

Building Upon Kyoto: The Long Term Prospects of International Climate Policy

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The papers in this report are based on presentations at the "International Conference on Long-term Prospect of International Climate Change Policy" which FoE Japan and Kiko Network hosted on 20-21 February 2004 in central Tokyo. The first day of this two-day conference reviewed the UNFCCC process and the latest climate science as well as in-depth analyses of different post-2012 regimes that had been proposed to date. The environmental community's view on the future targets was also presented. The second day focused on the current status and challenges of policy implementation in key industrialized countries. The conference was intended to provide vital information for policymakers, experts and the general public in considering long-term international climate policies. Additional conference information is available at http://www.foejapan.org/en/climate_evt_2e.html

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Foreword

Mie Asaoka, President, Kiko Network

It is now six years since the Kyoto Protocol was adopted in December 1997 as the international framework for long-term policies to address the threat posed by climate change – a threat unlike any experienced before by human society.

While the Kyoto Protocol is not yet in force (due to the unilateral declaration by the George W. Bush Administration of the United States that it would not follow the Kyoto Protocol, as well as delay in Russia's ratification of it) already many difficulties have been overcome, with detailed operational rules for the implementation of the Kyoto Protocol having been agreed upon at the Seventh Conference of the Parties (COP7), and more than 120 countries having ratified it. This indicates that the large majority of the countries and people of the world are strongly in support of the Kyoto Protocol as the only international system of rules that could allow us to confront global warming.

The Kyoto Protocol has been said by some to “amount to nothing more than the establishment of a goal for reducing levels of greenhouse gas emissions during the period 2008-2012.” But in fact, the Kyoto Protocol is an historic agreement, in that its fundamental framework recognizes that the means of overcoming global warming must be through the ongoing establishment (and monitoring) of successive agreements for emission levels for each five-year period into the future; this the fundamental future policy for global climate change.

Also, while some have ridiculed the process of international negotiations on climate change until now as a mere “game of diplomacy,” we must not overlook the fact that the expectations of future generations have been entrusted to us in this process. Moreover, the past ten years of working to reach consensus on international policies on climate change through dialogue and consultation has been an invaluable experience for today's international politics, occurring, as it has, with the world watching, using the United Nations as the venue to seek to overcome divisions between countries (including between North and South), and attempting to develop a just and fair shared approach to tackling the most important problem faced by the international community.

During this time, the treaties of climate change have crept ever closer. In order for us to limit the scale and speed of climate change to that which can be adapted to by ecosystems, it is essential to limit the future rise in global average temperatures to below 2 degrees Celsius, and in order to accomplish this, we must try to greatly reduce global emissions of greenhouse gas emissions. The reduction targets for the first five-year commitment period under the Kyoto Protocol are no more than a mere first step in this process. Starting with the second commitment period, it is vital to quickly develop the international framework further.

In contrast to this, there has been a movement, even within Japan, to seek to change to an international regime different from the Kyoto Protocol. There has been a movement to

downplay the impact of global warming, saying that “at most, even with a doubling of carbon dioxide concentrations in the atmosphere, the temperature will only rise a few degrees,” hopes for rapid progress in technological innovation have been used to provide a cover for delaying making reductions in greenhouse gas emissions.

Even without waiting for the Kyoto Protocol to come into force, various countries are already using it as a guide for the development of domestic policies to address climate change. In Japan, while they are insufficient, guidelines have been adopted to promote activities to reach the target established for the first commitment period. However, those responsible for economic and industrial policy are working to preserve existing policies, regarding the sector-specific reduction targets set under these guidelines as merely the results of a “domestic negotiation game,” and through dividing the 2002-2012 timeframe into three sub-periods for which goals will be re-evaluated through a “step-by-step” approach. While this year is the final year of the first sub-period, and re-evaluation activities have already been initiated, it goes without saying that the development of domestic policies needs to be related to the framework of long-term international policies, as well as to the importance of the discussions occurring about the future of the international framework.

Tokiharu Okazaki, Executive Director, Friends of the Earth Japan

David Brower, founder of Friends of the Earth, said “we do not inherit the Earth from our ancestors, we borrow it from our children.” Members of parliament, government bureaucrats, and managers and staff of corporations all come home to their children at the end of the day. If it is true that we are borrowing the Earth from our descendants, it is unforgivable if we leave it polluted and deplete its resources. Those who would be ordinary citizens once they return home, when they return to being parliament workers, public bureaucrats, or corporate representative, follow shortsighted policies that emphasize only short-term economic benefit. It seems truly strange to me how the current situation allows for people to act while abdicating their accountability to their descendants fifty or one hundred years in the future.

