible destabilization of the climate;
- (iii) multilateral efforts to preserve a stable climate and a safe future are proving to be slow and inadequate in relation to the scale and urgency of the challenges. They are failing to achieve action sufficient to avert the risks of catastrophic climate change.

The targets of the present negotiations for cuts in emissions are too little, too late. We must make structural and behavioral changes to shift the trajectory of consumption-driven economic growth and human development onto a sustainable, low-carbon course so as to reconcile the welfare of a growing world population with the real potentials and limits of nature. Effective action to avert the destabilization of the climate is in fact, a pre-condition for successful progress towards sustainable world development – which will be the focus of discussions at the Rio+20 UN Conference on Sustainable Development, in June 2012. We must position climate change in the wider context of sustainable economic and social development and identify and act on its underlying causes which are rooted in our present values and consequent social and economic choices and actions. In particular, we must break our addiction to the profligate use of fossil fuels on which our modern economies and agricultural sectors are based if we are to preserve a stable climate.

It is widely acknowledged that the current mitigation targets of the Cancun and Durban agreements are far from what is required to limit global average temperature rise to less than 2°C above pre-industrial levels. Current mitigation and energy policies will lead to irreversible and potentially catastrophic climate change (IEA, 2011). The action currently pledged could lead to a global average temperature rise of 5°C (Rogelj et al., 2010). Inertia in energy infrastructure is a major hurdle in reaching higher mitigation targets. The long economic timeframe of energy infrastructure means that investments made today will impact the levels of mitigation possible 30 years down the line. According to analysis by the IEA (2011), if we wish to limit atmospheric greenhouse gas levels to 450 ppm CO₂e, internationally co-ordinated action must be taken to halt the buildup of new fossil fuel infrastructure while increasing the efficiency of existing infrastructure and where possible speeding up investment in renewable energy solutions. If action is not taken, by 2017 all permissible emissions within a 450 ppm CO₂e scenario would come from energy infrastructure that has already been built. Consequently all new energy infrastructure after 2017 would need to be zero-carbon. Alternatively, emitting infrastructure would need to be retired before the end of its economic lifetime, an action that is potentially very costly and politically difficult (IEA, 2011).

Clearly rapid action is required to prevent this scenario from unfolding. Humanity has enormous capabilities of creativity, technological potentials and organization which could be mobilized to manage the threats of climate change and respect the realities of the natural world. This would create a myriad of positive opportunities to generate the new ideas, new policies and new partnerships needed to overcome the present economic crisis by reorienting and restructuring economies on to a more sustainable, resource-efficient and inclusive path and generating new economic activities and employment. Those who act early are already benefiting; those who fail to act – whether countries or corporations – are falling behind.

We need to approach the crisis from a proactive, positive perspective, recognizing that if all participants contribute to meeting the global de-carbonization challenge, this will provide benefits, opportunities and security to all. The changes required will demand vision and courage. Civil society and the general public must be properly informed about the realities and risks of climate change and mobilized to overcome the obstruction of the powerful interests vested in the present system which are determined to resist change.

The world community of nations must address the issue of climate as a truly global, systemic challenge which demands precautionary action, solidarity and long-term commitment. If an international climate agreement is to have legitimacy, it must adopt a values-based approach to development, centered on justice, inclusion and sustainability. It must engage not only the major emitters but also those countries and groups within society which are most immediately affected today by the consequences of climate change. And it must recognize the rights and aspirations of the young people and the future generations who will have to face these immense challenges.

Fortunately, many countries, cities, communities and corporations across the world are pursuing rigorous and comprehensive plans to limit their CO₂ emissions. They are demonstrating in practice not only that it is possible to achieve this goal without reducing economic growth but also that reducing emissions and improving energy and resource efficiency will generate many opportunities and contribute to the welfare and health of citizens and to competitiveness and employment.

Climate action is in fact a condition for meeting human needs and building the secure, innovative and sustainable societies of the future.

Leaders and policy-makers should actively promote innovative solutions and partnerships across all sectors – from agriculture to energy production to transport to buildings – which can help to decouple advances in human development and wellbeing from rising CO₂ emissions. Fundamental to achieving this will be major increases in resource productivity, including far greater energy efficiency, to break the present linkages between economic growth, resource use and environmental degradation. Experience in key countries, cities and corporations already shows that the emissions driving climate change can be sharply reduced and that energy and resource efficiency can be substantially increased at acceptable cost, and with major benefits. The ongoing economic crisis should be a wake-up call providing greater impetus for change, not an excuse for further delay. There are four key areas to focus on: 1) Raising mitigation ambition and early action; 2) Incorporating carbon-pricing mechanisms globally; 3) Promoting climate leadership alliances; 4) Climate finance and technology transfer.

Several decades of experience show that the risks and threats of climate change cannot be averted by incremental change and a reliance on market forces and voluntary measures alone. The future cannot be secured through interminable negotiations that only reach agreement on the lowest common denominator. Those States which are ready and willing to seize the opportunities and to make the transformations needed to build a sustainable future should take the lead, if necessary leaving the unwilling behind to cling to the failing and inadequate ideas of the past.

In a speech to the 66th Session of the UN General Assembly, the Secretary General urged global leaders “to use every ounce of your experience, skills and influence to advance action on climate change. Help us defend the science that shows we are destabilizing our climate and stretching our planetary boundaries to a dangerous degree. Help us to identify the new alliances – among public officials, business, civil society and faith communities – that will make sustainability the rallying point for action in the 21st Century.”

We, the Climate Change Task Force members and Associates, share the views of President Gorbachev:

“Climate change is only the tip of the systemic crisis we face. It poses existential threats to global stability and security that can shake the foundations of modern civilization. The biggest challenge of the next decade will therefore be to counter this systemic crisis with comprehensive solutions based on scientific knowledge focused directly on the causes and impacts of climate change while overcoming the pressures of various vested interests and of business-as usual politics.

The outcomes are not predetermined. They will depend both on events and on our purposeful actions. And change must start with leadership, whether in politics, business, science or civil society. The science, including the science of climate change, is clear. Civil society is on board. The onus is now on government and business leaders to act.”

We call on leaders across the world, individually and collectively, to consider and to act on the lines of action presented in our Statement. In this way they will not only avert the threats of dangerous climate change but also secure the future of humanity by moving the world economy onto a sustainable and equitable path, enabling present and succeeding generations to attain a healthier, safer and more prosperous future. We have the opportunity, the knowledge and the capabilities. The scale of the challenge is clear: we call on leaders to act.

i The Statement of the Climate Change Task Force elaborates on the following proposed lines of action to:

1. implement urgent and deep cuts in emissions
2. preserve natural capital and restore ecosystems
3. undertake rapid adaptation to the inevitable impacts of climate change
4. strengthen capacities and resilience
5. develop radical new solutions
6. reorient economies on to a sustainable path
7. mobilize the essential financial resources



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Climate change and environmental degradation pose growing threats to humanity. President Mikhail S. Gorbachev has therefore convened a high-level Task Force in order to stimulate an urgent and profound international response and to build the critical mass and political will for deep-rooted societal change capable of containing and then reversing the effects of climate change and environmental degradation.

The Task Force brings together a group of scientists, practitioners and experts from developed and developing countries, who use their knowledge, experience and worldwide networks to focus attention on the crucial issue of climate change within a broad economic, social and political context. (See Annex 1)

Institutional support for the Task Force is provided by Green Cross International, a Geneva-based international organization established on the initiative of President Gorbachev in 1993, following a call by delegates at the 1992 Rio Earth Summit for the creation of a 'Red Cross' for the environment. Green Cross International is focused on policy and action to manage and contain acute environmental and resource challenges across the world.

The Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 17), held in Durban, South Africa, in December 2011, once again demonstrated the inadequacy of the complex multilateral negotiating process to generate timely and effective action. It brought into stark relief the dangerous contradiction between the limits of 'politics as the art of the possible' and the need for urgent action to avert the rising risk of catastrophic climate change. The pace of climate change and the pace of the multilateral process are fundamentally out-of-step, with potentially catastrophic consequences.

The internal logic of the negotiating process – as articulated in the Durban Platform for Enhanced Action, which envisages a new international agreement by 2015 with a commitment by all countries to accept binding emissions cuts by 2020 – fails to recognize the realities and threats of the physical dynamics of accelerating climate change as defined by science.

It is now widely recognized that whatever action ultimately emerges from the intergovernmental process as currently conceived may well come too late to avert the destabilization of the favourable climatic conditions on which human civilization depends.

Governments must face the fact that the vast majority of scientists, experts and institutions competent in the fields relevant to climate change agree that the risks of climate destabilization are real, immediate and increasing. It is imperative that governments, individually and collectively, act to avert the risks of catastrophic climate change. Indeed, a growing body of expert and informed opinion, recognizing the failure of conventional politics to take the essential precautionary measures, is calling for emergency action to avert the risks of destabilization of the climate.

This Statement summarizes a broadly agreed international view of the risks and issues associated with climate change. It underlines the scale and intensity of the challenges posed by climate change to the future of humanity. It makes the case for urgent and concerted action to avert the threat of dangerous climate change by addressing its underlying causes. It identifies the opportunities and co-benefits that could be gained through effective action to avert these risks by moving on to a path of sustainable development. Most importantly, it suggests broad lines of priority and action to preserve a stable climate and a viable world environment by building the new resource-efficient, sustainable societies and economies of the future.

