

Report on Climate Security

May 2007

Sub-Committee on International Climate Change Strategy
Global Environment Committee, Central Environment Council
Ministry of the Environment of Japan

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Summary

“Climate Security” will likely become a leading concept guiding future climate-related policies. This Committee therefore studied how the climate security concept should be understood and utilized in Japan, as well as how the concept can contribute to advancing climate-related policies in the future.

International Debates Concerning Climate Security

Currently, there is intense debate concerning the climate regime beyond 2012 under the United Nations Framework Convention on Climate Change (UNFCCC). However, conflicts remain between the views of various nations; real negotiations on the future framework have not begun as expected. The United Kingdom, which set climate change as a focus of the 2005 Gleneagles G8 Summit, has recently recognized that climate change is an issue of security, broadly defined, and indicated that the international community should address the climate change issue from the perspective of “Climate Security.” In the United States, the view that climate change will have implications for national security has been expressed in the Biden-Lugar Senate Resolution. Also at the United Nations discussion’ on the issue of climate change were held for the first time by the Security Council on April 17th in 2007.

Accelerating Climate Change

The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) states that, very high confidence, ongoing climate change is the result of human activities, that changes to the climate are accelerating, and that effects of climate change are occurring worldwide. It also finds that various types of impacts are likely to be worsened in the future, including those related to water resources, ecosystems, food, and coastal areas. Moreover, the Stern Review states that urgent actions are required, having found that the costs of not responding to climate change could be at least 5%, and possibly 20% or more, of global Gross Domestic Product (GDP), with the effects of climate change likely to have an economic impact as great as the Twentieth Century’s two World Wars and the Great Depression.

The Evolution of the Concept of Security

In recent years, the concept of “security” has evolved from the narrow conception of military security into a broader concept. In effect, “threats” have come to be perceived as issues for not only nation states, but also international society as a whole. At the same time, the “values” that should be protected under the concept of security are understood not only national territories, but also the improvement of human safety and welfare. Whether or not the effects of climate change are really threats to “security” depend on the nature and scale of those effects. According to the IPCC Fourth Assessment Report and other relevant studies, the impacts of climate change are already endangering the ecosystems that form the foundation of human lives, health and activities. If appropriate measures are not taken promptly, these threats will grow, creating environmental refugees displaced by conditions of drought, severe water shortages and flooding due to sea level rise, which will certainly cause regional instabilities and conflicts. Climate change is thus not only a matter of “national security,” but also a matter related to many other security concerns, including “human security,” “food security,” and “energy security.”

The Notion of “Comprehensive Security” in Japan

Japan’s notion of “comprehensive security” is a concept of security that accommodates such broad concerns. It embraces not only each country’s individual efforts to counter threats, but also the improvement of the international environment as a whole, fostering cooperation among nations based on the concept of the shared benefit of all. Moreover, it proposes to utilize not only military means, but also non-military measures, such as strengthening the relationships among economically interdependent nations. The comprehensive security concept recognizes that the impacts of climate change are among the threats to national security and citizens’ lives, as well as being a threat to humanity as a whole, and that the improvement of international cooperation, including efforts to strengthen mutual economic interdependence, will bring the global security. “Comprehensive security” is therefore a concept that can contribute to the promotion of policies to respond to global climate change.

Responses to Climate Change in Light of Security

When we observe the climate change issue in light of the fundamental concerns of “security” – that is, *who* must act to protect *which values* from *which threats*, and in

what manner – the challenge becomes how to protect citizens from these “threats” posed by the effects of climate change, since the climate is the very foundation of human survival. To achieve this goal, each country’s efforts, as well as unified international cooperation, are necessary to preserve the global climate, which serve as a “global public good.”

The Advantages of the Climate Security Concept

The concept of “climate security” allows citizens and the international community to share the understanding that climate change is a “threat” facing all the world’s countries, corporations, organizations and individuals. Climate change policies can therefore be given a high priority within each country, paving the way for “low-carbon” economic growth and related transformations of technologies and systems, as well as lifestyles and work-styles. International cooperative actions to reduce greenhouse gas emissions are also thereby justified. For example, in developing countries, feasible long-term policies can be promoted to address the weather-related disasters and other problems currently being experienced, while at the same time building appreciation of the need for developing country participation in future international cooperative efforts. Also, as the climate “threat” becomes more keenly felt, international pressures can be expected to grow for mandatory emissions reductions on the part of the major carbon-emitting countries that are causing the threats.

Policies Based on “Climate Security”

Based on Japan’s conception of “comprehensive security,” actions taken to protect citizens from the threats of climate change would strengthen abilities to defend the nation’s security through building a low-carbon society, and provide additional benefits in terms of climate protects, energy security and international competitiveness of industries. Efforts are also needed to promote international cooperative efforts for climate security, which would strengthen the international regime under the UNFCCC, as well as assist other countries that share the concept.

The challenge of climate change is not merely a problem of the environment, but is a global-scale threat equivalent to the concerns related to food security, energy security, or even terrorism. Climate change should in fact be given the central attention, due to the fact that it will influence these other concerns both directly and indirectly. Policies and

measures to promote climate security will lead to the development of relevant technologies, social infrastructure and lifestyles that will allow economies and societies to grow on a low-carbon nature through reduced greenhouse gas emissions. This will also improve efficiency in resource and energy utilization in economic production, thus directly contributing to resource and energy security, while also providing the co-benefits of reduced discharges of air pollutants (such as sulfur oxides and nitrogen oxides) and water pollutants. Moreover, as awareness of adaptation policies grows, it will be possible to better contribute to securing the necessary foundations for human livelihoods, such as through reducing poverty, thereby contributing to human security.

“Climate security,” which views the impacts of climate change as threats to the world’s nations and peoples, is a perspective that recognizes the efficacy of urgent action in light of the comparative “costs of action” and “costs of inaction” on climate change, and as such will have a facilitative role with respect to negotiations concerning the future climate regime. Promoting an appreciation of climate security will allow us to break out of the current deadlock in international negotiations, under which there is a tendency to consider responses to climate change as “threats,” and therefore to see avoiding action as being in the national interest. Instead, negotiations could proceed with new proactive attitudes emerging.

In order to address the threat of climate change, it would be indispensable for the major greenhouse gas-emitting countries to reduce their emissions. Emissions by developing countries are rising quickly, but these countries have a greater potential for reducing emissions in a more cost-effective manner than developed countries. Moreover, as more durable social infrastructure is being developed, mainstreaming and integrating policies to mitigate and adapt to climate change within sustainable development policies will encourage countries to shift toward low-carbon societies. Nevertheless, this can only be accomplished through international cooperation. Moreover, early implementation of adaptation measures will be required for vulnerable countries facing serious harm of climate change.

Japan’s Role with Respect to Climate Security

The “comprehensive security” notion championed by Japan provides an appropriate basic concept that can serve to build a framework of climate security. Climate security would promote international collaboration and, through non-military means, would

protect each country, the activities of its citizens and corporations as well as the ecosystems upon which these depend from the threats of climate change. It is appropriate for Japan, which has a history of promoting security through non-military means, to advance this approach for addressing climate change.

This Committee therefore calls on Japan to adopt and effectively promote the concept of “climate security” within the conduct of national policies, as well as within the various international negotiations related to actions to reduce greenhouse gas emissions.

1. Background of the Study

National and International Climate Policy Debates

The start of the first commitment period under the Kyoto Protocol is rapidly approaching next year (2008). In order for Japan to achieve its Kyoto commitment of a six percent reduction in emissions compared to 1990 levels (the “1990 minus 6%” target), efforts are taking place to revise the Kyoto Protocol Target Achievement Plan in keeping with the Law Concerning the Promotion of Measures to Cope with Global Warming. Also, at the international level, debates are intensifying regarding the post-2012 climate regime, in order to prevent there being a gap between the end of the Kyoto Protocol’s first commitment period in 2012 and the start of the next commitment period.

Negotiations concerning the future climate regime take place at the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. However, there is a conflict of positions between the government of the United States, which is not a party to the Kyoto Protocol requiring commitments for major greenhouse gas emitting nations and which is not participating in the negotiations for a future commitment framework, and developing countries that assert that under a future framework only more stringent emissions reductions by developed countries are needed, with developing nations not subject to emissions reductions. Concrete negotiations have therefore not gotten under way.

Climate Change Response and the G8 Summits

On the other hand, the G8 initiated the so-called “Gleneagles Process,” which began with the 2005 Gleneagles Summit chaired by the United Kingdom. Under the Gleneagles Process, the “G20 dialogue” regularly brings together the members of the “G8+5” (the G8 countries plus Brazil, China, India, Mexico, and South Africa) and twenty rapidly growing nations, known as the G20. The first such G20 dialogue was held in November 2005 in the U.K., a second was held in October 2006 in Mexico, and a third is scheduled for the autumn of 2007 in Germany, with the fourth and final meeting scheduled for the spring of 2008 in Japan. These meetings, in order to contribute to solutions regarding technical and financing issues, include the participation of the International Energy Agency (IEA), as well as the World Bank. In addition, these meetings have had input regarding climate science from the

Intergovernmental Panel on Climate Change (IPCC), as well as the "Stern Review," which was commissioned by the U.K. government and addressed the economics of climate change.

The results of the Gleneagles Process are to be reported to the 2008 G8 Summit, to be chaired by Japan, at which time leadership by Japan will be expected.

Climate change has been raised as a key issue to be addressed at the 2007 G8 Summit in Heiligendamm, Germany, with the leaders of China and the other "Plus 5" countries expected to participate. The climate change issue is therefore at the top of the agenda facing leaders of key nations.

Climate Security: The Beginning and Development of International Debates

The United Kingdom, which initiated the Gleneagles Process, has recently framed the climate change challenge as an issue of security, referring to the problem of climate change as a problem of "climate security" in international venues. In speeches at the September 2006 United Nations General Assembly, and in conjunction with the G20 dialogue in Mexico held in October 2006, U.K. Foreign Secretary Margaret Beckett used the term "climate security" and called for prompt international response to this challenge.

In addition, the "Stern Review," which was issued in October 2006, analyzed the climate change issue from an economic perspective, and found that

"Our actions over the coming few decades could create risks of major disruption to economic and social activity, later in this century and in the next, on a scale similar to those associated with the great wars and the economic depression of the first half of the 20th century. And it will be difficult or impossible to reverse these changes."

This provides a clear warning that, without appropriate actions to address climate change, the impacts of climate change could have severe consequences for the global economy.

In the United States, the Bush Administration at present has not indicated that it considers the climate change problem to be a matter of security. However, the Biden-Lugar Climate Change Resolution, which passed the Senate Foreign Relations Committee in March 2007 and was referred to the full Senate, and an April 2007 report by the Center for Naval Analyses, a U.S. government-related think tank, expressed the

view that climate change will impact national security.¹

In addition, efforts have been made to address climate change as a high priority at the United Nations. Former U.N. Secretary General Kofi Annan, in a speech at the November 2006 COP-12 meeting in Nairobi, Kenya, stated that “Climate change is not just an environmental issue, as too many people still believe. It is an all encompassing threat.” Mr. Annan’s successor, U.N. Secretary General Ban Ki-moon, has focused on the issue of climate change, and is planning to hold a high-level special session concerning climate change at the time of the U.N. General Assembly in September of 2007, and has indicated his desire to convene a summit-level meeting on climate change in 2008. Further, on April 17, 2007, climate change was addressed for the first time at a meeting of the United Nations Security Council. This was at the strong request of the United Kingdom, which at the time served in the presidency of the Security Council, and was accepted by the other members; a session was held with an open discussion of energy, security and climate. The debate was chaired by U.K. Foreign Secretary Beckett, and, in addition to the ministerial level participation of Germany, Italy, Maldives, the Netherlands and Slovenia,, Secretary General Ban attended for part of the discussions, and speeches were made by a total of 55 countries, including Japan.

¹ Biden-Lugar Climate Change Resolution (Excerpts)

- “[T]he potential impacts of global climate change, including long-term drought, famine, mass migration, and abrupt climatic shifts, may lead to international tensions and instability in regions affected and, therefore, have implications for the national security of the United States.”
- “[T]he national security of the United States will increasingly depend on the deployment of diplomatic, military, scientific, and economic resources toward solving the problem of overreliance of the United States and the world on high-carbon energy.”
- “[The] United States should...participat[e] in negotiations under the United Nations Framework Convention on Climate Change...and leading efforts in other fora, with the objective of securing United States participation in binding agreements that—
 - (A) advance and protect the economic and national security interests of the United States;
 - (B) establish mitigation commitments by all countries that are major emitters of greenhouse gases, consistent with the principle of common but differentiated responsibilities;
 - (C) establish flexible international mechanisms to minimize the cost of efforts by participating countries; and
 - (D) achieve a significant long-term reduction in global greenhouse gas emissions.”