Advocacy NGOs have been conducting activities calling on government and industry to “change the economic pattern of large-scale production, consumption, and disposal,” to “reform energy policies,” and similar goals. Grassroots citizens groups are also conducting public education activities, calling for the “promotion of the use of natural renewable energy,” “reduction of energy use at home,” and “use of public transportation,” among others. Nevertheless, emissions of carbon dioxide are not decreasing, but in fact continue to increase. As citizens’ movements are not achieving results, it must be that something is blocking their progress.

We are too steeped in a lifestyle that wastes energy. Our economic prosperity has become an enemy itself. Industry claims that “household energy reductions efforts aren’t good enough,” while citizens groups claim that “industry’s measures are insufficient,” but those who make these statements are in reality one in the same. In other word, they wish to push the problem of responding to global warming on to others; there are too many people who would like to enjoy a convenient society for themselves, and who do not see the big picture. As long as all citizens do

not recognize this predicament, it will not be possible for us to return a “healthy world” for our descendents. I think that it would be useful if citizen movements in the future could find a way for members of parliament, bureaucrats and employees of corporations to all participate, each as “a member of a household.” We at FoE Japan, as we interact with members of the Diet, bureaucrats, and members of industry, feel that there is a growing awareness of the need to “return the Earth to our children.” Will you all join us in expanding this shared consciousness?

A Viable Global Framework for Preventing Dangerous Climate Change

Jennifer Morgan (World Wildlife Fund)¹
Jeff Fiedler (Natural Resources Defense Council)²

Introduction

The primary and ongoing legal obligation on all countries belonging to the Climate Convention is to prevent dangerous anthropogenic interference with the climate system. This paper outlines an approach for operationalizing this Article 2 requirement and presents a policy framework for a global agreement to achieve this goal. The paper is based heavily on the Climate Action Network Position Paper on the Adequacy of Commitments (released at COP-8) and CAN Discussion Paper A Viable Global Framework for Preventing Dangerous Climate Change. (released at COP-9).³

In order to preventing dangerous climate change global mean warming needs to be limited to a peak increase of below 2°C (above pre-industrial times) and reduced as fast as possible thereafter. Furthermore, the rate of temperature change must be reduced below 0.1°C per decade. This will not avoid major damages and therefore cannot be considered “acceptable.” However, we are already committed to warming over 1°C and these goals are still achievable and reduce climate impact risks to the extent possible.

Achieving these goals requires significant emission reductions, initially from industrialized countries and in the long term globally. This will not happen outside of a clear and equitable global political framework for allocating the burden of action. The core principles of this framework are those of equity, historical responsibility, and ability or capacity to act.

The proposed framework retains the Kyoto Protocol architecture of legally binding emission reductions in successive commitment periods for industrialized countries. This system provides the essential driving force for technological innovation and change leading to large emission reductions from the richer countries. The framework adds a Greening (or Decarbonisation) track for some developing countries, which aims to rapidly introduce sustainable energy production and end-use technologies, systems and practices. This should result in Greening (decarbonisation) of energy services in developing countries whilst accelerating the achievement of sustainable development priorities and objectives as part of national development pathways. As countries develop they would need to move in gradual stages from the Greening track to the Kyoto track. An Adaptation track is included for the most vulnerable regions and countries to

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³ These papers are available at www.climatenetwork.org. We also acknowledge the considerable contribution of Bill Hare to the development of both these papers.

deal with climate change that is deemed to be unavoidable. Some countries will only participate in the Adaptation track. Others will participate in both.

What is Dangerous? Operationalizing Article 2 of the UNFCCC

Article 2 of the United Nations Framework Convention on Climate Change (UNFCCC) states:

“The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.”

Defining dangerous interference is a policy decision that involves values as much as it does technical information. Nevertheless, technical information on the current state of the climate, and projections of the types of risks and their likelihood, should form the basis for operationalizing Article 2. The climate system is now in an unprecedented state relative to the last 400,000 to 800,000 years, and perhaps longer. IPCC findings indicate that human action is pushing the climate system out of familiar territory and that we are on the brink of committing ourselves to moving far beyond a tolerable window of climate change.