**Action to confront the realities of
climate change
can no longer be delayed**

I. Introduction: Challenges, Risks and Opportunities

The impacts of climate change across the world are becoming more evident and more damaging:

- Rising temperatures are affecting weather patterns and the timing and intensity of the rainfall on which food production relies. Supplies of fresh water are increasingly at risk, whether from receding glaciers, shifting patterns of precipitation, or additional pressures on lakes, rivers and aquifers. For example, recent studies show that water flows from the Cordillera Blanca in north-west Peru, on which the cities of Lima and La Paz rely, have peaked some 30 years earlier than was forecast.
- The temperature of oceans is rising and the level of their acidification is increasing, threatening the survival of coral reefs and degrading marine ecosystems, which support 95% of life on this planet and are a critical element in the sequestration of carbon.
- The increasing frequency and intensity of natural disasters, of extreme weather events and of devastating droughts and floods, coupled with accelerating sea level rise, are already causing widespread fatalities, as well as impacting the livelihoods and undermining the development efforts of hundreds of millions of people.
- Only the privileged - who have so far been largely insulated from the impacts of climate change - have the luxury of denying or ignoring these facts. But climate change will not spare the rich: 2011 was the worst year for extreme weather in the United States since records began in the nineteenth century, with 14 weather disasters, each causing over US\$ 1 billion in damage, with loss of life and devastating consequences for affected communities.¹

The physical evidence accumulating across the world shows that the processes of climate change are accelerating, driven by the massive scale of human impacts on our planet.

The combination of decades of excessive consumption by the affluent in the developed countries – now joined by the expanding middle classes in emerging economies – with all its attendant pollution and waste, coupled with the pressure of a growing world population on the ecological resources of the planet, are degrading the environment and destabilizing the climate. The clear physical evidence of rapid global environmental change is reinforcing the analysis of thousands of scientists, experts and respected institutions across the world and underlines that the present trajectory of world development is unsustainable. Empirical research, aided by advances in satellite and other monitoring techniques, is producing a solid understanding of the dynamics of the processes that drive climate change, as well as of the rapid and radical changes which affected climate in the geological past. While uncertainty remains in some areas, the fundamental processes at work are increasingly well understood.

This research also now presents a strong warning that the interacting processes that drive climate change are non-linear and can therefore trigger abrupt change. We do not simply face a process of gradual global warming as is widely imagined. We run the risk of sudden, irreversible and potentially devastating changes in the climate systems on which we depend. We cannot therefore continue on a business-as-usual path: we must take rapid and decisive precautionary action if we are to avert the risks of catastrophic climate change.

Climate change now poses growing risks and threats to the lives and livelihoods of millions of people, to the ecological and environmental systems of the planet and to the global economy. In addition, it constitutes a severe and growing “non-traditional” threat to international and national security and to world peace. Effective policies for mitigation and adaptation are therefore essential not only to achieve sustainable economic progress and to preserve a viable environment, but also to preserve security and peace for all.

The implacable forces of nature are moving ahead: further denial, disagreement and delay may simply entail that human interventions come too late to avert the irreversible destabilization of the climate. Meanwhile, carbon emissions continue to rise, by a record 5.3% in 2010²: they have cumulatively risen by 49% since 1990 in spite of the intensive international negotiations and efforts to contain them.

The need for urgent and substantial action

This Statement makes the case, based on a wide scientific and expert consensus, that action is urgently necessary to avoid the risk of triggering irreversible processes of climate change. Recent evidence and the latest scientific analysis reinforce this conclusion. It is clear that profound and rapid transformations in economic and energy structures will be essential to avert the increasing risks of devastating climate change.

Due to natural caution and the complex processes of peer review, scientists may in fact be significantly underestimating the pace and intensity of climate change. At present, emissions are rising at a rate above the worst-case scenario of the Intergovernmental Panel on Climate Change (IPCC 2007), which envisages an intolerable increase in global average temperature of over 6°C by 2100. However, according to John Reilly, Co-director of the climate program at MIT, IPCC estimates are too conservative: the IPCC worst-case scenario is in the middle of MIT scientists' estimates of likely outcomes.

In light of these realities, the world community of nations is confronted by a clear moral and practical imperative to take urgent, concerted action to address the risks and impacts of climate change and to face connected challenges in the areas of energy, water, food, biodiversity and the alleviation of poverty. In this perspective, the outcomes of COP 17 have failed to create the conditions under which States will mobilize to meet this imperative, and address the immense and immediate threats through rapid mitigation and effective adaptation.

Such precautionary actions would require a reallocation of resources and in some cases, additional costs. These would not simply constitute an added burden on the economy, but would be investments in the foundations of the healthier, more stable and sustainable societies of the future. They would also be accompanied by savings and opportunities even in the short term. The costs of early action to avert the threats of climate change will be substantially less than those of action delayed.

We have a historic choice: either to continue along the failing path of fossil-fuel based growth driven by the stimulus of ever-increasing demand for material consumption, or to change the trajectory of human progress towards the resource-efficient, low-carbon economies of the future.

We have the vast capabilities of creativity, knowledge, resources and organization needed to do this, and an array of proven solutions, innovations and potentials which could be disseminated across the world to achieve rapid results. The trajectory will have to change: we can either elect to change it now, coherently and rationally or be forced to change it in the near future, at far greater expense and in an atmosphere of panic or even conflict.

The growing understanding of the immense risks and threats posed to the future of humanity by climate change and ecological degradation comes at a time when leaders are focused on the immediate need to manage the deep financial and economic crises which threaten the stability and integrity of the world economic system today. Economic anxiety has already served to dampen government responses to climate change - both domestically and in international negotiations - for several years, causing further delays that humanity cannot afford.

Action on the climate crisis must not be postponed until the economic crisis is resolved. If any strategy is to have longer-term validity, it must combine measures to resolve the economic crisis with measures to assure a stable climate and a viable global environment. It is precisely because leaders have focused for decades on immediate issues, and ignored the gathering threats of climate change, that the climate issue has reached such a level of intensity and threat. The economic and the climate crises both have their roots in the failure of our present models and strategies of economic growth as measured by GDP, and the lack of connections between financial systems and the natural systems on which our lives depend. It is an extremely dangerous error to think that we must deal with the economy first, and the climate later. The environment and the economy are two sides of the same coin.

The world economy has surmounted many crises in the past. However, the climate crisis is different. It threatens irreversible, uncontrollable change in the fundamental and unique environmental conditions of the Holocene period that allowed the success of our civilization. Once the climate has been destabilized, there is no going back. Leaders must therefore recognize that economic and social welfare, distributional justice and the preservation of a stable climate and a viable environment are essentially connected, and must be tackled together in an integrated overall strategy for change if we are to sustain progress and preserve peace in an interdependent world.

As always in the on-going processes of technological progress and social and economic transformation, those with powerful vested interests in the existing system resist change. However, in the coming environmentally-constrained world, there will be a premium on energy and resource efficiency, on the reduction of waste and pollution, and on all areas of low-carbon development.

There will be immense opportunities for those who move early to take advantage of the new opportunities. Those who cannot - or will not - understand or accept the altered imperatives and priorities of the 21st Century are already being left behind in the emerging new era of sustainable and inclusive development.

Opportunities to build the resource-efficient, inclusive economies of the future

Fortunately, action to achieve a sustainable balance between humanity and nature offers “win-win” opportunities to improve human lives and to assure welfare and employment in new resource-efficient, low-carbon societies. We have enormous capabilities: we need a positive vision of the sustainable and inclusive economies of the future to give people hope and to mobilize creativity, energy and commitment.

A coherent strategy of investment, incentives and regulation to tackle the climate, energy and environmental challenges we face will contribute to recovery from the economic crisis by stimulating innovation, enhancing sustainable growth, generating employment and making constructive use of currently underutilized capacities. If action is taken early, the costs of the transition will be small in relation to the overall increase in economic activity and to the longer-term benefits to be gained. Advanced industrial societies have made several such deep transitions in the past, creating new economic and employment opportunities to the benefit of society as a whole.

The threat of climate destabilization is a truly global issue requiring a clear framework of strong climate policies at the international level and effective action by national governments. However, in parallel, all over the world, people are not waiting for the results of inconclusive international negotiations but are taking action today. Public awareness and concern for the future are generating a whole array of innovative, low-cost, down-to-earth solutions in every field, from agriculture, transport, urban design and energy efficiency to business and finance, ethical banking, trade and community organization.

Individuals, communities, corporations, cities and states have recognized the urgent need to face the realities of climate change and to reap the benefits of early action.

A key role of government will be to stimulate and support such decentralized solutions.

For example: the European Union has committed to a forward-looking strategy with a timetable of specific cuts in emissions and is extending and tightening the conditions of its Emissions Trading System; a recent report commissioned by the German Ministry of Environment concludes that “Post-crisis Europe can revitalize its economy by tackling the climate challenge”; Sweden has embraced the opportunity to modernize its economy on to a low-emission, resource-efficient basis, and to gain greater energy independence;³ and Korea is combining investments in ICT and green innovation to increase its opportunities and competitiveness in world markets.⁴ China is moving in the same direction. Although it is now, in aggregate, the largest emitter of greenhouse gases, China is focusing its 12th Five Year Plan on reorienting its economy on to a new less energy-intensive and more resource-efficient path, and is investing massively in laying the foundations for a competitive and sustainable future economy. Turning to the world's second biggest emitter, in some U.S. States, Renewable Portfolio Standards have been established, allowing the creation of tradable Renewable Energy Credits, an effective market-driven tool for driving down upfront and overall cost of projects. California has introduced a cap-and-trade system to help reduce its emissions.