The Interrelation of Climate Change and Sustainable Development

Given these and other developments concerning the climate change issue, it has now become recognized that the climate change challenge will have impacts on sustainable development of the following kinds:

- (1) There is a risk that the impacts of climate change will not only affect the environment, but will also hinder the poverty reduction and peace building efforts undertaken by the United Nations. In other words, climate change response measures are a prerequisite for efforts for poverty reduction and other goals to continue to make further progress.
- (2) There is a risk that the impacts of climate change, especially direct impacts on vulnerable countries, and global-scale economic disruptions to the majority of countries, will become security-related concerns.
- (3) Due to these kinds of serious effects, a high priority must be given to policies to respond to climate change, as well as to measures for mitigation and adaptation.

The accumulation of greenhouse gases, which is the cause of climate change, is due to activities such as the burning of fossil fuels and deforestation. These activities are in turn closely related to the provision of energy required for economic development and for the stability of people's livelihoods. Efforts to mitigate the effects of climate change must therefore be pursued giving due consideration of the effects that will be caused by climate change response measures.

In this way, policies on energy and development should be seen in relation to their role in mitigating the impacts of climate change, due to their deep interrelations in terms of the effects they will have on climate change issues.

Negotiations Concerning the Future Climate Regime Require Agreement among Leaders

Currently, the positions of various countries are at odds concerning the future climate regime under the United Nations Framework Convention on Climate Change, and negotiations have not commenced in earnest. On the other hand, as mentioned above, a higher priority is in general being given to climate change. While climate change solutions are to be determined at the Conferences of the Parties to the UNFCCC and Kyoto Protocol, agreement among leaders will be necessary in order for negotiations to

progress regarding the future climate regime and the path to climate stabilization.

The Role of this Committee

The debate over climate security is already proceeding at the international level, and there is the likelihood that climate security will be a key concept guiding future climate policies. This Committee has therefore studied the implications of this concept for Japan, including how the concept should be utilized with respect to advancing climate-related policies in the future.

2. The Effects of Climate Change

Climate Change Impacts that Have Already Occurred

The reports by Working Groups I and II for the IPCC Fourth Assessment Report have concluded that over the past hundred years the average temperature of the globe and sea levels have risen at an accelerating pace; that an enormous quantity of observational data demonstrates that the effects of climate change are occurring on a global scale, and that such warming is very likely (with a very high confidence level of greater than 90%) caused by anthropogenic emissions. Moreover, the IPCC concluded that there is a likelihood that climate change has contributed to the frequent occurrence of unusual weather phenomena over recent years.

Examples of unusual weather phenomena in recent years:

- Eleven of the past twelve years have been among the hottest years recorded since 1850.
- More than 35 thousand people died as a result of a heat wave that hit Europe in 2003.
- More than 2000 people died due to torrential rains in India and Bangladesh in 2004.
- More than 1700 people died as a result of damage caused by Hurricane Katrina in the United States in 2005.
- Due to a record-breaking drought in Australia in 2006, wheat harvests fell by about 60% from the previous year.

Projected Future Impacts (Global)

According to the report of IPCC Working Group I, the global average temperature has already risen 0.74 degrees Celsius over the past 100 years, and under different scenarios is projected to increase by between 1.8 degrees (the best estimate for the low scenario, with a likely range between 1.1 and 2.9 degrees) to 4.0 degrees (the best estimate for the high scenario, with a likely range between 2.4 to 6.4 degrees) over 1980-1999 levels by the end of the 21st Century. The speed of sea level rise is expected to accelerate, and under the different IPCC scenarios is expected to rise a further 18 to 59 centimeters by the end of this century.

Working Group II projects that in the future, growing and severe impacts are

anticipated in various sectors, including with respect to water resources, ecosystems, food production, and coastal areas, including the following:.

- By the middle of this century, water resources are projected to decrease by 10 to 30% in the mid-latitudes and arid tropical regions.
- With an increase of more than 1.5-2.5 degrees, there is a risk of extinction of some 20 to 30% of species.
- With a 1-3 degree rise of sea surface temperatures, coral bleaching and die-off events will occur frequently.
- With a 1-3 degree or greater increase in air temperatures, global food production is expected to decrease.
- By 2080, many millions of people would suffer impacts of annual flooding.

Moreover, while the costs and benefits from a lower than 1-3 degree temperature rise may balance out for certain regions or sectors, there is a high risk that the impacts from temperature rises of greater than 2-3 degrees would have negative economic effects in all of the world's regions. However, as averaged calculations of worldwide effects are not able to capture many unquantifiable effects, there is a high possibility that impacts are underestimated. Additionally, the recent report for the Fourth Assessment Report by IPCC Working Group III reconfirmed that a 4-degree rise in the global temperature would lead to average losses of 1 to 5 percent of GDP.

Projected Future Impacts (Japan)

The following types of impacts are projected for Japan:

- An atmospheric temperature increase of 2 to 3 degrees is projected by the end of this century, with most of the national land area likely to experience increased rainfall, including a 20% increase for western Japan.
- An increase is projected in the occurrences of typhoons and heat waves, with more frequent torrential rains nationwide.
- With a sea level rise of 1 meter, an area of 2,400 square kilometers of coastal area, including in Tokyo and Osaka, with a population of 4.1 million, will be affected by flooding, with a possibility of economic damages reaching 1 trillion dollars (120 trillion yen). In addition, sea level rise may lead to a decrease in the area of Japan's exclusive economic zone, such as due to the potential loss of the Okinotori Islands

and other areas.²

The “Costs of Action” and the “Costs of Inaction”

It is significant that the Stern Review, which was tasked with calculating the costs of climate change, included consideration of the "costs of inaction." Moreover, the Stern Review found that such “costs of inaction” should be weighed against the “costs of action” when determining measures to take in response to climate change.

The Stern Review found that the “costs of action” would equal 1% of global GDP. However, the report of Working Group III for the IPCC Fourth Assessment Report concluded that “co-benefits” arising from such climate change response actions (through returning tax revenues to society, technological advancements, reductions in air pollution, and other effects), can be substantial and may offset such costs.

In contrast, the "costs of inaction" can be expected to equal at least 5% of global GDP, with a possibility of reaching 20% of GDP or more, a scale which the Stern Review Report noted would be as damaging as the two World Wars and the Great Depression experienced during the Twentieth Century. Thus, the Stern Review concluded that it is necessary to begin prompt climate change response efforts.

Governmental funds alone would not be sufficient to meet the costs of these response measures, equal to 1% of global GDP, or the costs to address losses of at least 5% of global GDP; it is clear that efforts will be needed that engage society as a whole,

² Points of note related to the reports of Working Groups I and II for the IPCC Fourth Assessment.

- Assessments of projected climate change and related impacts are made with respect to the baseline year of 1990. According to the report of IPCC Working Group II, to express the change relative to the period 1850-1899, 0.5 degrees need to be added to the 1990 temperature values.
- While various statements are made related to emissions and atmospheric concentrations of carbon dioxide alone, all the greenhouse gases are relevant to efforts to stabilize concentrations, and it is therefore necessary to calculate the concentrations of all greenhouse gases in terms of their total carbon dioxide equivalents.
- Since the IPCC Fourth Assessment Report was based on analysis of observations of phenomena and scientific views that had been fully verified as of 2005, it does not fully consider the apparent trend of accelerations in the pace of climatic changes, or the most recent scientific knowledge. Because of this, it is necessary to bear in mind that future changes may be more rapid than the projections contained in the Fourth Assessment Report, with the potential for even larger impacts, such as through positive feedback effects due to warming and the dynamic behavior of the ice sheets in Greenland and Antarctica (dynamic melting) and other effects.

including measures that involve reforming economic and social structures.

Thus, as seen in the IPCC Fourth Assessment Report and the Stern Review, changes to the climate are accelerating, and it is clear that if prompt actions are not taken, all nations face the threat of irreversible and severe damage.³

³ Estimating losses under the Stern Review

- The “costs of inaction” include the costs of damages sustained if measures are not taken and climate change is allowed to progress, as well as preventative costs necessary to avert damages.
- The figure of 5% of global GDP was calculated as the rate that would need to be paid annually to defray the total costs of all damages projected through the year 2200. Because actual damages are expected to be greater closer to the year 2200, the 5% figure should be understood as an estimate, although a dependable one.
- Damages to health and the environment are estimated in monetary terms as representing a loss of 11% of GDP.
- Losses could reach 14% of GDP with carbon feedback effects.
- Damages to vulnerable regions, considered not only in economic terms but also from an ethical viewpoint, represent losses of 20% of GDP.

3. The Concept of Climate Security

1) The Expansion of the Concept of Security

Traditional Notions of Security

The traditional notion of security can be seen as a concept focusing on a country and its government, which is concerned with safeguarding its territory, maintaining political independence and protecting, through military and other necessary means, the people and assets within its borders from invasion by foreign enemies. In other words, security is concerned with “*who must act to protect what values from what threats, and in what manner.*”⁴

The Expansion of the Concept of Security

In contrast to this traditional approach to defining security, there is also a newer, broader conception of security.

In 1994, the concept of “Human Security” was introduced in the Human Development Report issued by the United Nations Development Programme (UNDP). The Commission on Human Security, which was supported by Japan and co-chaired by Dr. Amartya Sen and Mme. Sadako Ogata, in 2003 released a report entitled “Human Security Now,” which assessed, from the perspective of human security, the issues international society should address. The “human security” concept regards as threats not only the traditional threat of aggression by nations, but also various global crises that international society should address, including population growth, economic inequalities, excessive international migration, the degradation of the environment, the drug trade, international terrorism, and other “threats to individuals or populations.” The key concern of the human security concept is how the international community should respond regarding those who are suffering from these threats. Japan has recognized the key importance of human security, making it a guiding principle for its international

⁴ Limitations on the use of military force

- Since 1945, the use of force by one state against another, even for reasons of national security, has been prohibited under Article 2 Section 4 of the United Nations Charter, except in cases of the right of self-defense against military attack from another country and in cases in which the Security Council has approved the use of force.

assistance, and calling for its adoption by the international community.

The notion of security in recent years has therefore moved beyond the traditional conception of national security, to a broader notion that includes other concerns. In other words, the concept of security has expanded to view as related "threats" as not only those threats to national independence and territorial integrity but also other threats, and also sees the values that should be protected as including not just a nation's territory, but also ensuring the safety and improving the welfare of people. The preservation of human rights and democracy has also recently been included as values which should be protected.

Japan's Comprehensive Security Concept

In Japan, the concept of "comprehensive security" was proposed by a research group under then Prime Minister Ohira in 1980. This is a concept that recognizes that threats to national livelihoods are not only military in nature, but also arise with respect to potential insufficiencies in food and energy, as well as from natural disasters and other matters. It is a concept that calls for action not only to ensure the national defense, but also to maintain an international order based on an open trading regime; to realize energy security and food security; and to take measures to guard against large earthquakes and other catastrophic natural disasters. Additionally, it calls for pursuing self-help efforts, as well as ensuring a beneficial international environment that is free from threats, for the mutual benefit of all nations. Moreover, it is based on the premise that security is pursued not only through military means, but that non-military activities are also necessary. An example of such non-military means includes the strengthening of economic interrelationships, as relationships of mutual economic interdependence lead to cooperative international actions.

In relation to the concept of "climate security," it is significant that since 1980 Japan has been striving, through international cooperation and non-military means, to realize "comprehensive security" – that is, security going beyond military threats. Japan's notion of "comprehensive security" is thus a concept that can recognize as a threat the changes that will result from climate change. In other words, the threat to national livelihoods and safety that is posed by climate change can be regarded as a threat to "comprehensive security," which naturally leads to an appreciation for the concept of security being improved through international cooperation, including the strengthening of economic interdependence. The comprehensive security concept therefore can contribute to the promotion of climate change policies on a global basis.

2) The Concept of Climate Security

Terminology and Climate Security

The interrelationship of “climate change and security” could be explained through clarifying the concepts of “climate change” and “security.” However, in recent years, it has become most appropriate to use the phrase “climate security” to best express the linkage between climate change and security, and to make the issue most readily understandable.

Furthermore, issues such as energy security and resource security concern the distribution of resources (what could be called “upstream” issues), whereas climate security relates not only to the distribution of the limited resource of a stable climate, but also relates to dealing with the results that flow from utilizing the resources (what could be termed “downstream” issues); this introduces a new viewpoint to the security issue. Moreover, the term “climate security” while the term itself is novel could be said to spring from the thinking introduced by “Limits to Growth” by the Club of Rome.

Climate Change as a Security Concern

Applying the fundamental elements of security – that is, *who* must act to protect *what* values from *what* threats, and in *what* manner – to the issue of climate change leads to the following;

- ▶ *Who must act:* Fundamentally, nations must act. While cooperating internationally, nations must act to safeguard their citizens and their assets. However, measures to respond to changes in the climate, a "global public good," must involve all corporations, organizations and individuals, since there are many activities that are not determined by national governments, and which must be dealt with by all related stakeholders.