The IPCC Third Assessment Report (TAR) found that the climate changes that have occurred this century are already affecting human communities and ecosystems. The IPCC projects that much larger changes over the coming decades will occur unless decisive GHG emissions mitigation action is taken. Amongst the key findings in this context from the TAR are:

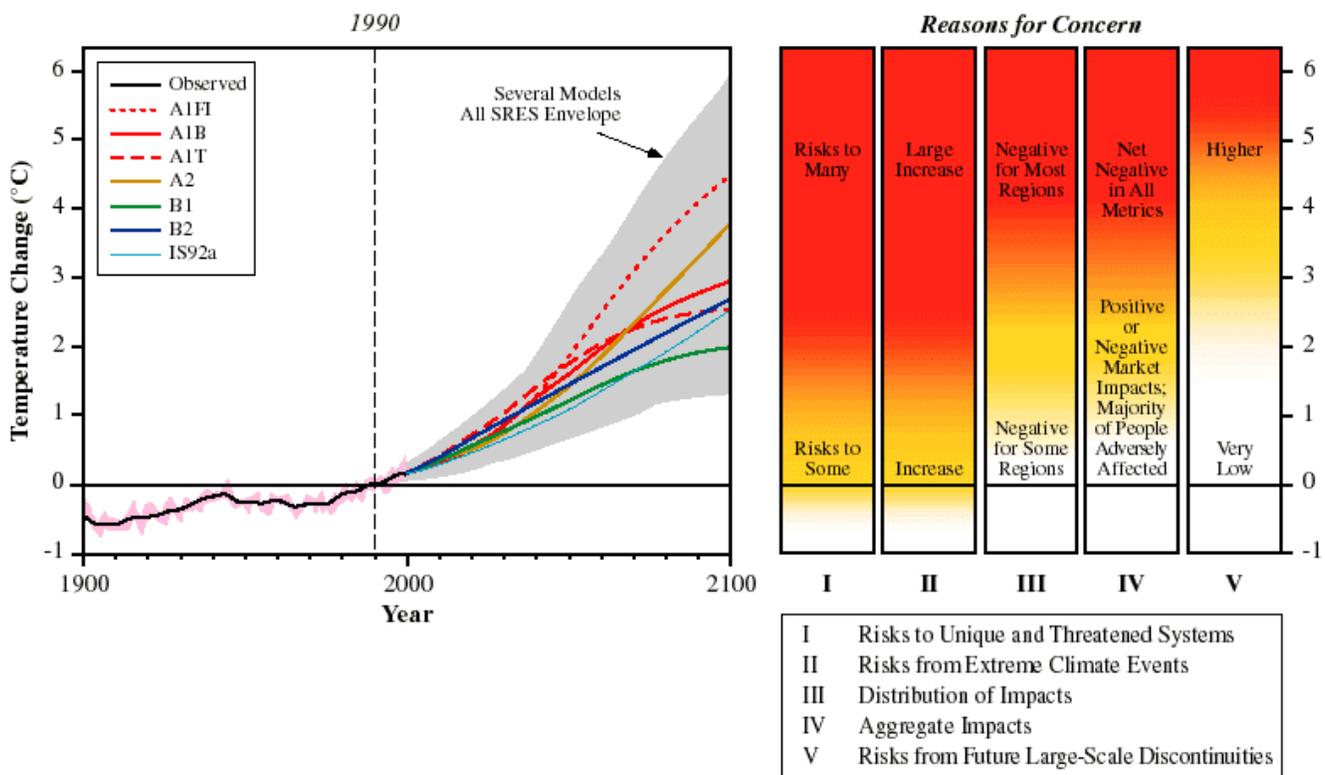
- There is new and stronger evidence that most of the observed warming over the last 50 years is attributable to human activities.
- The 20th century trends of increasing temperature, sea-level rise, and increased precipitation will very likely continue and intensify in the 21st century.
- The globally averaged surface temperature is projected to increase by 1.4 to 5.8°C over the period 1990 to 2100 and temperature will continue to rise in the following centuries.
- Global mean sea level is projected to rise by 0.09 to 0.88 metres between 1990 and 2100 and this rise will continue substantially unabated for many centuries, long after atmospheric greenhouse gas concentrations are stabilized.
- There is likely to be an increase in extreme weather events such as heat waves, droughts and in other places increased precipitation leading to floods, and higher minimum temperatures and fewer cold days.
- Glaciers and ice caps are projected to continue their widespread retreat during the 21st century, with tropical and subtropical glaciers retreating the most and in some case disappearing bringing large implications for populations dependent on those glaciers for freshwater.