All of these important economic actors, and many others, are moving to seize the opportunities of low-carbon, resource-efficient economies. Increasing evidence demonstrates in practice that these “co-benefits” can include: improved health, welfare and environmental security for their citizens; increased employment in new “green” activities; and improved economic performance and exports derived from competence and competitiveness in providing the goods and services of the future.

All over the world, people are not waiting for the results of inconclusive international negotiations but are taking action to seize the emerging opportunities

II. The Gathering Storm: Facing the Realities of Climate Change

1. There is a strong, well-founded scientific consensus that the global climate is now in a process of rapid change which poses real threats to the complex civilization of the 21st Century, to millions of people across the world today, to the rich biodiversity and ecosystems of the planet and to the prospects of future generations.⁵
2. Sustained scientific analysis of the drivers and dynamics of climate change and of the paleoclimatic record, supported by clear, documented evidence of change across the world, confirm that it is human activities on an unprecedented scale which threaten to destabilize the climate and the life-support systems of the planet. Despite extensive efforts over many decades, no credible, well-supported, alternative explanation has been advanced to explain the clear changes in progress.⁶
3. In spite of years of negotiation and effort and as reliance on coal and unconventional sources of oil (e.g., tar sands, oil shale) increases, we remain on a worst-case path which, if unchanged, will lead to a rise in global average temperature of around 6°C by 2100 and to the destabilization of the climate.⁷ But there will be large regional variations: temperature rise is likely to be twice the global average in critical areas such as the Greenland and Antarctic ice sheets and in mountain regions, which together constitute over 60% of the fresh water resources of the planet.
4. The consequences of such a rise would be devastating: the impacts of climate change which we see today across the world are driven by only a small rise in temperature of 0.8°C from the pre-industrial level (in 1750). A further rise of 0.6°C is already programmed for the future.⁸ Even a rise of 2°C will have massive, irreversible impacts.
5. The poor and underprivileged in developing countries are experiencing the most damaging impacts of climate change although they did not cause the problem. It is clear that the societies and economies of the rich and emerging countries will also be profoundly affected by the impacts of climate change and of an unstable and polarized world. A commitment to strong climate action is needed to avert the risks of dangerous climate change: no one will be immune.⁹
6. Concerted global action is required in a spirit of solidarity and common purpose to meet the common threat. It is clear that years of negotiation have not restrained the acceleration of climate change and the goals of the present negotiations are clearly inadequate.¹⁰

Scientists have long understood the natural processes which influence global temperature: these are not the cause of the rapid warming we experience today. It has been demonstrated that it is human-created emissions which are predominantly driving the present dangerous and unprecedented warming of the atmosphere. Uncertainties remain, and our knowledge of the workings of the non-linear climate systems is incomplete, but there is an overwhelming and well-founded consensus that we are on a path to dangerous and irreversible climate change.¹¹ Indeed, as mentioned earlier, due to natural caution and the complex processes of peer review, scientists may in fact be underestimating the pace, intensity and consequences of future climate change.

Scientists may in fact be underestimating the pace, intensity and consequences of future climate change

III. The Intensifying Impacts of Climate Change

Climate change is not only a problem for the future: it is having enormous impacts today on the global environment, on growth and development and on the lives and hopes of millions of people, especially the poor and disadvantaged who are not responsible for the problem. These impacts will intensify in the future, with severe implications for security at all levels.

1. 2010 was the hottest year on record, just ahead of 2005. Temperature records were set in 18 countries, with record heat-waves and droughts.^{12, 13, 14} Temperatures in the Arctic are around 5°C higher than they were some 40 years ago. From a global perspective, gradual change in temperatures and weather patterns and the rising frequency of extreme weather events over recent decades provide strong added evidence of climate change.
2. The expansion of subtropical dry regions towards the poles, by 4° of latitude so far, will continue, aggravating desertification, forest dieback and species extinction.^{15, 16}
3. Science explains why climate change provokes not only overall warming but also, because of the more rapid evaporation of water, increasingly extreme and unpredictable weather events, with clear evidence that the intensity of tropical storms is rising. Unusually high temperatures have increasingly been accompanied by catastrophic floods - in Pakistan, China, Australia and Thailand for example¹⁷- with major impacts on national development, the availability of fresh water and on food security and prices.^{18, 19, 20}
4. Arctic sea ice has reduced in thickness and the minimum summertime extent has decreased by 30% since satellite microwave observations began in the late 1970s. In Greenland, ice mass loss increased by a factor of seven between the mid-1990s and the mid-2000s; in Antarctica, ice loss nearly doubled in the same decade, due to changes in West Antarctica and the Peninsula.²¹ Mountain glaciers are also receding world-wide, contributing to sea level rise²² as well as causing greater floods from snow melt, reduced flows in summer months and implications for fresh water and energy supplies. Measurements of 30 worldwide glaciers have indicated that average mass loss for the decade 1996–2005 was more than four times the amount recorded from 1976-85.²³
5. The vast stocks of methane contained in permafrost and in under-sea clathrates (methane hydrates) are beginning to be released into the atmosphere as warming continues.²⁴
6. Finally, the vast oceans of the planet, critical to the functioning of the carbon cycle and home to some 95% of all life, are now suffering from warming, acidification and pollution at an alarming rate.²⁵

Climate change is not a distinct, stand alone issue. Its impacts affect almost all fields of policy, from energy, water and food security, through poverty and development, to economic growth, competitiveness and world peace and security. Its causes lie intrinsically in the social and economic choices which drive the present path of consumption-driven growth, pollution and waste²⁶ with the consequent overexploitation of the resources of the planet.

We do not, therefore, have a real choice between promoting development or controlling climate change: we must recognize that development and climate issues must be treated together within an integrated strategy. The risks ahead are real, immediate and backed-up by the work of almost all independent scientists competent in the field of climate research.

Although, major international institutions and influential people across the world are now well aware that climate change poses serious problems, this awareness falls short of a full understanding of the scale and urgency of the risks to the future.

It is therefore imperative that the insights of climate science and the realities of the processes already in progress be better understood and recognized by political leaders and decision makers, and by the general public. Further denial and delay will only increase the costs of intervention and the risk that action will come too late to avert the very disruptive and dangerous impacts of unprecedented climate change.

IV. Climate Change: A Growing Threat to Present and Future Generations

1. Climate change is a clear and growing threat. It is occurring more rapidly than anticipated only a few years ago. It is largely driven by the scale and intensity of human activities. It is already causing dramatic impacts on communities across the world, on the natural systems of the planet and on the lives and hopes of hundreds of millions of people.²⁷
2. The climate system is complex and non-linear. It is incorrect to imagine that we will only experience a steady, gradual process of global warming. We also face radical change and unexpected shocks.
3. If unchecked, feedback processes may be unleashed which would accelerate the world towards catastrophic consequences, beyond human influence, leading to the breakdown of the ecological and environmental systems and services on which humanity depends.^{28, 29}
4. As the climate warms, it may pass a tipping point beyond which it will become unstable, causing major, uncontrollable impacts on the life support systems of the planet.^{30, 31} The science is clear: it is crucial to cut emissions deeply and quickly to ensure that the climate system does not pass the threshold to catastrophic climate change.³²
5. No coherent alternative theory or explanation has been advanced to challenge the international scientific and expert consensus that climate change is occurring and that it is driven in large part by human-originated emissions into the atmosphere and by the degradation of the ecological and environmental systems of the planet.
6. Strong and urgent action to curb emissions is essential: incremental change will not be sufficient. The short-term calculus of politics and business must be complemented by the recognition of medium and longer-term risks, consequences and opportunities - which need to be acted on now.
7. Action must be comprehensive and cross-cutting: it must address not only the symptoms but also the fundamental drivers of climate change. National economies must be re-oriented onto a new trajectory of resource- and energy-efficient growth. Experience already demonstrates that this will open up immense opportunities for new economic activities and improved competitiveness, sustainable growth, exports and productive employment.³³

We are at a turning point in human affairs. National leaders cannot escape their clear historic responsibility to preserve the wellbeing, the security and the future prospects of their citizens by acting without further delay to ensure that the climate system remains stable. They must mobilize public support to overcome the powerful and well-financed corporate and financial interests that are committed to preserving their own advantages in the present system. They must support the positive initiatives of civil society and business communities. Denial, delay and failure to act will have devastating consequences.³⁴ We cannot wait until the threats of climate change and environmental breakdown are imminent and clear to the public to take action: by then, it will be too late to influence the outcome.