- ▶ *What values to protect?* What must be protected is the safety and welfare of citizens. Additionally, it is clearly stated as an objective of the United Nations Framework Convention on Climate Change to not only safeguard food production and economic activities for mankind, but also to protect ecosystems themselves; moreover, future generations and their values are also to be

protected. Even nations are not safe in the face of the enormous and worldwide effects of an altered climate. Changes to the climate, which all people benefit from and use, will know no borders. When seen in this light, the global climate can be regarded as a “global public good,” and activities to address climate change can be seen as efforts to remove threats to this “global public good.” Given the state of modern international society, measures to protect such a “global public good” will necessarily require international cooperation.

► *What threats?* The threats from climate change caused by emissions of greenhouse gases are broad, imperiling food production and economic activities, and harming the ecosystems that form the basis for these activities; these problems in turn may give rise to international conflicts.

- Unusual weather events that have occurred in recent years have not only created numerous human victims, but have also caused economic damages, including reduced harvest levels.

If current trends in greenhouse gas emissions continue, the average global temperature will increase further, with losses predicted for all countries and regions with respect to water resources, ecosystems, food, and coastal areas.

- The poor will be even more severely hit by sea level rise, shortages of potable water and decreased agricultural productivity, leading to increased migrations of environmental refugees from rural to urban areas, as well as from less productive to more productive lands; as many as perhaps 200 million people could be displaced by the middle of this century.
- According to American researchers and others, a relationship has been empirically demonstrated between decreases in rainfall and the outbreak of conflict; climate change will thus definitely have impacts leading to regional stabilities.
- Rising sea levels may lead to changes in national borders and the possibility of alterations to exclusive economic zones, causing disputes over national boundaries. Island nations may lose portions of their national territories as the sea surface rises, necessitating out-migration. In these ways, mankind may face for the first time a situation in which nations lose their national territories through means other than conflicts, which may call into question the very nature of the nation state.
- Impacts on Japan can be expected as a result of Japan’s high degree of international dependence on imported food, energy, and other resources (with

impacts on energy security, resource security, and food security), in addition to the physical threats of sea level rise and altered weather patterns and compound effects such as increased threats to health, such as due to increases in dengue fever and other diseases.

- These types of impacts can be expected to build on one another, potentially leading to conflicts between nations.

- *In what manner?* Each nation must not only develop appropriate mitigation and adaptation measures based on scientific data, but must also cooperate with international society in order to protect the climate which serves as a global public good.⁵

Effects of the Concept of Climate Security

Framing the climate change issue as a security-related concern raises the political priority placed on the issue both domestically and internationally; moreover, climate security will have various effects due to bringing about a shared appreciation of the growing and imminent “threat” that climate change poses to the world’s nations, corporations, organizations and individuals. This will in turn promote the following:

- Climate change will be given a higher political priority in each country. Economic and societal growth in a low-carbon manner will promote transformations in technologies and systems as well as lifestyles and work-styles.
- Cooperative efforts by international society to reduce greenhouse gas emissions will be justified and promoted.
- In developed and developing nations alike, solid, long-term measures will be promoted to deal with weather-related disasters and related problems that are occurring, while at the same time promoting an appreciation of the need for participation in international cooperative efforts. Efforts will be promoted to

⁵ Scientific data and the role of the IPCC

- The scientific information compiled by the Intergovernmental Panel on Climate Change is indispensable for devising policies that deal with the natural environment. While security-related threats can be justified based on subjective determinations, the threat from climate change can objectively be assessed based on the data compiled by the IPCC and related organizations, which thus gives these organizations “soft power” in promoting international actions.

assist "adaptation measures" for low-lying and island nations and other countries vulnerable to the effects of climate change.

- ▶ Further, as awareness of the "threat" becomes better recognized, international pressures will grow for emissions restrictions to be placed on the high greenhouse gas emitting nations that are causing the threat. If, for example, certain countries causing the threat do not reduce their emissions, and the Security Council determines that they thereby pose a threat to international peace, the international community could choose to take actions to strongly demand emissions reductions by those countries not complying (thus enforcing the removal of the threat); while such a situation may be unimaginable at present, the international community could choose to take such a course in the future. Nevertheless, in light of the fact that military actions would result in increased greenhouse gas emissions, such enforcement measures would likely take the form of non-military means such as economic sanctions.⁶

⁶ The threat faces almost all people

- The poor and countries vulnerable to climate change.
- Due to the current advanced degree of economic interdependence between nations, even those countries that are relatively immune from the impacts of climate change will have security-related issues thrust upon them via problems of trade or refugees resulting from the loss of global stability, caused by an increase in the number of countries destabilized by famine, disasters and other impacts.
- If global warming continues, all countries will be subjected to negative impacts, and if warming further advances, even those countries that may be relatively resilient in the face of the effects of climate change will have their prospects for sound development hindered by increasing problems of securing food and energy, or in dealing with unemployment and poverty, which will lead to security-related problems.

4. International Climate Policies from the Perspective of Climate Security

Efforts in keeping with Japan's notion of climate security, protecting citizens from the threat of climate change through building a low-carbon society, will not only strengthen the nation's security in terms of climate (including adaptation), energy security and industrial competitiveness, but such efforts are also necessary for Japan to contribute to the international community in keeping with the UNFCCC, which serves as the framework for responses to climate change, and will contribute to climate security for all nations involved.

Climate change is already a threat to the ecosystems that form the foundation of human life, health, economic activity and the system of nation states, and is not only a matter of "national security" but also a matter of human security, food security, energy security, and other concerns.

Sustainable Development and the Recognition of Positive Effects

There is the possibility that the security of nations may be threatened by famine or refugees resulting from meteorological disasters. Climate change affects the very basis of human existence, and is a latent threat to human life, safety and global stability. Climate change must thus be seen as not merely an environmental concern, but as a global-scale threat as important as that of food and energy supply or terrorism, and should be given a central priority in international politics due to the direct and indirect impacts it will have on these and other issues.

Investments related to national security made by nations until now, focused on threats of attack by other nations, including for weapons or nuclear warheads, have not contributed to sustainable development. In contrast, efforts made to address climate change, through reducing emissions of greenhouse gases, will promote the development of technology, social infrastructure, and systems and behavior patterns that will create low-carbon growth. This will have various co-benefits, leading to greater efficiencies in the utilization of energy and resources, contributing directly to resource and energy security, as well as leading to reductions in air pollution discharges (including of sulfur oxides and nitrous oxides) and water pollutants. Further, as the value of adaptation measures becomes better understood internationally, it will be possible to contribute more to poverty reduction and to securing the foundations necessary for human livelihoods, thus contributing to human security.

Recognition of climate change as a security issue, and the international cooperation between nations to protect ecosystems and national livelihoods from the threat of climate change that will result from this recognition, will thus lead to preserving abundant resources for future generations; integrating climate security into the vision of sustainable development will therefore make a significant contribution toward stable global development.

New Prospects for International Negotiations Based on a Transformed Appreciation of Threats

Despite the urgency and importance of the climate change issue, the meetings of the Conference of the Parties to the UNFCCC and Kyoto Protocol have not been able to proceed into negotiations on the future climate regime. One reason for this has been that the “effects” of climate change have not been seen as “threats;” indeed, what has been seen as “threatening” to nations has been the “responses” to climate change which, through restricting energy usage, are seen as hindering economic growth; this has led to a situation in which avoiding climate change response actions has been seen as in the national interest. “Climate security,” which defines the “effects” of climate change as threats to the world’s nations and people, would fundamentally challenge this dynamic. In other words, the climate security perspective views climate change related costs as including not only the “costs of action” but also the “costs of inaction,” as well as recognizing that comparing these costs leads to the conclusion that prompt action will be effective in responding to climate change; this approach can therefore contribute to progress in terms of negotiations concerning the future climate regime. Moreover, it can allow for breaking out of the current deadlock in negotiations, in which avoiding climate change response actions is thought to be in the interest of nations, thus facilitating negotiations and paving the way proactive new approaches to emerge.

In order to respond to the threat of climate change, it will be indispensable for the major greenhouse gas-emitting countries to reduce their emissions. Emissions by developing countries are also rising quickly, and these countries have a greater potential for reducing emissions in a more cost-effective manner than the developed countries. Moreover, as more durable social infrastructure is being developed, mainstreaming and integrating policies to mitigate and adapt to climate change within sustainable development policies will encourage countries to shift toward growing low-carbon economic societies. Nevertheless, this can only be accomplished through international cooperation. Moreover, early adaptation measures will be required for vulnerable

developing countries facing serious harm due to climate changes.

Emissions reduction commitments are based on the principle of "common but differentiated responsibilities" and thus must be tailored to the context of different countries in terms of both approach and content; this must be done in such a manner as to ensure that it will not result in large-scale greenhouse gas emissions in the future leading to dangerous concentration levels, as required under the Framework Convention on Climate Change.⁷

Expanding the Venues for International Negotiations

Although the issue of climate change is already being addressed under the United Nations Framework Convention on Climate Change, as explained above, if climate change is recognized as a threat to the international community and is seen as an issue of climate security, it could be addressed as a high priority issue within the G8 and other venues, such as the Security Council and other United Nations bodies. In this connection, it was an epoch-making event for the climate change issue to be addressed by the Security Council in April 2007 in response to the leadership of the United Kingdom, as this event contributed to recognition of the climate change issue at a high level in international politics.

⁷ Trends in viewing response costs as threats

- There is a tendency to underestimate the costs of inaction, based on arguments such as that temperature increases will not be very large, or that impacts will not be significant even if temperatures do increase.
- Countries that are growing while discharging large quantities of greenhouse gases may be aware of the economic losses to their own country resulting from the impacts of climate change, but they may nevertheless choose to continue on their carbon-emitting economic development path, viewing the benefits as outweighing the costs.
- Countries may choose to place a higher priority on their own national development, and not to take on obligations for reducing emissions, even if other, more vulnerable developing countries may be negatively impacted by warming.
- There is the assumption that the developed countries bear the primary responsibility for compensating other, vulnerable developing countries for the negative impacts they experience.

5. Conclusion

Science has shown (through impact estimates) that the threat of climate change is increasing, and that a lack of prompt measures may bring about an irreversible situation. Nevertheless, while there has been increasing recognition of the political importance of the climate change issue, and despite clarification of the threat in the IPCC Fourth Assessment Report, sufficient priority is not being given to the issue, as reflected in the recent lack of progress on international negotiations, as well as delays in undertaking domestic policies within nations.

Climate change is a threat to humanity and to the ecosystems that form the foundations of mankind's very existence, posting a direct threat to the security of each nation. If appropriate measures are not taken to address climate change, its effects could undo the efforts being made by the international community for poverty eradication, peace building, and economic development. In light of the fact that Japan will be greatly impacted by the international effects of climate change, being a nation highly dependent on international sources for energy, food and resources and surrounded by seas, policies must be taken by Japan to protect the safety of its citizens, giving a high priority to this issue.

In order to appreciate the true impacts of climate change, and to undertake appropriate responses, it is appropriate to frame the issue within the context of "climatic security." In addition, a shared appreciation by the international community of the importance of "climate security" will allow for climate change to be accorded a high priority, thus contributing to the promotion of climate change measures within each nation, including our own, thus in turn promoting cooperative international efforts.

The "comprehensive security" concept that has been championed by Japan provides an appropriate basic concept that can serve to build a climate security framework. Climate security will promote international collaboration and, through non-military means, will protect each country, the activities of its citizens and corporations, as well as the ecosystems that make these possible, from the threats of climate change. It is appropriate for Japan, which has a history of promoting security through non-military means, to advance this approach for addressing climate change.

This Committee therefore calls on Japan to adopt and effectively promote the concept of "climate security" within the conduct of our national policies as well as within the various international negotiations related to actions for reducing greenhouse gas emissions.

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Shohei YONEMOTO	Director, Institute of Science Technology Civilization
○ Chairperson	

The course of discussions at the Sub-Committee on International Climate Change Strategy.

The 15th meeting of Sub-committee (2 February, 2007)

1. Highlighted cases of climate change as an issue of climate security.

- Statement by former UN Secretary General Anan at COP12 (2006.11)
- Statement by the Minister of Environment Wakabayashi at COP12 (2006.11)
- Speech on diplomatic policy and climate security by UK Foreign Secretary Beckett at Berlin (2006.10)
- Movie: "An Inconvenient Truth" featuring former Vice-President of the United States Al Gore

2. Report of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change and Stern Review

- The recent IPCC report have found that global warming is occurring, with *very high confidence* that the net effect of human activities as its main cause. Additionally, in the end of the 21st century, the rise in global average temperature will be from 1.1 to up to 6.4 degrees C, with predictions of stronger Typhoons and hurricanes. (The effects will be elaborated in the Working Group II report, due in April.)
- Sir Nicholas Stern, Adviser to the Government on the Economics of Climate Change and Development and Head of UK Government Economic Service (former chief economist at the World Bank) issued the Stern Review last October. The Review iterates the urgency of climate change, with analysis from an economic perspective, and gathers attention world-wide.