The IPCC Third Assessment Report (TAR) provides a very substantial amount of information on the impacts that can be expected from different levels of warming in the future. In particular, virtually any level of warming will result in adverse effects on developing countries and ecosystems. However it is clear that even if the atmospheric concentrations of CO₂ and other greenhouse gases were held at present day levels a warming of at least 1°C above pre-industrial levels is most likely not avoidable. This committed warming is very likely to cause negative market impacts for developing countries as well as yield reductions in highly vulnerable agricultural regions. Irreversible damage to some unique ecosystems and the extinction of many of the species contained in them also is very likely. Sea level rise commitment also appears significant. Warming above 2°C results in rapidly escalating damages whose magnitude and extent is qualitatively different from lower temperatures. This includes increasing risk of abrupt climate impacts.

The impacts identified at and above 2°C warming already appear very severe with the scale of impacts rising in most cases very quickly beyond this level (see Figure 1). For developing countries, and particularly for the poorest, a 2°C warming is associated with very large impacts, which are only likely to worsen with time. These could undermine, if not reverse in some cases, progress towards sustainable development.

It seems doubtful that coral reefs, some Arctic and other sensitive ecosystems, would survive an extended period of global mean warming above 2°C, with large damages already expected at or below this temperature range. Such damages would adversely affect the livelihood and well being of the human populations dependent upon them, whether that be fishers dependent on the reefs or local communities dependent on freshwater resources for agriculture.

Figure 1. Types of Climate Impacts and their Risks

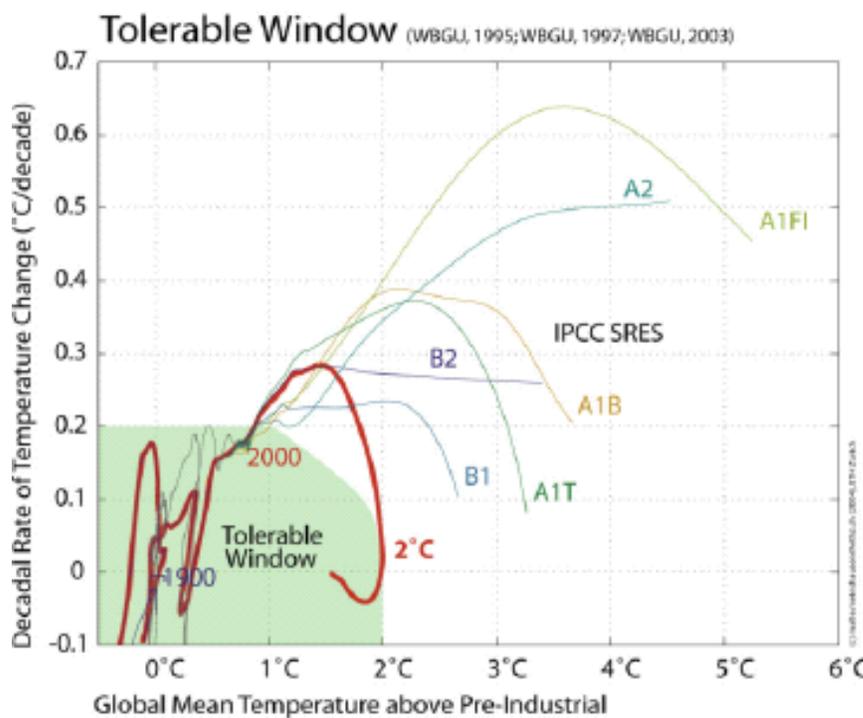


As a consequence of these and other considerations, the concept of dangerous climate change should be operationalized as follows:

- Global mean warming needs to be limited to a peak increase of below 2°C (above pre-industrial times) and reduced as fast as possible thereafter. Limiting peak temperature increase to this level will not avoid major damages and therefore cannot be considered “acceptable.” However, we are already committed to warming over 1°C. Staying below 2°C is a level that is still achievable and reduced risks to the extent possible.
- We need to keep the rate of temperature change at no more than about 0.1°C per decade. Limiting the rate of change is important in order to maximize the ability of natural ecosystems to “adapt” and minimize large-scale positive feedbacks from the carbon cycle. This barrier has already been broken, requiring immediate action to bring the rate of global warming within tolerable levels.

The implications of this articulation of “dangerous” are depicted in Figure 2, which shows a 2°C scenario relative to a “tolerable window” of peak warming and warming rate. This shows how immediate action is required to keep peak warming below 2°C and to bring the rate of warming back below 1°C. Carbon dioxide concentration would need to peak (not stabilize) no higher than 450 ppm or lower.