**Denial, delay and failure to act
will have devastating
consequences**

V. Gambling with the Future: the Risks and Consequences of Alternative Strategies

1. The international negotiations have been based on the assumption that a rise in temperature of 2°C above pre-industrial levels (1750) would be safe, and that the rise in temperature can be limited to 2°C if concentrations of CO_{2e}* can be stabilized below 450 ppm. Neither of these assumptions is now supported by science.³⁵
2. If all the emission cuts proposed in Copenhagen, Cancun and Durban were to be implemented in practice, we would still be on a path to a global average rise of 3.5 - 4.5°C by 2100 with intolerable consequences for our civilization. Scientists and expert institutions across the world are therefore demanding that emissions should be cut rapidly to achieve a target for concentrations of not more than 350 CO₂ ppm.³⁶ This would require not only deep cuts in emissions but also active policies to sequester carbon from the atmosphere.³⁷

**Note: The impacts of human activities on the atmosphere are caused not only by emissions of Carbon Dioxide (CO₂) but also by the emission of other gases such as methane and of particulates etc. To recognize the complex consequences of such emissions, scientists calculate a measure of "CO₂ equivalent", or CO_{2e}.*

In spite of all efforts and commitments to date, we are at present on or above the worst case, business-as-usual scenario of the Intergovernmental Panel on Climate Change (IPCC). According to the International Energy Agency's World Energy Outlook 2011, global CO₂ emissions reached an all time high of 30.4 billion tonnes, with a record-breaking 5.3% increase in 2010. If we fail to implement strong climate policies to cut emissions and we continue on this path, the atmospheric concentration of CO_{2e} (the measure which includes CO₂ and other greenhouse gases) would rise from 440 ppm today to around 850 ppm in 2100, with a 50% chance that global average temperatures would rise by between 5° and 6°C. There is a lower probability but real risk that the outcome would be a rise of 8°C to 9°C by 2100.^{38, 39} This would be catastrophic for humanity and the planet. During the time of the dinosaurs when tropical forests ringed the arctic ocean, temperatures were only 6°C warmer than at present. This indicates the scale of the changes in prospect.

The consequences of such a rise would be devastating – a vast extinction of species, widening desertification and acidification of the oceans, radical change in rainfall patterns, and a further intensifying of the extreme weather events we see today, such as floods, droughts and desertification, fires, etc. A rise in sea level of many meters would be an inevitable consequence of such a rise in global average temperature: the melting of the Greenland Ice Sheet alone, where the temperature rise is double the global average, would lead to a rise of seven meters in sea level. More immediately, a rise of just one meter would for example remove some 40% of the Mekong delta from use for food production and would threaten coastal communities and facilities around the world.

The implications for food and water security for an anticipated world population of 9 billion people by 2050 would be immense. A rise of temperature on such a scale, by unsettling the climate services on which agriculture depends and degrading the life support systems on which humanity relies, would drastically reduce the carrying capacity of the planet. In an interdependent world, there would be little prospect of economic progress, security and peace, even for the rich.

To avoid these risks, the world community of nations has been engaged for several decades in complex negotiations within the United Nations Framework Convention on Climate Change – but these have not so far reduced the rate of emissions or the risks of dangerous climate change. The negotiations are based on three fundamental assumptions. But unfortunately, recent scientific research and a deeper understanding of the dynamics of climate change show that these assumptions are unfounded.⁴⁰

(i) The first assumption is that an increase in global average temperature of 2°C above the pre-industrial level will be safe, avoiding the threats of dangerous climate change. But we see today the alarming consequences across the world of an initial rise of only around 0.8°C since pre-industrial times, around 1750. And, in any case, as stated above, a global average rise of 2°C implies a rise of double this, of 4°C, in critical regions of the world, such as the Greenland ice sheet.

(ii) The second assumption is that the rise in global average temperature can be limited to 2°C if the concentration of greenhouse gases, CO_{2e}, in the atmosphere can be stabilized below 450 ppm.⁴¹ It is now widely understood however that a level of concentration of 450 ppm offers only a 50% chance at best of holding the rise in temperature to 2°C.⁴² With better insight into the dynamics of the climate system, the climate appears to be significantly more sensitive to increasing concentrations of greenhouse gases than had been assumed. The rise in temperature for a given increase in concentrations will very likely be higher than anticipated even a few years ago. This reinforces the case for rapid and deep cuts in emissions.

(iii) The third assumption on which policies are implicitly based is that we need only to manage a steady and continuous process of gradual global warming and therefore have enough time to deliberate and negotiate, to ratify and to act. This is particularly evident from the outcome of the Durban negotiations which envisage ratification and implementation of a new international agreement on emission cuts by 2020. But climate change is the result of the interaction of a variety of connected systems and processes which are non-linear: the most profound risk therefore is that, if the system is pushed beyond a series of 'tipping points', a number of 'positive feedback' processes will be triggered which will cause sudden massive change.⁴³ It is therefore of deep and growing concern that a number of these processes are already beginning to be activated, for example:

- As the atmosphere and the sea surface warm, the area of Arctic summer sea ice diminishes. White sea ice reflects 80% of incoming radiation directly back to space. Therefore, as the area of ice reduces, more energy is absorbed by the ocean and the temperature rises even more, further reducing the area of ice. This process, once started, feeds on itself⁴⁴ and is therefore termed a 'positive feedback loop'. Over the past 30 years, around three million square kilometers of summer ice – the size of India – have disappeared, while 2007 and 2011 have both seen record levels of ice melt. Some experts fear that the 'tipping point' has already been passed whereby the Arctic will be completely ice free for at least part of the summer in the future.⁴⁵
- Forests and other terrestrial and marine ecosystems sequester over 50% of human-generated carbon emissions. As they are destroyed and degraded, and impacted by rising temperatures - which has been occurring for decades - they absorb less of these emissions, and, potentially can instead themselves release vast quantities of CO₂ and potentially, of methane into the atmosphere: the temperature then rises and they degrade further.⁴⁶ Conserving and rehabilitating vital ecological systems such as the Amazon rain forest and coastal mangrove zones is therefore vital to avoid potentially immense consequences for carbon sequestration and for rainfall and weather patterns across the world.
- Particularly important are the vast amounts of methane which are frozen in permafrost and in methane hydrates (clathrates) beneath the oceans, perhaps the largest concentration of energy on the planet. The rate of thaw of the permafrost is now accelerating and the clathrates in the Barents Sea are beginning to give off methane as they warm. This will accelerate global warming, with the consequence that more methane will be released. Igor Semiletov, of the Far Eastern branch of the Russian Academy of Sciences, said in December 2011 that he had, in twenty years, never before witnessed the scale and force of the methane being released from beneath the Arctic seabed.
- Ocean acidification, caused directly by increased CO₂ emissions, has severe consequences for both marine life and the global climate. Mean ocean acidity has increased by 30% in the last 200 years, and if CO₂ emissions continue unabated, it could increase by a further 150-200% by 2100. This rate of change is about ten times faster than anything experienced by the ocean during the last 65 million years. If emissions are not radically and rapidly cut, it will take tens of thousands of years for oceanic pH to return to current levels. Ocean acidification is reducing the absorptive capacity of the ocean's great carbon sink, a crucial element in the carbon cycle, so that in the future more carbon will be retained in the atmosphere and contribute to climate change.^{47, 48}

Once such “positive” feedback processes start, they can amplify the effects of rising concentrations of greenhouse gases and accelerate climate change. Even deep cuts in emissions would then be ineffective to stabilize the climate system.

This potentially non-linear behaviour of the climate system, driven by positive feedback processes, underlines and defines the imperative to take rapid precautionary action to avert the risk of passing beyond tipping points to irreversible climate change. It is precisely to prevent this ‘runaway’ climate change that many scientists consider there to be a need for emergency action to cut emissions.

In this perspective, the agreements reached in Durban which call for international agreement on emission cuts by 2015, to be ratified and implemented by 2020, are clearly inadequate in relation to the scientific consensus that global emissions must peak by the middle of the current decade and then decline rapidly to have any chance of containing the rise in temperature to 2°C.

It is far from certain that the current strategy of the international negotiations to limit the rise in concentrations of CO_{2e} to 450ppm and thus - according to their assumptions - to limit the rise in global average temperature to 2°C, will, even if implemented, avert the risk of catastrophic climate change. In addition, the emission cuts actually proposed at present would be entirely inadequate to achieve this 2°C outcome.⁴⁹ The imperative is not only to stabilize concentrations but to reduce them, after a peak, to a safe level very likely below that of today.

The levels of emission cuts pledged at COP 15 in Copenhagen, reaffirmed at COP 16 in Cancun and at COP 17 in Durban, would still lead to atmospheric CO₂ of 885ppm, and a likely temperature rise of 4.5°C by 2100,⁵⁰ with disastrous consequences. Sea levels would very likely rise 2 meters by 2100 and continue rising thereafter. This was recognized by governments at Cancun, where the Conference of the Parties agreed “to work to stay below 2°C with a clear timetable for review to ensure that global action is adequate to meet the emerging realities of climate change”. Delegates in Durban expressed their “grave concern” over the difference between the emissions cuts they have pledged to and what they need to achieve their stated goals. This increasingly inexcusable ‘ambition gap’ - resulting in a gaping ‘gigatonne gap’ - needs to be closed. On the positive side, at COP 17, for the first time all States - developed, emerging and developing - committed to negotiate a global climate change agreement.