3. The Concept of Environmental Security

The announcement from Sub-committee member Mr. Yonemoto.

4. Discussion

How to assess the current situation where climate change is considered as an agenda for security. What are the points we should consider in looking at climate change as a security agenda?

The 16th of Sub-Committee (29 March, 2007)

1. Characteristics of Traditional Security Issues

- Nation is at the heart of Security
 - Threat to national security = Primary threat is Military
 - Subject of Protection = Nation

broadening
of concept
→

Crisis: energy • food • economy
Subject: world • mankind •
daily life

2. Required Elements to consider Climate Change as a Security Issue

3. Recognizing Climate Change as a Security Issue

Discussion of "Human Security"

4. Discussion

The 17th of Sub-Committee (25 April, 2007)

Discussion and presentation of the Draft Report

References

1. Overview of the Gleneagles Process and Recent Developments Related to Climate Change

G8 Gleneagles Summit (Climate Change Actions)

◆ **G8 Gleneagles Summit (July 2005) – Climate Change a Key Concern**

1) *Shared scientific understanding:*

- Global warming is a real concern; human activities contribute (accepted by US)
- Global level cooperation is needed to slow increases in, restrain, and eventually reduce emissions levels

2) *Progress on concrete actions*

- Formulation of the “Gleneagles Plan of Action” – Promotion of energy efficiency, global observations, etc.

3) *Partnership with emerging economies*

- Start of “dialogue” to strengthen partnership among G8 and emerging economies

→ **Reporting on outcomes at the 2008 Summit (chaired by Japan)**

Actions on Climate Change within the G8 Process – Dialogue among 20 key countries (the G20)

2005 Gleneagles Summit (UK)

Start of climate change dialogue
engaging 20 key countries (G8 plus China, India, and others) responsible for approx. 80% of total global emissions; also includes World Bank and IEA.

Reporting on outcomes at 2008 G8 Summit in Japan

Dialogue on Climate Change, Clean Energy and Sustainable Development among G8 and others (G20 dialogue)

- First meeting - November 2005, London
- Second meeting - October 2006, Mexico
- Next meeting scheduled for Germany (G8 host country)

2005

7月

2005 Gleneagles Summit (UK)

Nov. **1st Dialogue Meeting (UK)**

2006

Jul. – G8 St. Petersburg Summit (Russia)

Oct. **2nd Dialogue Meeting (Mexico)**

2007

Mar. – G8 Environment Ministers Meeting (Germany)

Jun. – G8 Heiligendamm Summit (Germany)

Fall **3rd Dialogue Meeting (Germany)**

2008

Spring **4th Dialogue Meeting (Japan)**

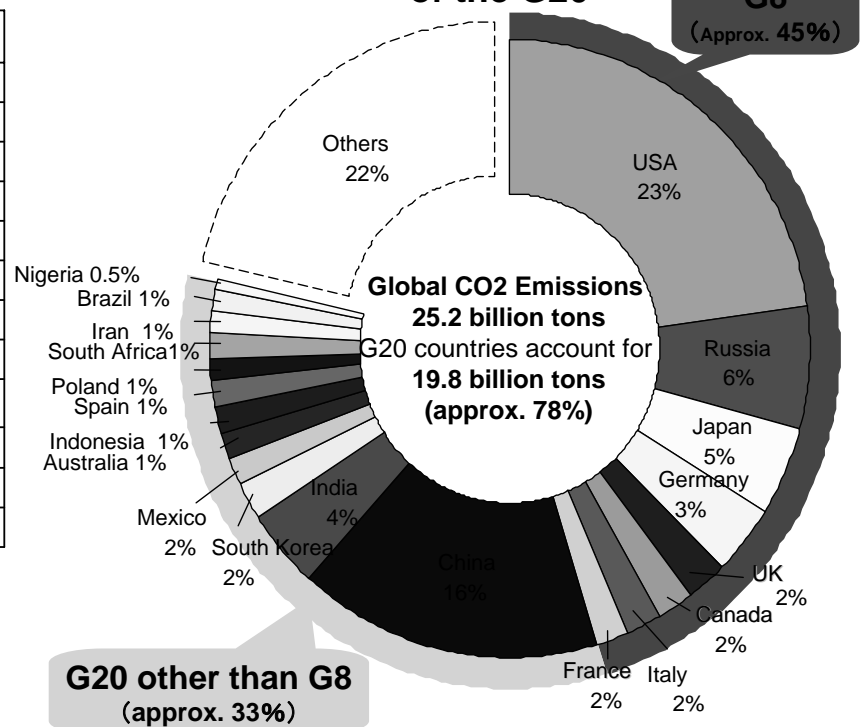
G8 Climate Change Process

G8 Summit in Japan

About the “G20” Countries

Global CO2 Emissions (2003) – Role of the G20

G20 countries			
G8	USA	Others	China
	Russia		India
	Japan		South Korea
	Germany		Mexico
	UK		Australia
	Canada		Indonesia
	Italy		Spain
	France		Poland
G20 other than G8			South Africa
			Iran
			Brazil
			Nigeria



※Compiled by Ministry of Environment of Japan, based on “Energy & Economy Statistical Handbook”
(Supplemented in part by IPCC data)

Recent Developments in Debates Related to Climate Change

Growing Recognition of Climate Change as a Threat

- **UK Foreign Secretary Beckett:** “Without climate security it will become increasingly difficult to guarantee national security and economic security. An unstable climate will undermine the capacity of governments to deliver the outcomes that our citizens expect on growth and jobs, trade and investment, migration, conflict, eradicating poverty and protecting public health.”
- **Former UN Secretary-General Annan:** “Climate change is an all-encompassing threat.” (Details later)
- [Reports]**
- **IPCC Fourth Assessment Report:** “Very high confidence” that climate change is the result of rising anthropogenic greenhouse gas emissions.”
- **Stern Review:** Analyzed the risks and costs of not taking actions. “There is still time to avoid the worst impacts of climate change if strong collective action starts now” and “early action to respond to climate change will reduce economic impacts .”

Calls for Stronger Political Leadership

- **UN Secretary-General Ban:** “Climate change will be one of my key priorities as UN Secretary-General.”
- **UNFCCC Executive Secretary de Boer:** “Leaders should discuss climate change at the United Nations.”
- **UK Prime Minister Blair, German Chancellor Merkel:** “Climate change is a serious concern, which all humanity must tackle. We will make climate change a high priority within the EU and the G8 process.”

2. Biden-Lugar Resolution

110TH CONGRESS
1ST SESSION

S. RES. _____

Expressing the sense of the Senate regarding the need for the United States to address global climate change through the negotiation of fair and effective international commitments.

IN THE SENATE OF THE UNITED STATES

Mr. BIDEN (for himself and Mr. LUGAR) submitted the following resolution;
which was referred to the Committee on

RESOLUTION

Expressing the sense of the Senate regarding the need for the United States to address global climate change through the negotiation of fair and effective international commitments.

Whereas there is a scientific consensus, as established by the Intergovernmental Panel on Climate Change and confirmed by the National Academy of Sciences, that the continued buildup of anthropogenic greenhouse gases in the atmosphere threatens the stability of the global climate;

Whereas there are significant long-term risks to the economy and the environment of the United States from the temperature increases and climatic disruptions that are pro-

jected to result from increased greenhouse gas concentrations;

Whereas the potential impacts of global climate change, including long-term drought, famine, mass migration, and abrupt climatic shifts, may lead to international tensions and instability in regions affected and, therefore, have implications for the national security interests of the United States;

Whereas the United States has the largest economy in the world and is also the largest emitter of greenhouse gases;

Whereas the greenhouse gas emissions of the United States are projected to continue to rise;

Whereas the greenhouse gas emissions of developing countries are rising more rapidly than the emissions of the United States and will soon surpass the greenhouse gas emissions of the United States and other developed countries;

Whereas reducing greenhouse gas emissions to the levels necessary to avoid serious climatic disruption requires the introduction of new energy technologies and other climate-friendly technologies, the use of which results in low or no emissions of greenhouse gases or in the capture and storage of greenhouse gases;

Whereas the development and sale of climate-friendly technologies in the United States and internationally present economic opportunities for workers and businesses in the United States;

Whereas climate-friendly technologies can improve air quality by reducing harmful pollutants from stationary and mobile sources and can enhance energy security by reducing reliance on imported oil, diversifying energy sources, and

reducing the vulnerability of energy delivery infrastructure;

Whereas other industrialized countries are undertaking measures to reduce greenhouse gas emissions, which provides the industries in those countries with a competitive advantage in the growing global market for climate-friendly technologies;

Whereas efforts to limit emissions growth in developing countries in a manner that is consistent with the development needs of those countries could establish significant markets for climate-friendly technologies and contribute to international efforts to address climate change;

Whereas the United States Climate Change Science Program launched by President George W. Bush concluded in April 2006 that there is no longer a discrepancy between the rates of global average temperature increase observed at the Earth's surface and in the atmosphere, strengthening the scientific evidence that human activity contributes significantly to global temperature increases;

Whereas President Bush, in the State of the Union Address given in January 2006, called on the United States to reduce its "addiction" to oil and focus its attention on developing cleaner, renewable, and sustainable energy sources;

Whereas President Bush has launched the Asia-Pacific Partnership on Clean Development and Climate to cooperatively develop new and cleaner energy technologies and promote their use in fast-developing nations like India and China;

Whereas the national security of the United States will increasingly depend on the deployment of diplomatic, mili-

tary, scientific, and economic resources toward solving the problem of the overreliance of the United States and the world on high-carbon energy;

Whereas the United States is a party to the United Nations Framework Convention on Climate Change, done at New York May 9, 1992, and entered into force in 1994 (hereinafter referred to as the “Convention”);

Whereas, at the December 2005 United Nations Climate Change Conference in Montreal, Canada, parties to the Convention, with the concurrence of the United States, initiated a new dialogue on long-term cooperative action to address climate change;

Whereas the Convention sets a long-term objective of stabilizing greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system;

Whereas the Convention establishes that parties bear common but differentiated responsibilities for efforts to achieve the objective of stabilizing greenhouse gas concentrations;

Whereas an effective global effort to address climate change must provide for commitments and action by all countries that are major emitters of greenhouse gases, developed and developing alike, and the widely varying circumstances among the developed and developing countries may require that such commitments and action vary; and

Whereas the United States has the capability to lead the effort to counter global climate change: Now, therefore, be it

Resolved, That it is the sense of the Senate that the United States should act to reduce the health, environmental, economic, and national security risks posed by global climate change and foster sustained economic growth through a new generation of technologies, by—

(1) participating in negotiations under the United Nations Framework Convention on Climate Change, done at New York May 9, 1992, and entered into force in 1994, and leading efforts in other international fora, with the objective of securing United States participation in binding agreements that—

(A) advance and protect the economic and national security interests of the United States;

(B) establish mitigation commitments by all countries that are major emitters of greenhouse gases, consistent with the principle of common but differentiated responsibilities;

(C) establish flexible international mechanisms to minimize the cost of efforts by participating countries; and

(D) achieve a significant long-term reduction in global greenhouse gas emissions; and

(2) establishing a bipartisan Senate observer group, the members of which shall be designated by

the chairman and ranking member of the Committee on Foreign Relations of the Senate, to—

(A) monitor any international negotiations on climate change; and

(B) ensure that the advice and consent function of the Senate is exercised in a manner to facilitate timely consideration of any applicable treaty submitted to the Senate.

15 November 2006



Secretary-General

SG/SM/10739
ENV/DEV/904

Department of Public Information ? News and Media Division ? New York

CITING 'FRIGHTENING LACK OF LEADERSHIP' ON CLIMATE CHANGE, SECRETARY-GENERAL

CALLS PHENOMENON AN ALL-ENCOMPASSING THREAT IN ADDRESS TO NAIROBI TALKS

Following is the text of UN Secretary-General Kofi Annan's address to the Climate Change Conference, as delivered in Nairobi today, 15 November:

I thank the Government and people of Kenya for hosting this international conference. You have warmly welcomed thousands of people into your midst, and created excellent conditions for the crucially important work on our agenda. Thank you for yet another strong show of support for the United Nations.

All of us in this hall are devoted to the betterment of the human condition. All of us want to see a day when everyone, not just a fortunate few, can live in dignity and look to the future with hope. All of us want to create a world of harmony among human beings, and between them and the natural environment on which life depends.

That vision, which has always faced long odds, is now being placed in deeper jeopardy by climate change. Even the gains registered in recent years risk being undone.

Climate change is not just an environmental issue, as too many people still believe. It is an all-encompassing threat.

It is a threat to health, since a warmer world is one in which infectious diseases such as malaria and yellow fever will spread further and faster.

It could imperil the world's food supply, as rising temperatures and prolonged drought render fertile areas unfit for grazing or crops.

It could endanger the very ground on which nearly half the world's population live -- coastal cities such as Lagos or Cape Town, which face inundation from sea levels rising as a result of melting icecaps and glaciers.