Figure 2. The Tolerable Window of Peak Warming and Rate of Warming



The slow rate of uptake of CO₂ by the ocean means that global CO₂ emissions to the atmosphere will need begin to drop quite rapidly well before the peak concentration is reached, and will need to be close to zero by 2100. Absolute reductions of about 80 percent by Annex 1 countries by mid-century relative to 1990 are needed, followed by further reductions towards zero by 2100. Global emissions would need to peak by the 2020s at the latest, with substantial global reductions by the 2050s. Within this overall picture some developing countries would continue to increase their emissions for sometime after the 2020s before beginning the stabilisation stage.

Basic Principles for a Viable Global Framework

Honoring the FCCC Article 2 commitment requires significant emission reductions, initially from industrialized countries and in the long term globally. This will not happen outside of a clear and equitable global political framework for allocating the burden of action. The core principles that should form the basis for the allocation of actions to limit and reduce global emissions are those of equity, historical responsibility, and ability or capacity to act.

- The equity principle requires, amongst other things, that all have equal access to the atmospheric commons. The setting of the relative emission targets for countries should be designed to give increasing weight to the aim of per capita emissions convergence over the course of the 21st century. Intergenerational equity is also important and means that the present generation should not pass to future generations unfair burdens. Delaying action on climate change now would transfer large costs to future generations.
- The principle of historical responsibility is an important element in determining who should act and when.
- The ability to pay and the capacity to act are important principles in deciding who should act, when and in what way.

The political framework also needs to be fully consistent with and capable of achieving the criteria presented in the first half of this paper for avoiding dangerous global warming. Furthermore, operationalizing this framework must not jeopardize sustainable development objectives. Actions in this area should be designed to ensure that sustainable development objectives are met, in particular the provision of energy services and the enhancement of health objectives. The Rio principles should be recalled and applied, in particular in relation to the provision by developed countries of resources and funding for development.

A Framework for Action: Three Parallel Tracks for Climate Policy in the 21st Century

The framework for action proposed here for discussion involves three parallel tracks. Track 1 is the Kyoto track with legally binding emission reductions in successive commitment periods. This system provides the essential driving force for technological innovation and change leading to large emission reductions from the richer countries. Track 2 is a Greening (decarbonisation) track for the developing countries that are not currently taking on actions under the Kyoto Track. This track is also a critical part of the global climate protection system and aims in large part at rapidly introducing sustainable energy production and end-use technologies, systems and

practices. This should result in Greening (decarbonisation) of energy services in developing countries whilst accelerating the achievement of sustainable development objectives. As countries develop they would need to move from Track 2 to Track 1 (see below). Track 3 is the adaptation track for the most vulnerable regions and countries to deal with climate change that is deemed to be unavoidable.

Kyoto Track

Track 1 is the Kyoto Protocol track with its legally binding, tradable emission limitation and reduction obligations. In addition to the present Annex B countries other countries will need to join this track in the second commitment period and beyond as their economic and development situation allows according to agreed criteria. The determination of which additional countries should join the legally binding obligation structures of the Kyoto Protocol would have to be based on criteria that involved a combination of factors involving relative per capita emissions, per capita income, and historical responsibility. For the second commitment period this would most likely involve a relatively small number of developing countries that are at the upper end of the income range for this group.

The Kyoto Track builds upon the heart of the existing Kyoto architecture of Annex I commitments: legally binding commitment periods of 5 years and the fact that the emission obligations are not an unlimited right to emit. In accordance with the principle of historical responsibility and the equity principle, Annex I (industrialized) countries must take the lead in substantially reducing emissions (see below) by adopting absolute caps on emissions, before asking developing countries to take on commitments. Voluntary action or even binding sectoral intensity targets as have been proposed by some are not an adequate replacement for legally binding emission limitation and reduction obligations. This was recognized in Berlin and led to the negotiation of the Kyoto Protocol. Current trends in the U.S. reinforce the fact that voluntary simply do not spur the necessary emission reductions and that mandatory cap and trade systems with absolute emission reduction targets are the optimal mechanism for climate protection in developed countries.