The fundamental failure of the political process to address the risks of dangerous climate change have been underlined by the Executive Director of the International Energy Agency, Maria van der Hoeven. In relation to the Clean Energy Ministerial Conference in April 2012, she warns that: “governments are falling badly behind on low-carbon energy, putting carbon reduction targets out of reach and pushing the world to the brink of catastrophic climate change... The world’s energy system is being pushed to breaking point. Our addiction to fossil fuels grows stronger every year. Many clean-energy technologies are available but they are not being deployed quickly enough to avert potentially disastrous consequences... the world is on track for warming of 6°C by the end of the century, a level that would create catastrophe”.

In summary:

- **our current path of steadily increasing emissions is destabilizing the climate and destroying the ecological systems on which we depend;**
- **the international negotiations intended to contain the threats of climate change are aimed at targets which will not avert the risks of catastrophic climate change;**
- **the level of ambition of the cuts envisaged in Durban would allow a rise of around 4°C by 2100, with devastating consequences;**
- **in addition, the systemic nature of the processes which drive climate change entail the risk of non-linear effects, leading to sudden change and the triggering of runaway climate change, beyond human influence, which the multilateral negotiations are not addressing.**

It is urgent to revise international, national and local strategies in the light of these realities and risks and to take strong and rapid action to achieve deep cuts in emissions to ensure that the warming of the atmosphere does not trigger runaway climate change.

Powerful action is required to manage the risks of accelerating climate change: investment in R&D must be increased to generate innovative, breakthrough solutions but we cannot rely on technological fixes alone to save us

VI. Positioning Climate Change in its Wider Context

1. To avert the threats of climate change, we must address its underlying causes, which lie in the unsustainable model of consumption-driven, fossil-fuel based economic growth - with the consequent waste, pollution and overuse of resources - followed by industrialized states, and more recently adopted by emerging economies,⁵¹ coupled with the impacts of a rising middle class and a growing world population on the environment. We will not be able to avert the threats of climate change unless we change the trajectory of economic growth and transition away from the fossil-fuel based energy system on which it now depends.
2. Climate change is one of an array of connected challenges and cannot be treated as a distinct, stand-alone issue. It intersects with demographic change, ecosystems and environmental degradation, economic growth, energy use and development. Measures to contain the threats of climate change through mitigation and adaptation must be integrated within a wider economic, environmental and social strategy to make our economies and societies sustainable for the future.⁵²
3. It is an illusion to imagine that we can meet even the most basic needs and aspirations of 9 billion people by 2050 and preserve world peace if we fail to avert the impacts of dangerous climate change.⁵³ There is no real choice between development and the mitigation of climate change: development in many regions of the world will be nullified if climate change is not restrained.
4. A further rise in temperature is inevitable with the consequent escalation of environmental impacts,⁵⁴ regardless of the future steps taken to mitigate climate change. Substantial resources must therefore be devoted to adaptation, to humanitarian assistance to offset the impacts of climate change and to increasing the capacity of vulnerable communities to prepare for and cope with them.
5. Strategies to address the issue of climate change must respect justice and human rights if they are to have any legitimacy. Within a framework of common but differentiated responsibilities, those who are the victims of climate change must be fully engaged in the search for solutions, and the interests of future generations must be taken into account.
6. Climate change is a truly global issue demanding agreement, cooperation and concerted action at the international level. However, the urgency and scale of the threats are such that those who are ready to act must move ahead, if necessary leaving behind those unwilling to engage in a concerted international effort.

To understand and act on climate change, we must see it in its context. It is essentially a systemic problem, critically connected to many other issues, such as the degradation of terrestrial and ocean ecosystems, the availability of fresh water, the overuse of energy and resources, continuing increase in consumption, pollution and waste, and the development needs of a growing world population.

In a world in which excessive wealth coexists with abject poverty, humanity as a whole is living beyond its means.

Exponential increases in economic growth, driven largely by the demands of developed countries, and more recently increased by rising consumption in emerging economies, are over-stressing and degrading the natural systems of the planet. As natural capital is overused and ecosystems degrade, they absorb less of the emissions pumped by humans into the atmosphere,⁵⁵ leading to an increase in the rate of climate change.

The vital biodiversity and the terrestrial and ocean ecosystems on which we directly depend are particularly damaged by accelerating climate change. According to UNEP, around 17,000 plant and animal species are already at risk of extinction today.⁵⁶

IPCC has concluded that a rise of 0.1°C in a decade puts 15% of the affected species at risk, and temperatures in many parts of the world are rising faster than that. This crucial link between climate and the conservation of the biosphere must be reflected in policy through major efforts to avoid deforestation and to recover degraded lands.

The impacts of climate change on the oceans and on marine ecosystems are of crucial importance. Oceans, where life originated and where 95% of life on this planet resides, play a fundamental role in the carbon cycle, absorbing some 25% of anthropogenic emissions. This crucial process of carbon sequestration is now being degraded by the rising acidification and warming of the oceans. And the oceans are under assault through multiple other human activities from overfishing to pollution, including the relentless flow of nitrogen-rich fertilizers into the oceans leading to deoxygenated 'dead zones' where life has ceased.

Strategies to reduce the concentration of greenhouse gases in the atmosphere must therefore incorporate measures to reduce emissions with measures to restore and enhance the ocean and terrestrial ecosystems of the planet.

Another crucial link is between energy and climate. Industrialized societies have been based on cheap and readily available energy derived from fossil fuels, and climate change is driven in large part by this addiction to fossil fuels. In its central scenario for 2011, the International Energy Agency forecasts that global primary demand for energy will increase by one-third between 2010 and 2035, with 90% of the projected growth in demand coming from non-OECD countries, including 30% from China.⁵⁷

However, to preserve a viable and stable climate, emissions must be dramatically cut over the same period (by around 80% by 2050)⁵⁸ if we are to maintain the possibility of keeping the global average rise in temperature below the 2°C, the level at which it has been assumed that the impacts of climate change would be manageable. This will require not only aggressive cuts in CO₂ emissions but also in non CO₂ emissions such as methane and black soot within an integrated strategy to reduce concentrations of both short-lived and long-lived greenhouse gases in the atmosphere.

The scale of this challenge can be seen from the following perspective: to have a 75% chance of containing the rise in global average temperature to less than 2°C, total cumulative global emissions between 2000 and 2050 must be limited to less than 1000 billion tonnes CO_{2e}.

This would require net global emissions to peak before 2020 and then to reduce to near zero by 2100.

Achieving this goal, while meeting the energy needs of a world population of around 9 billion, is a central challenge for climate change abatement, requiring the restructuring of energy systems to allow a shift to more renewables and increased energy efficiency. As we move into the period of peak oil, where escalating demand cannot be met by increasing supply, the restructuring of the energy system on which economic activity depends will become a central concern, intimately linked to measures to avert dangerous climate change. This remains true even as the rush to exploit unconventional sources accelerates. These have substantial environmental consequences, they produce added emissions and they have low "Energy Returns on Energy Invested".

Expert studies warn that the threat of fossil-fuel supply limitations must be a central factor when considering the risks of climate change and planning strategies to tackle them, and stress that our reactions to the threat of peak oil must not aggravate climate change. Both phenomena in fact require the same approach: a swift movement away from fossil-fuel dependence. Peak oil may stimulate faster action in this direction, especially in light of recent observations that, since 2005, conventional crude oil production has not risen to match increasing demand, effectively indicating that oil markets have already reached a critical tipping point.⁵⁹

The threats arising from climate change will only be resolved through coherent, integrated strategies at the national and global levels to limit the concentration of greenhouse gases in the atmosphere by moving systematically towards low- or zero-carbon economies. These strategies must cut across entrenched disciplines, sectoral boundaries and special interests to integrate the critical facets of policy, including policies to achieve resource-efficient "green" growth, to restructure energy systems, to reverse the destruction of ecosystems and natural capital and to achieve inclusive and sustainable world development. Disconnected, incremental short-term responses have proved ineffective so far and will not be sufficient to avert the systemic risks of catastrophic climate change.

Coherent and integrated strategies are urgently needed to avert the systemic risks of catastrophic climate change

VII. The Economic Case for Action

It is becoming increasingly clear that the current path of economic growth is failing in many respects to achieve the central goals of societies across the world: it is generating wide inequalities in wealth and income and excluding billions of the poor from the benefits of progress; it is failing to provide adequate levels of productive employment and eroding social cohesion; it is unsustainably overusing the resources of the planet and destroying the life-support systems on which humanity depends; and it is destabilizing the very particular climatic conditions which have enabled the development of our civilization. Ever larger numbers of people are calling for fundamental changes.

The Stern Review on the Economics of Climate Change published in 2006 concluded that the benefits of strong, early action on climate change far outweigh the costs which we will incur if action is delayed, or if we fail to act. More recent evidence of the accelerating impacts of climate change across the world, coupled with deeper understanding of the systemic risks ahead, has further reinforced this conclusion. For example, the IEA stresses that delaying action is a false economy as, for every US\$ 1 of investment in transforming the power sector avoided before 2020, an additional US\$ 4.3 will need to be spent subsequently to compensate for the higher emissions.⁶⁰

Major future costs will be avoided by early action. For example, the costs associated with rising sea levels increase exponentially as levels rise. Early action can reduce these costs and also the cost of damage from more intense tropical storms and floods, all point to the wisdom of taking urgent preventative mitigation and adaptation actions.