All this and more lies ahead. Billion-dollar weather-related calamities. The destruction of vital ecosystems such as forests and coral reefs. Water supplies disappearing or tainted by saltwater intrusion.

Climate change is also a threat to peace and security. Changing patterns of rainfall, for example, can heighten competition for resources, setting in motion potentially destabilizing tensions and migrations, especially in fragile States or volatile regions. There is evidence that some of this is already occurring; more could well be in the offing.

This is not science fiction. These are plausible scenarios, based on clear and rigorous scientific modelling. A few diehard sceptics continue to deny "global warming" is taking place and try to sow doubt. They should be seen for what they are: out of step, out of arguments and out of time. In fact, the scientific consensus is becoming not only more complete, but also more alarming. Many scientists long known for their caution are now saying that global warming trends are perilously close to a point of no return.

A similar shift may also be taking place among economists. Earlier this month, a study by the former chief economist of the World Bank, Sir Nicholas Stern of the United Kingdom, called climate change “the greatest and widest-ranging market failure ever seen”. He warned that climate change could shrink the global economy by 20 per cent, and cause economic and social disruption on a par with the two World Wars and the Great Depression.

The good news is that there is much we can do in response. We have started using fossil fuels more cleanly and efficiently. Renewable energy is increasingly available at competitive prices. With more research and development -- current levels are woefully, dangerously low -- we could be much farther along.

Spurred by the Kyoto Protocol, international carbon finance flows to developing countries could reach \$100 billion per year. Markets for low-carbon energy products are expected to grow dramatically. But we need more “green” approaches to meet surging energy demand. And we need to put the right incentives in place to complement the constraint-based efforts that have prevailed to date.

The climate challenge offers real opportunities to advance development and place our societies on a more sustainable path. Low emissions need not mean low growth, or stifling a country’s development aspirations. So let there be no more denial. Let no one say we cannot afford to act. It is increasingly clear that it will cost far less to cut emissions now than to deal with the consequences later. And let there be no more talk of waiting until we know more. We know already that an economy based on high emissions is an uncontrolled experiment on the global climate.

But even as we seek to cut emissions, we must at the same time do far more to adapt to global warming and its effects. The impact of climate change will fall disproportionately on the world’s poorest countries, many of them here in Africa. Poor people already live on the front lines of pollution, disaster and the degradation of resources and land. Their livelihoods and sustenance depend directly on agriculture, forestry and fisheries. Think, for example, of the women and girls forced to forage for fuel and water in the absence of basic energy services. Or of the innumerable African communities that have suffered climate-related disasters in recent years. The floods of Mozambique, the droughts in the Sahel and here in Kenya, are fresh in our memories. For them, adaptation is a matter of sheer survival. We must make it a higher priority to integrate the risks posed by climate change into strategies and programmes aimed at achieving the Millennium Development Goals.

The message is clear. Global climate change must take its place alongside those threats -- conflict, poverty, the proliferation of deadly weapons -- that have traditionally monopolized first-order political attention. And the United Nations offers the tools the world needs to respond.

Regional and national initiatives have their value. But the UN Framework Convention is the forum in which a truly global response is being formulated. The Kyoto Protocol is now fully operational, and its Clean Development Mechanism has become a multibillion-dollar source of funding for sustainable development.

This mechanism is an outstanding example of a UN-led partnership linking government action to the private sector in the developing world. I am pleased to announce that six UN agencies have launched, at this conference, the “Nairobi Framework”, a plan to support developing countries, especially in Africa, participate in the Clean Development Mechanism. I encourage donor countries to help make these efforts a success. I am also pleased to note that today, UNDP and UNEP are embarking on an initiative to help developing countries, again including in Africa, to factor climate change into national development plans -- so-called “climate proofing” in areas such as infrastructure.

UN agencies will continue to bring their expertise to bear. But the primary responsibility for action rests with individual States -- and for now, that means those that have been largely responsible for the accumulation of carbon dioxide in the atmosphere. They must do much more to bring their emissions down. While the Kyoto Protocol is a crucial step forward, that step is far too small. And as we consider how to go further still, there remains a frightening lack of leadership.

In developing countries, meanwhile, emissions cannot continue to grow uncontrolled. Many of them have taken impressive action on climate change. Rapidly growing economies, like China, have been increasingly successful in decoupling economic growth from energy use, thereby reducing the emission intensities of their economies. But more needs to be done.

Business, too, can do its part. Changes in corporate behaviour, and in the way private investment is directed, will prove at least as significant in winning the climate battle as direct Government action.

And individuals too have roles to play. A single energy-efficient light bulb placed in a kitchen socket may not seem like much; but multiplied by millions, the savings are impressive. Voting power could be similarly compelling, if people were to make action on climate change more of an election issue than it is today and individuals, through their purchasing choices, can put pressure on corporations to go green.

There is still time for all our societies to change course. Instead of being economically defensive, let us start being more politically courageous. The Nairobi Conference must send a clear, credible signal that the world's political leaders take climate change seriously. The question is not whether climate change is happening or not, but whether, in the face of this emergency, we ourselves can change fast enough.

* * * * *

For information media ? not an official record

17 April 2007

Secretary-General

SG/SM/10949



SC/9001

ENV/DEV/921

Department of Public Information • News and Media Division • New York

CLIMATE CHANGE REQUIRES LONG-TERM GLOBAL RESPONSE,

SECRETARY-GENERAL TELLS SECURITY COUNCIL

Following is the text of the statement, as delivered today, by UN Secretary-General Ban Ki-moon at the Security Council debate on energy, security and climate:

Thank you for the opportunity to address the Security Council on this serious and timely topic.

Throughout human history, people and countries have fought over natural resources. From livestock, watering holes and fertile land, to trade routes, fish stocks and spices, sugar, oil, gold and other precious commodities, war has too often been the means to secure possession of scarce resources. Even today, the uninterrupted supply of fuel and minerals is a key element of geopolitical considerations.

Things are easier at times of plenty, when all can share in the abundance, even if to different degrees. But when resources are scarce — whether energy, water or arable land — our fragile ecosystems become strained, as do the coping mechanisms of groups and individuals. This can lead to a breakdown of established codes of conduct, and even outright conflict.

At the 2005 World Summit, Member States renewed their commitment to promoting a culture of prevention of armed conflict. They also pledged to strengthen the capacity of the United Nations to this end. The Security Council adopted resolution 1625 on conflict prevention, particularly in Africa, and reaffirmed the need to address the root causes of conflict.

In a series of reports on conflict prevention, my predecessor, Secretary-General Kofi Annan, pointed to the threats emanating from environmental degradation and resource scarcity. Let me quote from the latest of the reports: “Environmental degradation has the potential to destabilize already conflict-prone regions, especially when compounded by inequitable access or politicization of access to scarce resources. I

urge Member States to renew their efforts to agree on ways that allow all of us to live sustainably within the planet's means."

Excellencies, allow me to renew and amplify this call. Compared to the cost of conflict and its consequences, the cost of prevention is far lower — in financial terms but most importantly in human lives, and life quality.

I firmly believe that today, all countries recognize that climate change, in particular, requires a long-term global response, in line with the latest scientific findings, and compatible with economic and social development.

According to the most recent assessments of the Intergovernmental Panel on Climate Change, the planet's warming is unequivocal, its impact is clearly noticeable, and it is beyond doubt that human activities have been contributing considerably to it.

Adverse effects are already felt in many areas, including agriculture and food security; oceans and coastal areas; biodiversity and ecosystems; water resources; human health; human settlements; energy, transport and industry; and extreme weather events.

Projected changes in the earth's climate are thus not only an environmental concern. They can also have serious social and economic implications. And — as the Council points up today — issues of energy and climate change can have implications for peace and security. This is especially true in vulnerable regions that face multiple stresses at the same time — pre-existing conflict, poverty and unequal access to resources, weak institutions, food insecurity, and incidence of diseases such as HIV/AIDS.

Consider the following scenarios — all alarming, though not alarmist:

— The adverse effects of changing weather patterns, such as floods and droughts, and related economic costs, including compensation for lost land, could risk polarizing society and marginalizing communities. This, in turn, could weaken the institutional capacity of the State to resolve conflict through peaceful and democratic means, to ensure social cohesion, and to safeguard human rights.

— Extreme weather events and natural disasters, such as floods and drought, increase the risk of humanitarian emergencies, and thus the risk of instability and dislocation.

— Migration driven by factors, such as climate change could deepen tensions and conflicts, particularly in regions with large numbers of internally displaced persons and refugees.

— Scarce resources, especially water and food, could help transform peaceful competition into violence.

— Limited or threatened access to energy is already known to be a powerful driver of conflict. Our changing planet risk making it more so.

— And of course, the economic costs and losses of all these scenarios would impede the ability of countries to reach the Millennium Development Goals.

These are, of course, only possible scenarios. But we cannot sit back and watch to see whether they turn into reality. The entire multilateral machinery needs to come together to prevent it from becoming so.

We must focus more clearly on the benefits of early action. The resources of civil society and the private sector must be brought in. And this Council has a role to play in working with other competent intergovernmental bodies to address the possible root causes of conflict discussed today.

The Secretariat stands ready to assist all entities engaged in the pursuit of their respective mandates. I personally look forward to engaging with Member States on these issues, and hope that through discussions in various fora, we can develop a broad consensus on the way forward.

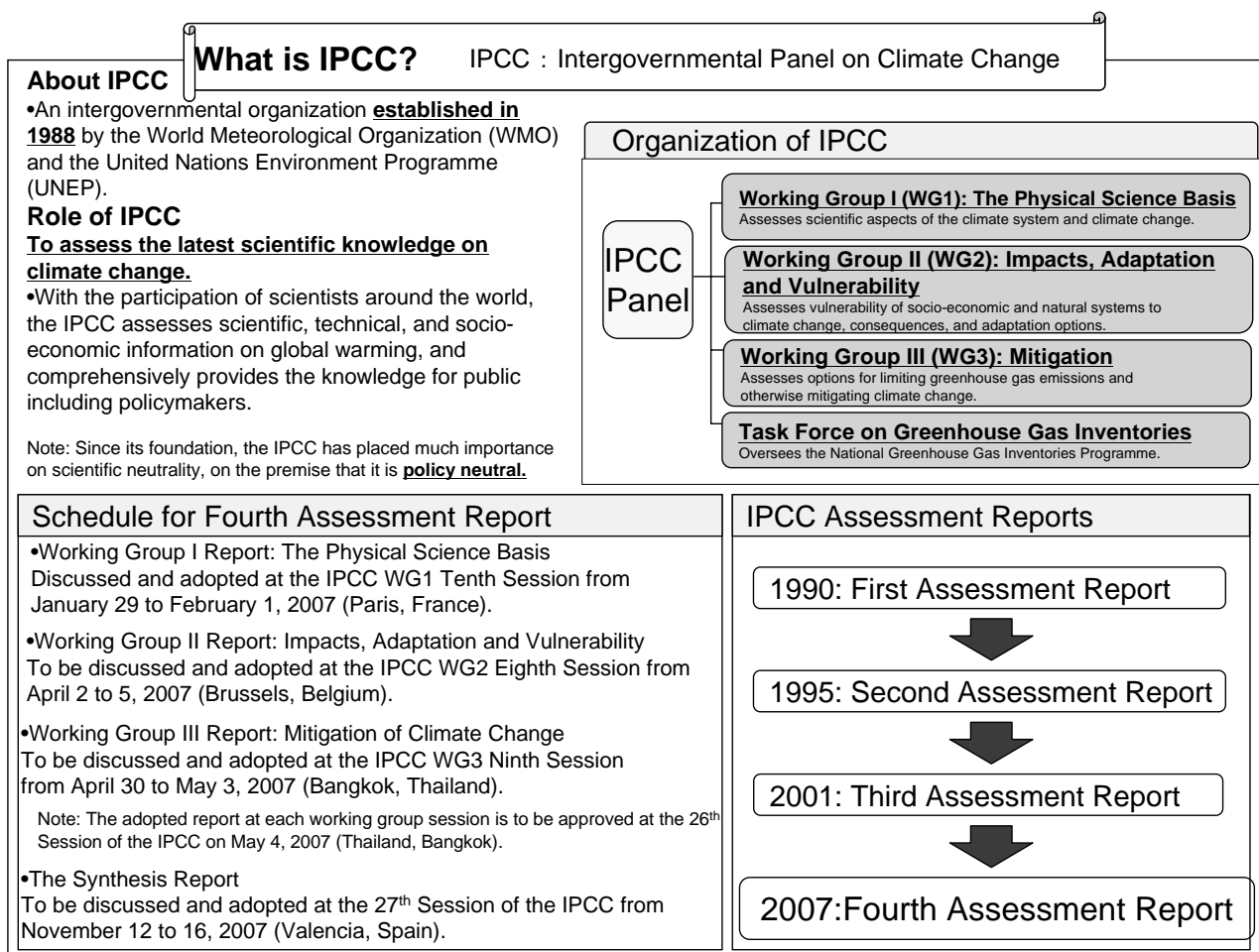
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Reference: “SECURITY COUNCIL HOLDS FIRST-EVER DEBATE ON IMPACT OF CLIMATE CHANGE ON PEACE, SECURITY, HEARING OVER 50 SPEAKERS (17 April 2007)”