Expenditures on measures to avert catastrophic climate change should not be seen simply as a cost to society: they will prove to be vital investments in the future. Even within the narrow economic calculus, which relegates social and environmental consequences to the status of externalities, significant concrete financial gains can be identified in reduced fossil fuel subsidies and import bills, investments in new energy infrastructure and technologies, and employment opportunities.

The claim that environmental responsibility, emissions reduction and resource efficiency are somehow bad for competitiveness and growth is a myth.

The transformation of industries to become less carbon-intensive and more resource efficient will reduce their costs, provide new avenues for investment and growth, and improve their competitiveness.

Low-carbon development is a booming industry. New investments in clean energy rose by 22% in the year ending June 2011, amounting to US\$ 41 billion globally.⁶¹ UNEP now values the sector at a record US\$ 211 billion. The global wind power market rose 6% in 2011, led by China, and now employs over 700,000 people worldwide.⁶² Wind power has made up more than a third of all new U.S. electricity generation in recent years and is on track to providing 20% of the nation's electricity by 2030. Many businesses are not waiting for a global climate deal, but are already coming up with innovative ways to become more resource efficient and driving positive change forward, to the benefit of their shareholders.

Forestry, which represents 12% of global CO_{2e} emissions through deforestation and degradation, presents major possibilities by creating win-win situations where land is worth more with trees than without. At a price of just US\$ 10 for every tonne of unreleased emissions, areas of Amazon forest can generate several times more income from carbon markets than from deforestation for pasture. Other prospects arise from restoring already degraded lands. In Niger, one of the world's poorest nations, a program to support the regeneration of trees has benefited 4.5 million people, improved food production and farmers' income, and created a new market.

As many nations struggle with unemployment, the rise of 'green jobs' is a welcome source of stable, skilled employment. In Germany, more than 340,000 new jobs have been created in the renewable energy sector in the last ten years, and soon more people are projected to work in this sector than in the automobile industry - signalling a major shift in national priorities. In the U.S., more people now work in the solar industry than in steel production, and the solar job growth rate from 2010 to 2011 was ten times that of the overall economy.⁶³

A recent study calculates that, if the EU raised its climate target from 20% to 30% emissions reductions, it could increase economic growth by 0.6% per year, raise GDP by up to US\$ 842 billion and create 6 million new jobs by 2020.⁶⁴

By contrast, many economic processes and structures remain deeply entrenched in the fossil fuel based paradigm. Despite all evidence calling for the reverse, in 2010, fossil fuel subsidies reached an all-time high of US\$ 409 billion, compared with just US\$ 66 billion for renewable energy. Subsidising fossil fuels encourages continued wasteful consumption and greatly undermines the development and competitiveness of low-carbon alternatives.⁶⁵

The development of new policies to manage the threats of climate change and to respect the realities of the natural world offers a myriad of positive opportunities to generate the new ideas, new policies and new partnerships that are needed to overcome the present economic crisis by re-orienting and restructuring our economies on to a more sustainable, resource-efficient and inclusive path. Those who act early are already benefiting: those who fail to act – whether countries or corporations – are falling behind.

We can no longer accept the long-entrenched concept that exponential, market-driven growth in material consumption is the determinant of human progress. Our current strategy relies on the stimulation of demand to renew growth and employment although it is excessive material consumption, pollution and waste which are destroying the climate and the life-support systems of the planet. It therefore makes little sense to struggle to return to the pre-crisis path of economic growth which was clearly unsustainable.

This is not a plea for zero growth. We must radically restructure our economies onto a path which is fundamentally resource and energy efficient, which respects the value of natural capital and ecosystems services and which includes the poor in the benefits of progress. A strategy which focuses on climate change as a specific issue will for all these reasons not succeed.

Climate change is in fact a symptom of deeper causes in our economies and societies, which lie in the patterns of material-intensive consumption and production which we have chosen in order to achieve economic growth as measured by GDP. We must identify these root causes, the drivers of climate change, and develop coherent strategies to deal with them if we are to avert the risks of catastrophic climate change.

It is essential and urgent that the present strategies and policies for economic growth be radically changed. This has major implications far beyond the methodology of the calculus of GDP, although this too must be substantially revised.

The failures of the present models of growth must be corrected: the analysis of choices, risks and opportunities must take proper account of “externalities”; the value of natural capital and of ecosystems services must be fully recognised; the real value of public goods must be integrated into policy analysis; the interests of future generations and the longer-term consequences of policies must be integrated into the selection of policy options; and fairness in the distribution of costs and benefits, of income and opportunity must be reflected in the consideration and execution of policy and the monitoring of national and world progress.

Improved environmental performance coupled with increased energy and resource efficiency and conservation will help reduce costs, improve competitiveness and provide new avenues for investment, employment and growth

VIII. Salvaging the Future: Lines of Action to Master the Threats of Climate Change

1. Implement Urgent and Deep Cuts in Emissions

The first objective must be to limit the scale and impact of future climate change by cutting emissions rapidly and deeply. Developed countries have benefited from the exploitation of fossil fuels on a massive scale for decades, contributing largely to the present concentration of greenhouse gases in the atmosphere. In accordance with the established principle of “common but differentiated responsibilities”, they thus face a major responsibility to lead in cutting emissions to avert the risks of catastrophic climate change. However, the emissions cuts required to maintain a safe climate (with average temperature rise below 2°C) cannot be achieved without action from all states, and in particular all large CO₂-emitters including the major emerging economies. As a step in the right direction, COP 17 in Durban did achieve a limited measure of agreement on international cooperation as the way forward to lay the foundation for deeper cuts in the future.

Substantial cuts – of more than 20% of CO₂ emissions – must be made by all developed countries by 2020 to preserve any hope of limiting temperature rise to 2°C, and these cuts must be backed up by a clear and binding program of further substantial cuts globally by 2050.⁶⁶ Future negotiations should also consider the fact that the current system, under which it is the state where a good is produced that is held responsible for the associated carbon emissions, rather than where it is consumed, is weighted heavily in favour of states which import a large portion of their manufactured goods. This effectively means that consumers in the ‘importing’ states have outsourced a large portion of their carbon emissions to ‘producer’ nations. A fair means of sharing responsibilities for these ‘offshored’ emissions should be established.

There is an opportunity to build effective cooperation between developed and developing countries so as to achieve rapid and deep cuts in both CO₂ and non-CO₂ emissions and thus to reduce concentrations of short-lived and long-lived greenhouse gases in the atmosphere.

The urgency for action is underlined in a recent report by the International Energy Agency, which estimates that if action is not taken rapidly then by 2017, all the emissions permitted if we are to preserve the 2°C scenario (450ppm CO_{2e}) will be locked-in by the energy infrastructure then existing.

As stated by Lord Nicholas Stern in Durban, “Climate change and sustainability are urgent issues that require immediate action – they cannot be delayed by endless political wrangling.”

Jim Leape, Director General of WWF International was even more direct: “We face a huge failure of ambition: nothing here will keep us out of catastrophic climate change.” Nnimmo Bassey, Chair of Friends of the Earth International, reflecting on the grave impacts of climate change in Africa summarized the view of many: “The Durban outcome shows no sense of urgent action in the face of a planetary emergency – just a promise to start a whole new round of negotiations on a whole new treaty, when we already have a treaty, delaying action to 2020 if we are lucky, by which time it will be too late.”

The massive flows of funds required for the structural transformation of the energy sector and the economy will mainly come from private sources, but the role of government is key to stimulating and guiding this process by:

- a) establishing clear goals and targets to promote the stable, long-term market development of low-carbon alternatives;
- b) creating a framework of regulation and incentives which encourages and sustains research and accelerates investment in the technologies and activities of the green economy;
- c) assigning a meaningful price to carbon through a carbon tax and/or an emission trading scheme. As long as fossil fuels enjoy a substantial effective subsidy against renewables, and fossil-fuel related emissions can be pumped into the atmosphere or the local environment destroyed at little or no cost to the producer, their use will expand regardless of the consequences for the climate, the environment and public health;
- d) dedicating more funding from public budgets to stimulate new green enterprises, in particular by transferring funds saved through energy efficiency or reductions in fossil fuel subsidies, for example (see VII above);

- e) working with the private sector to remove remaining barriers to the more widespread deployment of renewable energy and other low-carbon solutions;
- f) focusing – and urgently implementing – explicit policies for the rapid improvement of energy efficiency – in buildings (which account for about one third of all global greenhouse gas emissions), in transport and in infrastructure. The polluter-pays principle should be more extensively applied in order to increase incentives to conserve energy and reduce emissions. It is absolutely vital to avoid the “lock in” of inefficient energy technologies over decades to come. In this area in particular, the role of cities and regions is central;
- g) eliminating the subsidies which today provide perverse incentives for the use of fossil fuels.

2. Preserve Natural Capital and Restore Ecosystems

Cutting emissions is clearly a top priority, but the ultimate objective must be to limit the level of the concentration of greenhouse gases in the atmosphere. It is therefore vital to enhance the capability of terrestrial and ocean ecosystems to absorb and store carbon. This will reduce the net emissions from human activity into the atmosphere. A key issue is that the value of terrestrial and ocean ecosystems and of natural capital is not reflected in the measurement of GDP or in the accounting of mainstream economics. This must change if policies are to reflect real costs and values, including environmental ‘externalities’.