<http://www.un.org/News/Press/docs/2007/sc9000.doc.htm>

5. Overview of IPCC Fourth Assessment Report

(For more details on the report, please refer to the IPCC website at <http://www.ipcc.ch/>)



IPCC 4th Assessment Report: Outline of WG1 Report - I

	Observed Changes	Projected Future Changes
Atmospheric Temperature	<ul style="list-style-type: none"> Global mean temperature increased by 0.74°C in the past 100 years. The linear warming trend over the last 50 years is nearly twice that for the last 100 years. <p>Global Mean Temperature and Difference (1961-1990)</p>	<ul style="list-style-type: none"> Projected to increase by 1.1°C ~ 6.4°C in the 21st century In a rapid economic growth scenario: about 4.0°C (<i>likely</i> range is 2.4°C to 6.4°C) In a sustainable scenario: about 1.8°C (<i>likely</i> range is 1.1°C to 2.9°C) <p>Projected changes in the 21st century (relative to 1980-1999)</p>
Sea Level	<ul style="list-style-type: none"> Rose about 1.8 mm per year (1961-2003) Rose about 3.1 mm per year (1993-2003) <p>Global Mean Sea Level (Rose by 0.17 m in the 20th century)</p>	<ul style="list-style-type: none"> Projected to rise by 0.18 m ~ 0.59 m In a rapid economic growth scenario: 0.26 m ~ 0.59 m In a sustainable scenario: 0.18 m ~ 0.38 m <p>Projected Sea Level Changes at the end of 21st century (rapid economic growth scenario)</p>

IPCC 4th Assessment Report: Outline of WG1 Report - II

Global warming is *very likely* due to increases in anthropogenic greenhouse gas concentration.

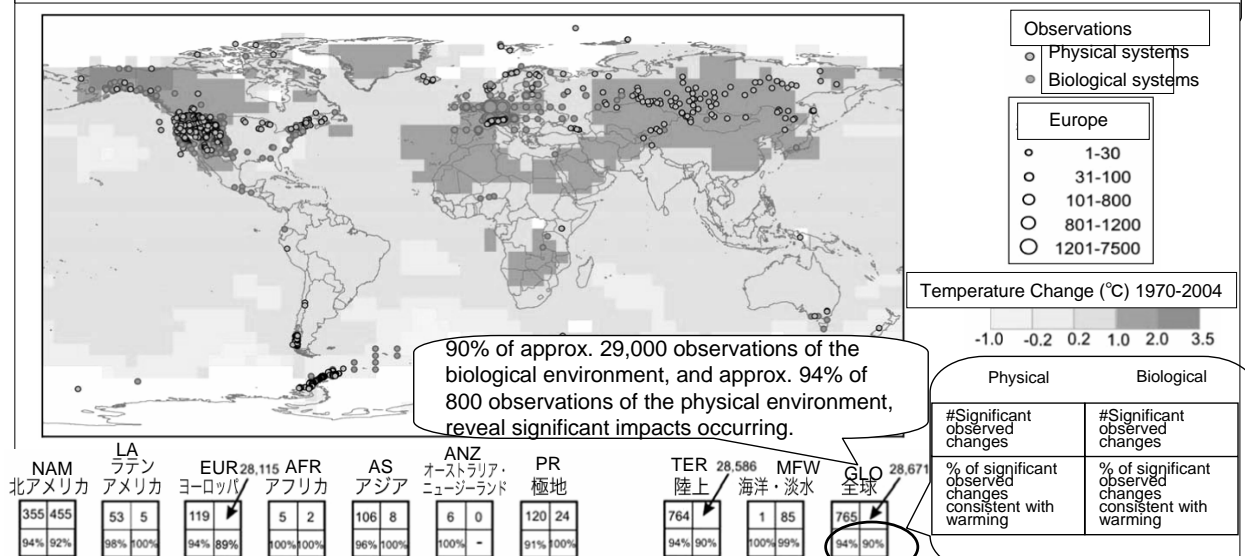
	Observed Changes	Projected Future Changes
Increase of CO ₂	<ul style="list-style-type: none"> Primary source of the increased CO₂ levels → Fossil fuel use, agriculture and land-use change Atmospheric CO₂ levels: about 1.4 times pre-industrial About 280 ppm (pre-industrial) → 379 ppm (2005) Annual fossil CO₂ emissions: about 1.1 times over the 1990s 6.4 GtC/year (1990s) → 7.2 GtC/year (2000-2005) 	<ul style="list-style-type: none"> CO₂ levels at the end of the 21st century: about 1.8 times to 4.5 times over pre-industrial levels (About 490 ppm ~ about 1,260 ppm)
Arctic Sea Ice	<ul style="list-style-type: none"> Shrunk by 2.7% per decade, with larger decreases in summer of 7.4% per decade. 	<ul style="list-style-type: none"> Arctic late-summer sea ice disappears almost entirely by the latter part of the 21st century, in some projections.
Ocean Acidification	<ul style="list-style-type: none"> Present decrease of 0.1 units since pre-industrial times 	<ul style="list-style-type: none"> Projected to decrease by between 0.14 and 0.35 units over the 21st century, adding to the present decrease.
Climate-Carbon Cycle Feedback		<ul style="list-style-type: none"> Decrease in absorption of atmospheric CO₂ into land and ocean, as the climate system warms. Increase in unabsorbed CO₂ in the atmosphere.
Precipitation	<ul style="list-style-type: none"> Precipitation changed in many regions. (1900-2005) Increase: Eastern parts of North and South America, northern Europe and northern and central Asia. Drying: the Sahel, the Mediterranean, and parts of southern Asia. More intense and longer droughts in wider areas (tropics and subtropics). The frequency of heavy precipitation events has increased over most land areas. 	<ul style="list-style-type: none"> The frequency of hot extremes, heat waves and heavy precipitation events → <i>Very likely</i> to increase Precipitation <ul style="list-style-type: none"> <i>Very likely</i> to increase in high latitudes <i>Likely</i> to decrease in most subtropical regions
Others	<ul style="list-style-type: none"> Typhoons and Hurricanes <ul style="list-style-type: none"> No clear trend in the annual numbers Suggested increases in intensity (since 1970) Water vapor content in the air has increased since 1980 (land, ocean). Permafrost <ul style="list-style-type: none"> Temperatures at the top of the permafrost layer has risen by up to 3°C (Arctic, since the 1980s). The maximum area covered by frozen ground in winter has decreased by about 7% (Northern Hemisphere, since 1900) 	<ul style="list-style-type: none"> Typhoons and Hurricanes <ul style="list-style-type: none"> Annual decrease in number Increase in intensity Increase in peak wind speeds and precipitation

1. Improved Scientific Understanding of Global Warming Impacts – Status

- Observational evidence from all continents and most oceans shows that many natural systems are being affected by regional climate changes, particularly temperature increases.

Source: AR4 SPM (IPCC Fourth Assessment Report Summary for Policymakers)

Correlations based on worldwide observations¹ of changes in physical and biological environments².



Note: Polar Regions include also observed changes in marine and freshwater biological systems. "Marine and freshwater" includes observed changes at sites and large areas in oceans, small islands, and locations within continents.

*1: A subset of about 29,000 data series was selected from about 80,000 data series from 577 studies. These met the following criteria: (1) Ending in 1990 or later; (2) spanning a period of at least 20 years; and (3) showing a significant change in either direction, as assessed in individual studies.

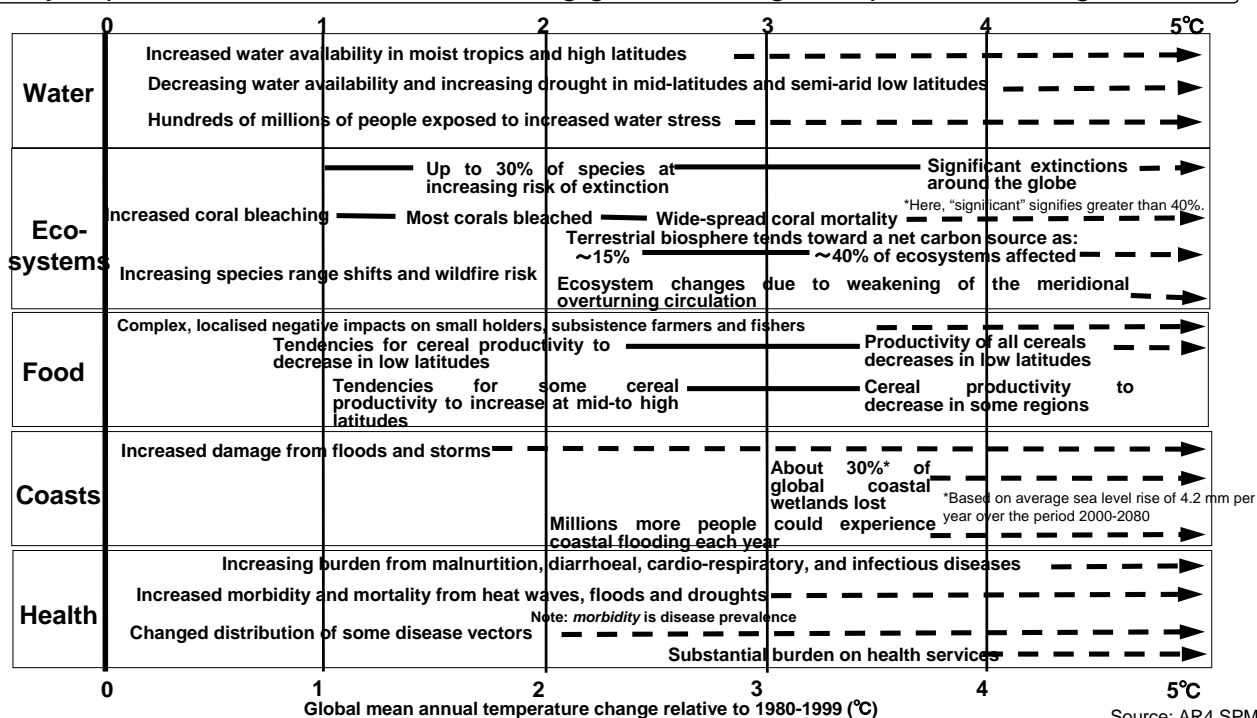
*2: "Physical systems" in this regard includes areas of snow, ice and frozen ground; hydrology; and coastal processes; "biological systems" refers to terrestrial, marine, and freshwater biological systems.

Source: AR4 SPM

2. Future impacts projected in different sectors

Climate change is projected to have negative impacts on vulnerable sectors, even with a 0-1°C rise in temperature.

Key impacts as a function of increasing global average temperature change



Source: AR4 SPM

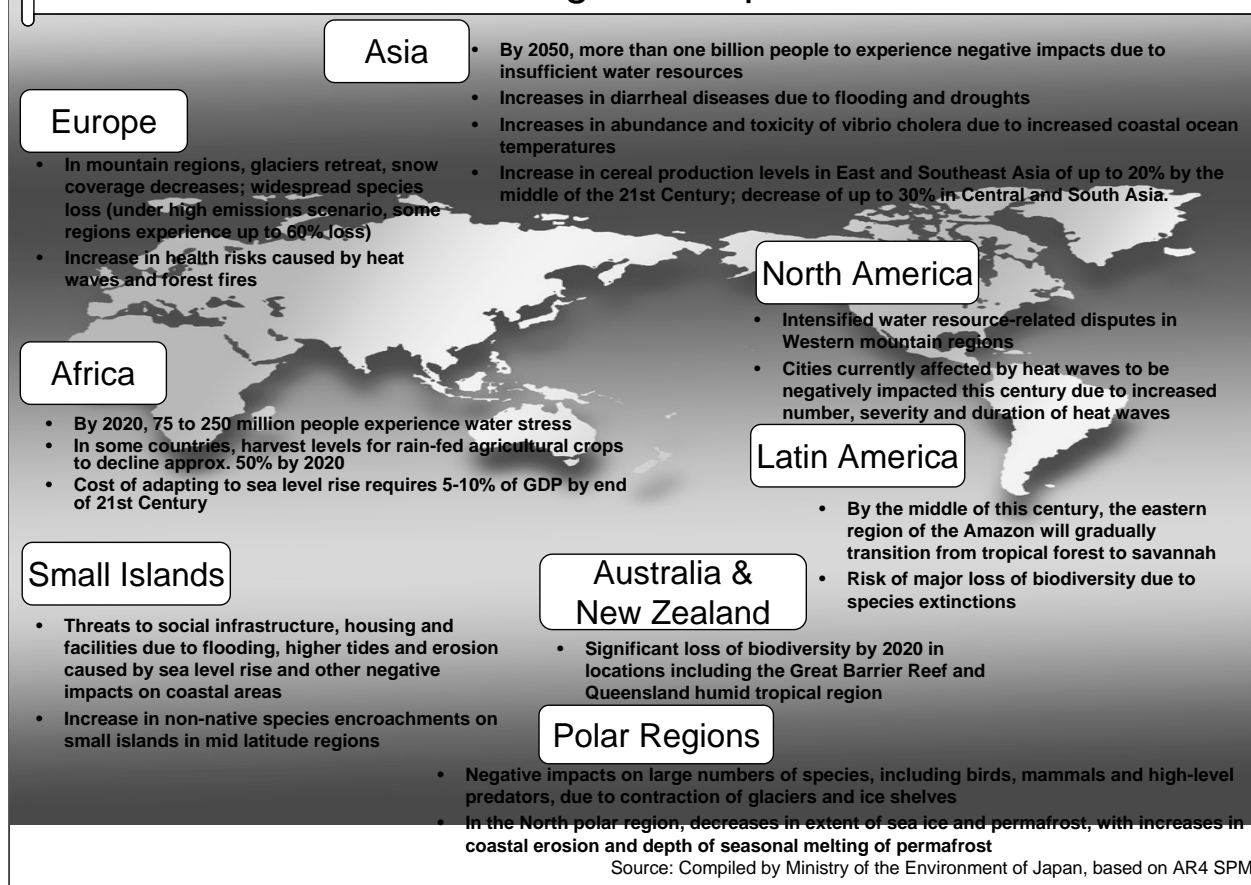
3. Sectoral Impacts Accompanying Increases in Global Average Temperatures