Major programs not only of afforestation and the prevention of deforestation (as already under negotiation in the REDD+ process) but also for the recovery of degraded lands, will not only reduce emissions and sequester additional carbon from the atmosphere, but can also provide employment while helping to generate sustainable and resilient local economies and preserve and restore biodiversity and ecosystems.⁶⁷ It is vital that such initiatives be developed on a case-by-case basis, with the full engagement of affected communities and cultures.

Important untapped resources in this area are the carbon contained in productive soils, and the ‘blue carbon’ held by marine ecosystems such as mangroves and sea-grasses, which to date has not been incorporated in climate accounting even though limited observations suggest that they amount to more than five times the carbon held in terrestrial forest.

These ecosystems are also being destroyed at an alarming rate, causing large quantities of carbon to be released into the atmosphere. Their protection would have added benefits for fisheries, tourism and coastal protection. Incentives to protect these ‘blue carbon’ sinks - and a potential source of sustainable income for local communities - would be created through their effective inclusion in official carbon markets and as a potential component of national emissions accounting.

In this context it is important to recognize that proposed approaches to geo-engineering, which seek to mitigate the rise in global temperature by limiting incoming radiation from the sun, can do nothing to reduce the devastating consequences of acidification of the oceans and the destruction of marine ecosystems: there is in fact no real alternative to the cutting of anthropogenic emissions and the preservation of natural carbon absorption capacities.

Strategies to avert the threats of adverse climate change and strategies to preserve the vital ecosystems of the planet on which humanity depends are essentially linked. Measures to manage the threats must therefore be integrated with measures to prevent the extermination of species and to restore the ecological foundations of the natural world.

3. Undertake Rapid Adaptation to the Inevitable Impacts of Climate Change

Whatever the success of steps towards mitigation may be, climate change is already having major impacts across the world, particularly on food and water security and the livelihoods of the poor and disadvantaged in developing countries⁶⁸ and increasingly also in developed countries. And we are already locked in to more warming. For vulnerable developing countries, support for adaptation to the inevitable consequences of climate change is therefore an essential, urgent priority. For the industrialized countries, providing such support is a moral imperative as they are largely responsible for the impacts of climate change. Immediate action is needed as vulnerable communities are already suffering, and local resources are inadequate to this scale of threat.

The Green Climate Fund now under negotiation, aimed at disbursing US\$ 100 billion per year for adaptation, is an essential first step.

The planned level will not, however, be adequate to meet the scale of the support required, as the now inevitable impacts and pressures arising from climate change will have major implications for huge numbers of people, potentially threatening major capital cities and the ability of states to function.

Lives and property in developed states will not be immune from the impacts of climate change. Storms, heat waves, fires and floods are already occurring in many industrialized countries and creating new challenges for disaster preparedness, coastal defences, urban planning and the insurance industry. A recent report by the National Intelligence Council of the United States identified two dozen nuclear facilities as being at risk from rising sea levels. Scientific understanding of the linkages between extreme weather events and global warming is rapidly becoming more solid. The scale of such impacts will increase as climate change intensifies.

4. Strengthen Capacities and Resilience

Measures for both mitigation and adaptation are situation specific: solutions must be found to meet the particular circumstances in each case. This implies that human capacities at the local level must be strengthened through education, training and access to knowledge, information and technology so that targeted solutions for mitigation and adaptation can be developed. A significant part of the response to climate change can be achieved by supporting the development of sustainable local economies and communities which can find their own innovative solutions to meet local needs for food, energy, water and human security. A greater focus on the transfer of technology and on education and the development of human capital, together with improved capacities for management and implementation, will also strengthen the resilience of societies to the sudden changes that can be expected as the non-linear processes of climate change proceed.

Additional innovative financial instruments and mechanisms must be developed to strengthen the ability of vulnerable communities to predict, understand and prepare for the risks posed by rising sea levels and other climate related threats, which can completely overwhelm the resources of a developing country and reverse decades of development efforts. Acting now will increase resilience to the threats, and serve to reduce damage and costs.

Capacity building and planning at local, regional and national levels must be given more urgent attention, and aided by technology sharing and joint programs.

As underlined by a recent report by Oxfam and CNA, the need for humanitarian assistance will also increase in response to the impacts of climate change, especially of natural disasters, extreme weather events, diminished water resources and a gradual reduction in the capacity of productive but fragile lands to support human life under the assault of rising temperatures, increasing populations and environmental breakdown.⁶⁹ These impacts and pressures will inevitably have major implications for the internal displacement and migration of large numbers of people with the consequent threats to stability, security and governance.

5. Develop Radical New Solutions

The dissemination of existing technologies, knowledge and best practice will play a vital role and can achieve rapid results, for example in improving energy efficiency and conservation and encouraging the rapid deployment of proven low cost solutions across the world. These include the widespread use of renewable technologies, increased use of public transport and of energy-efficient cars, the massive savings that can be gained through more efficient buildings and the greening of cities, as well as improvements in land use and resource conservation such as restoring forests and mangroves and harvesting rainwater. But the transformations required to meet the challenges of accelerating climate change cannot be met through existing technologies and established solutions alone.

Enormous opportunities are opening up where basic and applied scientific research and innovation can generate new technological solutions in such vital areas as alternative energy sources and energy efficiency, low-carbon transport, food production, nutrition and health, resource efficient production, the purification and conservation of water, and the clean-up of pollution. This underlines the need for substantial increases of investment in basic and applied research and the rapid dissemination of innovation, knowledge and technology. The kind of active encouragement, incentives and funding that fuelled the information-technology revolution of the past twenty years should be directed at the generation of low-carbon innovations worldwide. This should be achieved by partnerships between governments, private enterprise and universities and other research institutions.

6. Reorient Economies on to a Sustainable Path

Specific policies for adaptation and mitigation are urgently necessary to respond effectively to the challenges of climate change and sustainability, but they will not be sufficient. To correct the underlying causes of climate change, it will be essential to restructure economies and energy systems on to a more productive, sustainable, inclusive and equitable path. To meet the needs and aspirations of a world population of over 9 billion people by 2050, continuing economic progress will be essential to generate the investment and resources required. But, if exponential growth continues on the present energy and material intensive trajectory, this will certainly destabilize the climate and overwhelm the environmental capacities of the planet.

To resolve this fundamental dilemma, the focus of strategy must be placed on achieving a new quality or content of growth so as to improve human welfare and security within the real environmental limits of the planet. At both the national and the international levels, policies and responsibilities for mitigation and adaption must therefore be integrated within coherent strategies for sustainable and inclusive growth. To achieve the transformational change which is required in behaviour, policies and action will call for concerted efforts by all partners, including civil society, academia, cities and communities, business and government. Structures and procedures for decision making and governance must be adapted to integrate climate change strategies within the core activities of government, not only within the competences of ministries of the environment. Climate change must become a central determining factor in all economic and other important policy decisions and strategies at every level of government.

7. Mobilise the Essential Financial Resources

Governments must play a key role in climate finance by establishing a sound and stable framework, both national and international, to provide the clear and predictable signals needed by markets to facilitate the flow of private finance and investment. They must also provide the conditions that will engage the private sector and all social partners in a concerted global effort to avert the impacts of climate change on the natural life-support systems of the planet. The finance required from official, governmental sources will be small in relation to the scale of flows required from other sources, but public finance will be critical to demonstrate commitment, to provide incentives and to ensure stability.

Above all, public finance will be crucial to directly address the elements which may otherwise be left largely unresolved by private flows of finance, such as adaptation, humanitarian assistance, education, environmental protection, capacity building and basic research.

Clear government decisions sustained over time, for example on carbon-pricing, will provide the strong and predictable incentives which are essential to trigger research, innovation and investment and the implementation of change on the scale required. Public finance must not be directed at preserving the status quo under the pressure of special interests but should be aimed at stimulating innovation, generating new opportunities for employment and growth and building the foundations for the new resource-efficient, sustainable economies for the future.

A global policy framework is essential to define the conditions and financial arrangements for concerted international action on the truly global challenge of climate change. But action cannot await – and is not awaiting – the outcome of international negotiations. The climate issue will be resolved through a diverse array of activities and financial flows in many contexts and conditions: action by city administrations, by corporations, by communities, by regions, and individual nations will all contribute, supported by the efforts and commitment of individuals to change their own behaviour and to insist on environmentally and socially responsible policies and products. It is a key role of government to stimulate such decentralized solutions.

We cannot manage the scale, complexity and dynamics of the 21st Century with the tools of the 20th. We are at a turning point in world history where new ideas, new values, new strategies and new institutional arrangements are needed. We have learned that we cannot rely solely on “the magic of the market place.” Nor can we rely on technological solutions to save us from ourselves. We know that business as usual will lead to disaster. We must find the vision, the leadership and the creativity to collaborate in developing constructive solutions to offer a decent future to present and succeeding generations. The lines of action proposed above have the potential to move the world economy onto a sustainable and equitable path. We have the capabilities: we must find the will.

IX. Conclusions

Evidence from across the world, together with deep scientific understanding of the processes at work, combine to demonstrate that the intensifying impacts of climate change, if uncorrected, will undermine the foundations of our economies and societies within a relatively short period and will compromise the prospect for security and peace and the opportunities for future generations.

Successful strategies and innovations in both the public and the private sectors have shown that strong and clear policies to address climate change can produce major benefits and lead to a better, more sustainable world of harmony between humanity and nature.

However, governments and world leaders are preoccupied by what are perceived as being more immediate issues, and have not recognized the scale and implications of the climatic and environmental changes in progress, as now well understood by science. International negotiations have so far proved ineffective in generating the concerted global action urgently required to avert the threats of catastrophic climate change.

Emissions continue to grow after twenty years of international discussion. However, action is moving ahead fast through many channels across the world, at the level of communities, cities and states, through innovation and the development of new “green” goods and services in the private sector, and through the pressures and efforts of the myriad of organizations and entities which constitute civil society.

Leaders must now recognize that concerted action to confront the realities of climate change cannot be further delayed. The central challenge is, by the effective anticipation and management of risk, to avoid any possibility of triggering catastrophic climate change and to manage the inevitable impacts of climate change so as to preserve the prospects for world development and peace.

In a spirit of solidarity, the international community must take full account of the enormous consequences of climate change on the poor and underprivileged of the planet and on the prospects of young people and future generations. This is not only a historic challenge and responsibility but also an enormous opportunity to lay the foundations of the resource-efficient, sustainable and inclusive societies of the future.

“Climate change is only the tip of the systemic crisis we face. It poses existential threats to global stability and security that can shake the foundations of modern civilisation. It will exacerbate the escalating challenges of poverty, social inequality and the crises of food, water and energy across the world and threatens to disrupt the lives and unleash the migration of millions of people.

The biggest challenge of the next decade will therefore be to counter this systemic crisis with comprehensive solutions based on scientific knowledge focused directly on the causes and impacts of climate change while overcoming the pressures of various vested interests and of business-as-usual politics.

The outcomes are not predetermined. They will depend both on events and on our purposeful actions. And change must start with leadership, whether in politics, business, science or civil society. The science, including the science of climate change, is clear. Civil society is on board. The onus is now on government and business leaders to act.”

Mikhail Gorbachev

X. References

1. US National Oceanic and Atmospheric Administration. Extreme Weather 2011 (2012)
2. International Energy Agency (IEA). World Energy Outlook 2011 (2011)
3. Swedish Ministry of the Environment. Towards a Low Carbon Society (2008)
4. UNEP. Overview of the Republic of Korea's National Strategy for Green Growth (2010)
5. IPCC. Climate Change Synthesis Report (2007)
6. Ibid.
7. Le Quéré, C. et al, Trends in the sources and sinks of carbon dioxide, *Nature Geoscience*, 2 (2009: 831-836)
8. Le Quéré et al. (2009: 831-836) and Caillon, N. et al, Timing of atmospheric CO₂ and Antarctic temperature changes across Termination III, *Science*, 299 (2003: 1728-1731)
9. UNFCCC. Climate Change: Impacts, Vulnerabilities and Adapting in Developing Countries (2007)
10. Le Quéré et al. (2009: 831-836)
11. IPCC. Climate Change Synthesis Report (2007)
12. NASA. NASA Research Finds 2010 Tied for Warmest Year on Record. *Research News* (2011)
13. Earth Policy Institute. 2010 Hits Top of Temperature Chart (2011)
14. WMO Press Release no. 906 (2011)
15. IPCC Executive Summary (2007: 4)
16. Lu, Jian et al, Expansion of the Hadley cell under global warming, *Geophysical Research Letters*, 34 (2007)
17. World Bank. Climate risks and adaptation in Asian coastal megacities: a synthesis report (2010)
18. IPCC Executive Summary (2007)
19. FAO. Climate Change and Food Security: A Framework Document (2008: 11)
20. UNEP. Calendar of events 2010 (2011)
21. Steffen, K. et al, Cryospheric Contributions to Sea-Level Rise and Variability, in *Understanding Sea-Level Rise and Variability* (2010)
22. Milly, P. C. D. et al, Terrestrial Water-Storage Contributions to Sea-Level Rise and Variability, in *Understanding Sea-Level Rise and Variability* (2010)
23. 21 issues for the 21st Century: Results of UNEP Foresight Process on Emerging Environmental Issues (2012)
24. Shakhova, Natalia et al, Extensive methane venting to the atmosphere from sediments of the East Siberian Arctic Shelf, *Science*, 327(2010)
25. UNEP. Environmental Consequences of Ocean Acidification: A Threat to Food Security (2010)
26. Brundtland, G. (ed.), *Our Common Future: The World Commission on Environment and Development* (1987)
27. IPCC. Climate Change Synthesis Report (2007: 30)
28. Rockström, J. et al, A safe operating space for humanity, *Nature*, 461 (2009: 472-475)
29. IPCC. Climate Change Synthesis Report (2007)
30. Scheffer, Marten et al, Early-warning signals for critical transitions, *Nature*, 461 (2009: 53-59)
31. Hansen, James. Storms of my Grandchildren (2009: 144)
32. Hansen, James et al, Target Atmospheric CO₂: Where Should Humanity Aim? (2008)
33. Scott, Jonathan (2011)
34. Hansen, James et al. (2008)
35. Ibid.
36. Ibid.
37. van Vuuren, D. et al, RCP 2.6: Exploring the possibility to keep global mean temperature increase below 2°C, *Climate Change*, 109 (2011)
38. IPCC AR4 (2007)
39. van Vuuren, D. et al, The representative concentration pathways: an overview, *Climate Change*, 109, (2011)
40. Hansen, James et al. (2008)
41. IPCC AR4 WGI (2007)
42. Ibid.
43. National Research Council (2003: 16)
44. Serreze, Mark C. et al, Perspectives on the Arctic's Shrinking Sea-Ice, *Science*, 315 (2007: 1533- 1536)
45. National Snow and Ice Data Center, www.nsidc.org (2011)

46. Miller, John B. (2008)
47. Turley, C.M. and Findlay, H.S., Ocean acidification as an indicator for climate change, in Climate and Global Change: Observed Impacts on Planet Earth (T. M. Letcher, ed.) (2009)
48. Zeebe, R.E. and Ridgwell, A., Past Changes of Ocean Carbonate Chemistry, in Ocean acidification (J.-P. Gattuso & L. Hansson ,eds.) (2011)
49. European Commission. A Roadmap for Moving to a Competitive Low Carbon Economy in 2050(2011)
50. The Climate Interactive Analysis, scientifically-reviewed climate simulator (2012)
51. UNEP. UNEP Yearbook 2011 (2011)
52. UNEP. UNEP 2010 Annual Report (2011: 31-33)
53. UNEP Disasters and Conflicts: Introduction
54. Hurtley, Stella and Szuromi, Phil Ed., This Week in Science, Science, 307 (2005: 1687)
55. UNEP. Towards a Green Economy: Synthesis for Policy Makers (2011)
56. UNEP. Biodiversity Loss is Bankrupting the Natural Economy (2010)
57. International Energy Agency (IEA), World Energy Outlook (2011)
58. European Climate Foundation. Roadmap 2050 (2010)
59. David King and James Murray, Oil's Tipping Point has Passed, Nature, Vol. 481, 26 Jan. 2012
60. International Energy Agency (IEA), World Energy Outlook (2011)
61. Bloomberg New Energy Finance. Stronger quarter for clean energy investment, as solar thermal projects attract billions of dollars (2011)
62. Global Wind Energy Council, Release of global wind statistics: Wind Energy Powers Ahead Despite Economic Turmoil (2012)
63. The Solar Foundation, GreenLMI and Cornell University, National Solar Jobs Census (2011)
64. A New Growth Path for Europe: Generating Prosperity and Jobs in the Low-Carbon Economy, European Climate Forum et al, commissioned by the German Federal Ministry for the Environment (2011)
65. International Energy Agency (IEA). World Energy Outlook 2011(Factsheet 2011)
66. European Commission. A Roadmap for Moving to a Competitive Low Carbon Economy in 2050 (2011)
67. UN-REDD. Programme Strategy 2011-2015 (2011)
68. UNFCCC. Climate Change: Impacts, Vulnerabilities and Adapting in Developing Countries (2007)
69. Oxfam and CNA Report: An ounce of Prevention: Preparing for the Impact of a Changing Climate on US Humanitarian and Disaster Response. (June 2011)

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Note: Not all members of the Task Force and Associates necessarily agree with all the elements in this statement but endorse the general ideas and principles contained in the document.

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Annex 2 - List of Endorsements (as of June 13, 2012 - Endorsement in Process)

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Annex 3 - Institutional Endorsement (as of June 13, 2012 - Endorsement in Process)

Organization	Description
Club of Madrid	Independent non-profit organization composed of more than 80 democratic former Presidents and Prime Ministers from 56 different countries.
ICLEI	Local Governments for Sustainability is an association of over 1,220 local government Members who are committed to sustainable development.

Annex 4 - About Green Cross International

“Green Cross International, founded in 1993 by Nobel Peace Prize laureate Mikhail Gorbachev, is an independent non-profit and non-governmental organization working to address the inter-connected global challenges of security, poverty and environmental degradation through a combination of advocacy and on-the-ground projects. GCI is headquartered in Geneva and is present in over 30 countries. GCI provides the platform for the Climate Change Task Force activities.”

www.gcint.org

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