From the Report of Working Group II for the IPCC Fourth Assessment Report (Issued April 6, 2007)

Temperature increase (above baseline)	Impacts expected due to associated range of temperature increase
0°C-1°C	<ul style="list-style-type: none"> •Water: Increase in water availability in humid tropical regions and high latitude regions •Water: Decrease in water availability and increase in droughts in mid latitude regions and semi-arid low latitude regions •Water: Several hundred million people face more severe water scarcity •Coral Bleaching: Increase in coral bleaching •Ecosystems: Changes in species distributions and increased forest fire risks •Food: Localized and compound negative impacts on small-scale and subsistence farmers and fishers •Coasts: Increased damages due to floods and strong winds •Health: Increased morbidity and mortality rates due to heat waves, floods and droughts •Health: Changes in distribution of some disease vector species •Health: Increased societal burdens due to malnutrition, diarrheal diseases, respiratory ailments and infectious diseases
1°C-2°C	<ul style="list-style-type: none"> •Species Extinctions: 20-30% of plant and animal species face increased risks of extinction given more than a 1.5-2.5 °C increase •Coral Bleaching: Frequent bleaching events and large-scale coral die-offs due to 1-3 °C increase in ocean surface temperatures •Food: Decreased cereal productivity in low latitude regions, and increased productivity of some cereals in mid latitude regions
2°C-3°C	<ul style="list-style-type: none"> •Coral Bleaching: Large-scale coral die-offs •Ecosystems: Impacts on ~15% of ecosystems •Ecosystems: Changes in ecosystems due to weakening of deep ocean circulation •Coastal Regions: Increase of several hundred million people affected by annual flooding •Health: Major burdens on health services •Net benefits decrease and net costs increase with impacts of climatic changes in all regions
3°C-4°C	<ul style="list-style-type: none"> •Species Extinctions: Major (greater than 40%) extinctions of species worldwide •Ecosystems: Impacts on ~40% of ecosystems; terrestrial biomes become net carbon emissions sources •Food: Decreased productivity for all cereals in low latitude regions and decreased productivity for some cereals in other regions •Coastal Regions: Loss of 30% of coastal wetlands worldwide due to sea level rise

Source: Compiled by Ministry of the Environment of Japan, based on AR4 SPM.

4. Regional Impacts



Source: Compiled by Ministry of the Environment of Japan, based on AR4 SPM.

5. Significance of the Report of Working Group II for the IPCC Fourth Assessment Report (Issued April 6, 2007) - 1

1. Unanimous agreement among all participating countries and scientific consensus (based on concrete data from various sectors and regions), that:
 - 1) the impacts of climate change are already occurring worldwide, and
 - 2) these impacts will worsen in future

▶ Provided a solid scientific basis for future international negotiations; expected to contribute to accelerating the pace of negotiations.

▶ Now that we have entered an era in which we must “live with climate change,” the report indicates the importance of adaptation measures, especially for vulnerable developing countries.

6. Significance of the Report of Working Group II for the IPCC Fourth Assessment Report (Issued April 6, 2007) - 2

2. While the economic impacts are becoming somewhat clearer, there are large disparities between regions and sectors. There is a very high likelihood that the globally-aggregated figures underestimate the damage costs, as various unquantifiable impacts will not be able to be included in calculations.

▶ If the average global temperature increase is kept to less than a 1-3°C increase above 1990 levels, there will be benefits for some regions and sectors, while other regions and sectors will face costs. However, some low latitude regions and the Polar Regions will experience negative economic impacts even with slight temperature increases. Increases of greater than 2-3°C will negatively impact all regions economically.

3. The impacts on specific sectors and regions will differ greatly, even though they may experience the same amount of warming.

▶ An increase of only 0-1 °C would impact vulnerable sectors and regions. Based on the report, it is difficult to determine what would be a safe level of warming.

Mitigation in the short and medium term (until 2030)

Global greenhouse gas (GHG) emissions have grown since pre-industrial times, with an increase of 70% between 1970 and 2004 . (49 Gigatonnes of carbon dioxide equivalents (GtCO₂-eq) emitted in 2004) . With current policies and related practices, global GHG emissions will continue to grow over the next few decades .

Global economic mitigation potential in 2030 could offset the projected growth of global emissions or reduce emissions below current levels.

Global economic mitigation potential in 2030 estimated from bottom-up studies

Carbon price (US\$/tCO ₂ -eq)	Economic potential (GtCO ₂ -eq/yr)
0	5-7
20	9-17
50	13-26
100	16-31

Key mitigation technologies and practices

Sector	Key mitigation technologies and practices currently commercially available	Key mitigation technologies and practices projected to be commercialized before 2030
Energy Supply	Fuel switching; nuclear power; renewable heat and power (hydropower, solar, wind, etc.); early applications of CCS (e.g. storage of removed CO ₂ from natural gas)	Carbon Capture and Storage (CCS) for gas, biomass and coal-fired electricity generating facilities; advanced nuclear power; advanced renewable energy
Transport	Hybrid vehicles; biofuels; modal shifts from road transport to rail and public transport systems; non-motorised transport (cycling, walking)	Second generation biofuels; higher efficiency aircraft; advanced electric and hybrid vehicles
Buildings	Efficient lighting; recovery and recycle of fluorinated gases	Integrated design of commercial buildings including technologies, such as intelligent meters; solar PV integrated in buildings
Industry	Heat and power recovery; material recycling and substitution	Advanced energy efficiency; CCS for iron manufacture, etc.
Agriculture	Improved crop and grazing land management to increase soil carbon storage; improved livestock and manure management to reduce CH ₄ emissions	Improvements of crops yields
Forestry/forests	Afforestation; reforestation; forest management; reduced deforestation	Tree species improvement to increase biomass productivity; improved remote sensing technologies for mapping land use change
Waste	Landfill methane recovery; waste incineration with energy recovery; composting of organic waste; recycling and waste minimization	Biocovers and biofilters to optimize CH ₄ oxidation

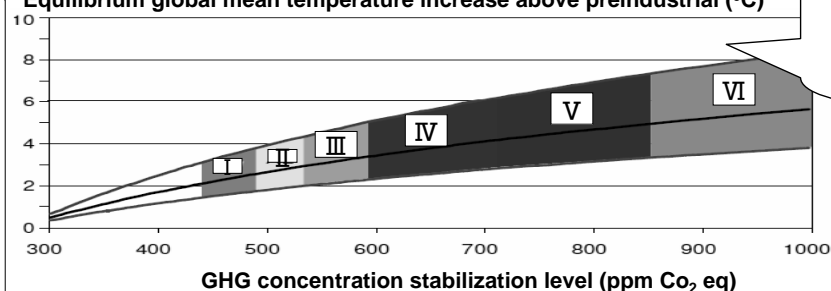
Mitigation in the long term - I

In order to stabilize the concentration of GHGs in the atmosphere, emissions would need to peak and decline thereafter. The lower the stabilization level, the more quickly this peak and decline would need to occur. Mitigation efforts over the next two to three decades will have a large impact on opportunities to achieve lower stabilization levels.

Category	CO ₂ Concentration (ppm)	CO ₂ -eq Concentration (ppm)	Global mean temperature increase above pre-industrial at equilibrium (°C)	Peaking year for CO ₂ emissions (year)	Change in global CO ₂ emissions in 2050 (% of 2000 emissions) (%)
I	350-400	445- 490	2.0-2.4	2000-2015	-85 to -50
II	400-440	490- 535	2.4-2.8	2000-2020	-60 to -30
III	440-485	535- 590	2.8-3.2	2010-2030	-30 to +5
IV	485-570	590- 710	3.2-4.0	2020-2060	+10 to +60
V	570-660	710- 855	4.0-4.9	2050-2080	+25 to +85
VI	660-790	855-1130	4.9-6.1	2060-2090	+90 to +140

6 stabilization scenarios and global mean temperature increase

Equilibrium global mean temperature increase above preindustrial (°C)



Red line: climate sensitivity of 4.5°C "upper bound of likely range"
 Black line: climate sensitivity of 3°C "best estimate"
 Blue line: climate sensitivity of 2°C "lower bound of likely range"

Mitigation in the long-term – II / policies, measures, instruments

Macro-economic Costs

Estimated global macro-economic costs in 2030 relative to the baseline for least-cost trajectories towards different long-term stabilization targets

Stabilization levels (ppm CO ₂ -eq)	Median GDP reduction (%)	Range of GDP reduction (%)	Reduction of average annual GDP growth rates (percentage points)
590-710	0.2	-0.6 – 1.2	<0.06
535-590	0.6	0.2 – 2.5	<0.1
445-535	not available	<3	<0.12

Estimated global macro-economic costs in 2050 relative to the baseline for least-cost trajectories towards different long-term stabilization targets

Stabilization levels (ppm CO ₂ -eq)	Median GDP reduction (%)	Range of GDP reduction (%)	Reduction of average annual GDP growth rates (percentage points)
590-710	0.5	-1 ~ (+)2	<0.05
535-590	1.3	slightly negative ~ (+)4	<0.1
445-535	not available	<5.5	<0.12

The range of stabilization levels assessed can be achieved by deployment of a portfolio of technologies that are currently available and those that are expected to be commercialized in coming decades. This assumes that appropriate and effective incentives are in place for development of technologies and etc. for addressing related barriers.

Policies that provide a real or implicit price of carbon could create incentives for producers and consumers to significantly invest in low-GHG products, technologies and processes. Such policies could include economic instruments, government funding and regulation.

6. Executive Summary of the Stern Review

30 October 2006

Publication of the Stern Review on the Economics of Climate change

The most comprehensive review ever carried out on the economics of climate change was published today.

The Review, which reports to the Prime Minister and Chancellor, was commissioned by the Chancellor in July last year. It has been carried out by Sir Nicholas Stern, Head of the Government Economic Service and former World Bank Chief Economist.

Sir Nicholas said today:

“The conclusion of the Review is essentially optimistic. There is still time to avoid the worst impacts of climate change, if we act now and act internationally. Governments, businesses and individuals all need to work together to respond to the challenge. Strong, deliberate policy choices by governments are essential to motivate change.

But the task is urgent. Delaying action, even by a decade or two, will take us into dangerous territory. We must not let this window of opportunity close.”

The first half of the Review focuses on the impacts and risks arising from uncontrolled climate change, and on the costs and opportunities associated with action to tackle it. A sound understanding of the economics of risk is critical here. The Review emphasises that economic models over timescales of centuries do not offer precise forecasts ? but they are an important way to illustrate the scale of effects we might see.

The Review finds that all countries will be affected by climate change, but it is the poorest countries that will suffer earliest and most. Unabated climate change risks raising average temperatures by over 5°C from pre-industrial levels. Such changes would transform the physical geography of our planet, as well as the human geography ? how and where we live our lives.

Adding up the costs of a narrow range of the effects, based on the assessment of the science carried out by the Intergovernmental Panel on Climate Change in 2001, the Review calculates that the dangers of unabated climate change would be equivalent to at least 5% of GDP each year.

The Review goes on to consider more recent scientific evidence (for example, of the risks that greenhouse gases will be released naturally as the permafrost melts), the economic effects on human life and the environment, and approaches to modelling that ensure the impacts that affect poor people are weighted appropriately. Taking these together, the Review estimates that the dangers could be equivalent to 20% of GDP or more.

In contrast, the costs of action to reduce greenhouse gas emissions to avoid the worst impacts of climate change can be limited to around 1% of global GDP each year. People would pay a little more for carbon-intensive goods, but our economies could continue to grow strongly.

If we take no action to control emissions, each tonne of CO₂ that we emit now is causing damage worth at least \$85 ? but these costs are not included when investors and consumers make decisions about how to spend their money. Emerging schemes that allow people to trade reductions in CO₂ have demonstrated that there are many opportunities to cut emissions for less than \$25 a tonne. In other words, reducing emissions will make us better off. According to one measure, the benefits over time of actions to shift the world onto a low-carbon path could be in the order of \$2.5 trillion each year.

The shift to a low-carbon economy will also bring huge opportunities. Markets for low-carbon technologies will be worth at least \$500bn, and perhaps much more, by 2050 if the world acts on the scale required.

Tackling climate change is the pro-growth strategy; ignoring it will ultimately undermine economic growth.

The Review looks at what this analysis means for the level of ambition of global action. It concludes that the levels of greenhouse gases in the atmosphere should be limited to

somewhere within the range 450 - 550ppm CO₂e (CO₂ equivalent). Anything higher would substantially increase risks of very harmful impacts but would only reduce the expected costs of mitigation by comparatively little. Anything lower would impose very high adjustment costs in the near term and might not even be feasible, not least because of past delays in taking strong action.

The second half of the Review examines the national and international policy challenges of moving to a low-carbon global economy.

Climate change is the greatest market failure the world has seen. Three elements of policy are required for an effective response.

The first is carbon pricing, through taxation, emissions trading or regulation, so that people are faced with the full social costs of their actions. The aim should be to build a common global carbon price across countries and sectors.

The second is technology policy, to drive the development and deployment at scale of a range of low-carbon and high-efficiency products. And the third is action to remove barriers to energy efficiency, and to inform, educate and persuade individuals about what they can do to respond to climate change. Fostering a shared understanding of the nature of climate change, and its consequences, is critical in shaping behaviour, as well as in underpinning both national and international action.

Effective action requires a global policy response, guided by a common international understanding of the long-term goals for climate policy and strong frameworks for co-operation. Key elements of future international frameworks should include:

Emissions trading:

- Expanding and linking the growing number of emissions trading schemes around the world is a powerful way to promote cost-effective reductions in emissions and to bring forward action in developing countries.
- Strong targets in rich countries could drive flows amounting to tens of billions of dollars each year to support the transition to low-carbon development paths.

Technology co-operation:

- Informal co-ordination as well as formal agreements can boost the effectiveness of investments in innovation around the world.
- Globally, support for energy research and development should at least double, and support for the deployment of low-carbon technologies should increase up to five-fold.
- International co-operation on product standards is a powerful way to boost energy efficiency.

Action to reduce deforestation:

- The loss of natural forests around the world contributes more to global emissions each year than the transport sector. Curbing deforestation is a highly cost-effective way to reduce emissions; large-scale international pilot programmes to explore the best ways to do this should get underway very quickly.

Adaptation:

- The poorest countries are most vulnerable to climate change. It is essential that climate change be fully integrated into development policy, and that rich countries honour their pledges to increase support through overseas development assistance.
- International funding should also support improved regional information on climate change impacts, and research into new crop varieties that will be more resilient to drought and flood.

Notes for editors

- Pre-industrial levels of greenhouse gases in the atmosphere were 280ppm CO₂ equivalent (CO₂e). The current concentration is 430ppm CO₂e.
- The Review examined evidence from many different economic models of the impacts of climate change and of the costs and benefits of mitigation. One model, PAGE2002, was

used to illustrate the results from considering new scientific evidence and a wider range of impacts. This model was chosen because it specifically allows for a rigorous statistical treatment of risk and uncertainty.

- The Stern Review can be downloaded at **www.sternreview.org.uk**. Background on the Review, including the terms of reference and responses to the Call for Evidence, can also be found here.
- Sir Nicholas Stern is Head of the Government Economic Service, and Adviser to the UK Government on the Economics of Climate Change and Development. He is a former Chief Economist of the World Bank.
- For media enquiries, please call 020 7270 6280, or email **sterninvites@hm-treasury.gsi.gov.uk**.

TITLE:Press: 2006-stern

DATE:2006/10/30 21:05

URL:**http://www.hm-treasury.gov.uk/newsroom_and_speeches/press/2006/press_stern_06.cfm**

Projected Impacts of Climate Change

Global temperature change (relative to pre-industrial)

0°C

1°C

2°C

3°C

4°C

5°C

Food

Falling crop yields in many areas, particularly developing regions

Possible rising yields in some high latitude regions

Falling yields in many developed regions

Water

Small mountain glaciers disappear – water supplies threatened in several areas

Significant decreases in water availability in many areas, including Mediterranean and Southern Africa

Sea level rise threatens major cities

Ecosystems

Extensive Damage to Coral Reefs

Rising number of species face extinction

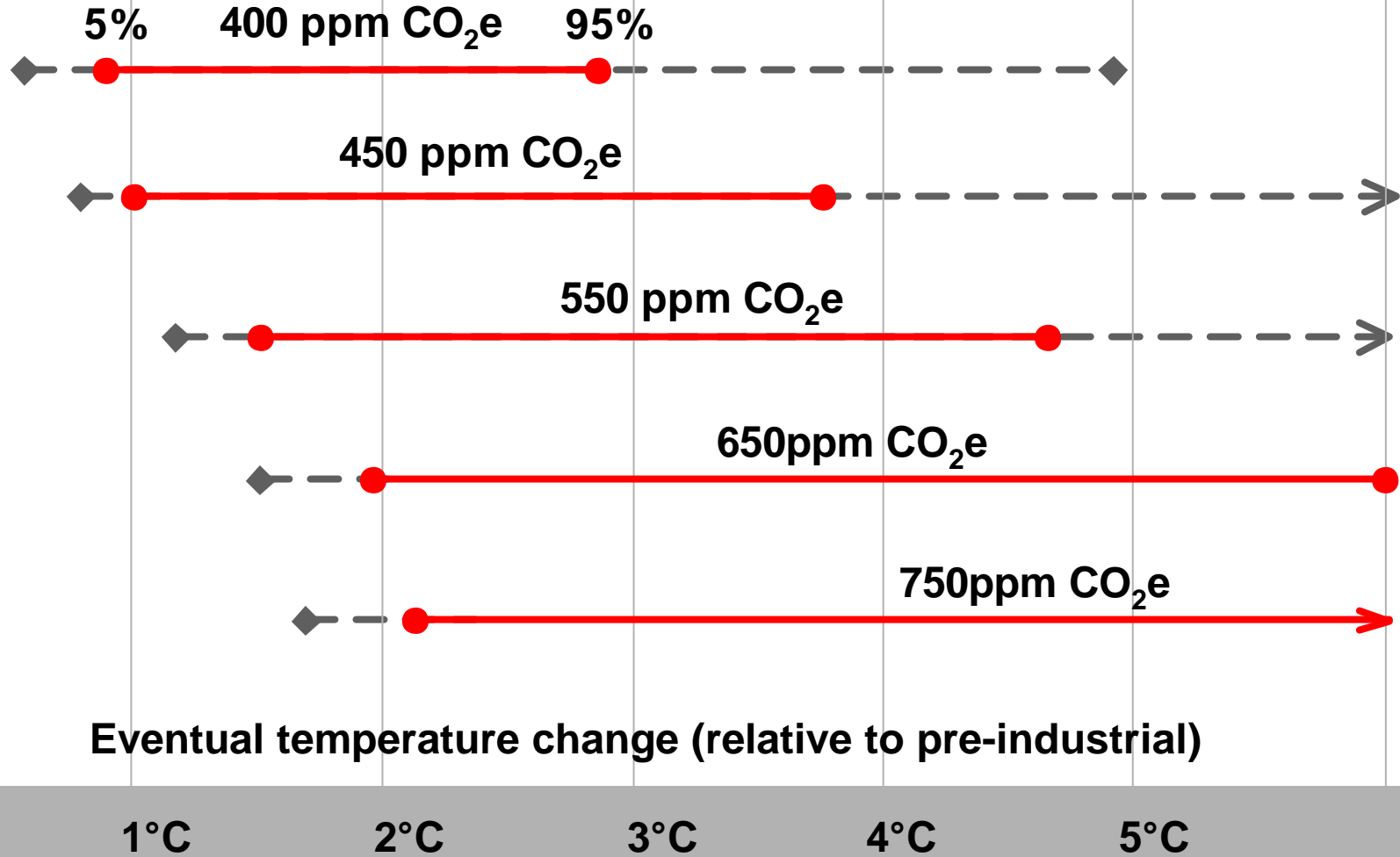
Extreme Weather Events

Rising intensity of storms, forest fires, droughts, flooding and heat waves

Risk of Abrupt and Major Irreversible Changes

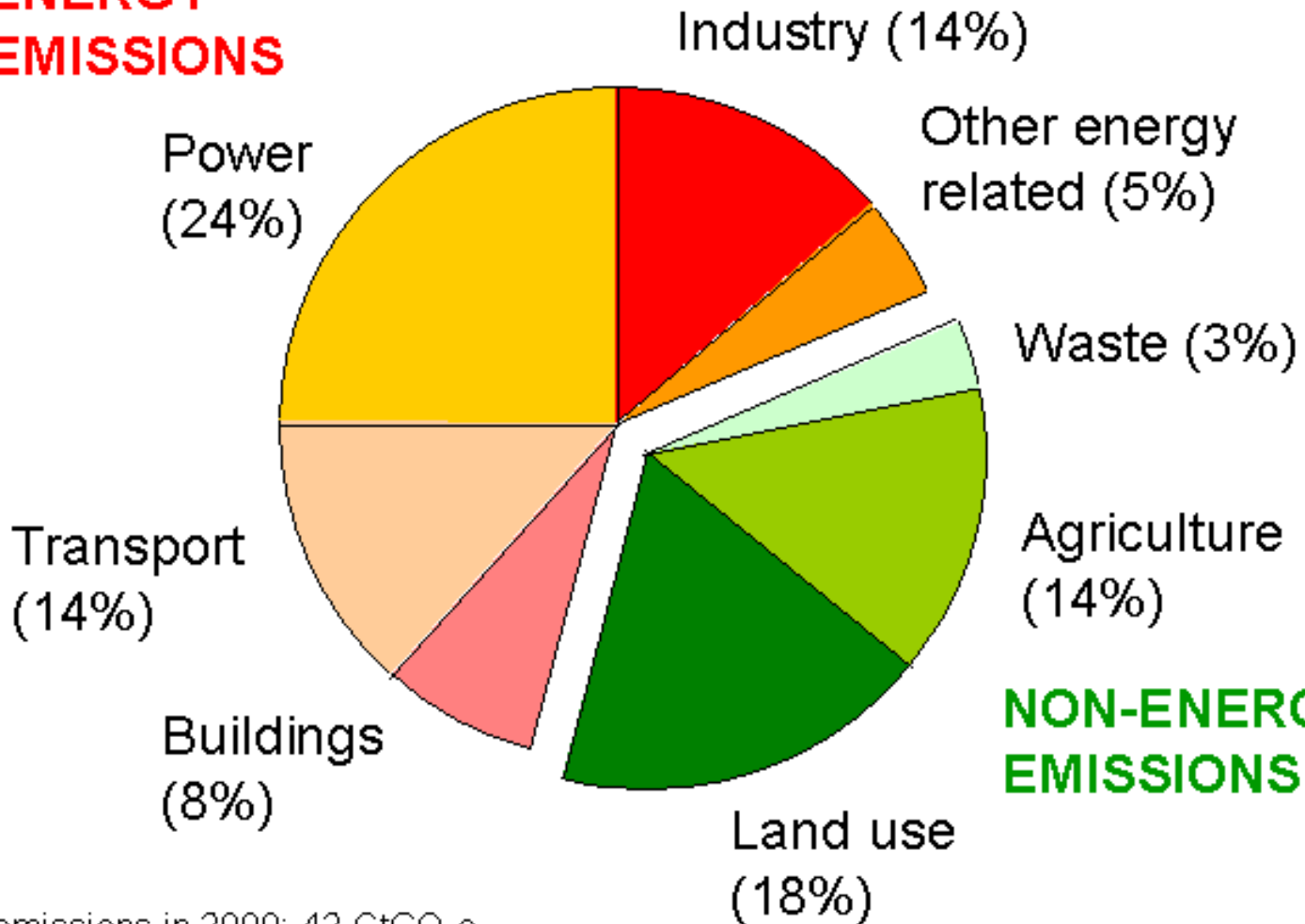
Increasing risk of dangerous feedbacks and abrupt, large-scale shifts in the climate system

Stabilisation and Commitment to Warming



Global Emissions by Sector

ENERGY EMISSIONS



Total emissions in 2000: 42 GtCO₂e.

NON-ENERGY EMISSIONS