Greening (Decarbonisation) Track: Energy for Sustainable Development

Track 2 is a Greening (decarbonisation) track for the majority of countries whose level of economic development does not require their involvement in the Kyoto track. Track 2 should be designed to enable developing countries to follow a low carbon path to development. Actions and policies in this track should rapidly accelerate the introduction of new, sustainable technologies, many of which would already have been introduced, tested and commercialised in the Track 1 countries as a consequence of their emission reduction programmes. The agreed level of action and the effect on emissions could be driven by a number of factors. The availability of resources and technology from the industrialized countries is critical as is also the capacity and ability of the developing countries to act. There is a necessary linkage between the level of emission reduction undertaken by Kyoto track countries and the level of action to be undertaken by countries on the Greening (decarbonisation) track to reduce the growth in their emissions. Countries operating under this track would need to ensure that they are adopting no regrets measures as a matter of priority. Where technical or other assistance is required to do so, this needs to be made available from the industrialized countries. The provision of resources and technology by the industrialized countries to activities in developing countries under this track

would need, in addition to the factors mentioned above, to be modulated by the relative capacity of individual countries.

All large emitters (based on absolute emissions) would need to be involved in the Greening (decarbonisation) track. The least developed countries, where their emissions remain below an agreed level, would not need to be involved. There would however be significant incentives from a sustainable development perspective for LDCs to be involved, should they wish.

Various ideas have been proposed that could be used to guide the level and character of actions in the Greening (decarbonisation) track. These include the concept of SD PAMs (Sustainable development policies and measures), sectoral targets, carbon intensity targets, growth caps and the Triptych approach. The latter is a concept that is specifically designed to take into account national circumstances in setting goals for policy action: three sectors are distinguished – domestic, energy intensive, internationally exposed industry and the power sector (see den Elzen (2003)). Each of these approaches has useful elements and should be further explored for their application to Greening (decarbonisation) policies under Track 2. Considerable additional work is needed to elaborate the Track 2 mechanisms, in large part because this track was not an element of the Kyoto Protocol.

Adaptation Track

Track 3 is an adaptation track designed to meet the needs of key vulnerable regions (including Least Developed Countries, Small Island Developing States) to assist with anticipating, and through adaptation measures, limiting the unavoidable effects of climate changes up to an agreed level of global mean warming. Those that bear the main responsibility for these climate changes, the industrialized countries, would be required to fund these measures. A certain level of climate change is now unavoidable virtually irrespective of policy action and this should form the benchmark for the analysis and costing of adaptation measures for the most vulnerable regions⁴. Adaptation measures will not in all cases be sufficient to limit damages to acceptable levels from the unavoidable climate change and sea level rise that would result even if global temperatures are kept below a 2°C increase limit. Compensation for these damages would need to be included in Track 3. Existing elements of the UNFCCC/Kyoto Protocol system that would form part of a coherent Track 3 are the Adaptation Fund, the Special Climate Change Fund and the LDC fund. Countries requiring assistance under the Adaptation track would also be eligible and able to operate under Track 2 or even Track 1, depending on their relative circumstances. However there are some countries that would only participate in the Adaptation track due to their low emissions profiles.

⁴ The level of unavoidable warming can be calculated in different ways and with different assumptions leading to quire different results, however it would seem that a further warming of at least 0.5°C above the present cannot be avoided under virtually any scenario.

In order to determine which countries fall into which tracks, the scheme outlined above essentially involves three mitigation stages through which countries would move over time and which are important in operationalizing the principles of equity, responsibility and capacity described at the beginning of this paper. In the first stage, which is embodied in Track 2, the Greening (decarbonisation) track, all developing countries with the exception of the LDCs are involved. In the second stage countries move from Track 2 to Track 1 and begin to stabilize their emissions. In other words in this stage countries move from a situation where their emissions are growing to one where emissions stabilize. This would entail a binding obligation to stabilize emissions for an agreed period of time prior to beginning the reduction phase and countries in this stage would fall fully under all of the provisions of the Kyoto Protocol and its procedures and rules. Where appropriate, countries could also enter this stage with a binding limit to the growth of their emissions. The third stage, also part of Track 1, is the main reduction stage (e.g., reduction commitments, not limits to emissions), into which all Annex B countries should be moved by the second commitment period.

Countries would have to move from stage 1 to stage 2 according to criteria involving a combination of relative per capita emissions (equity), and ability/capacity to act (one factor of this is per capita income) and responsibility. The level at which emissions would be stabilized under in stage 2 could be essentially determined as the level of emissions at which the country meets the agreed criteria for the transition from stage 1 to stage 2. Some flexibility, but not much, could be permitted in setting the initial stabilization level taking into account domestic circumstances. Movement from stage 2 to stage 3 would occur automatically after a period of 5 or ten years.

Emission reduction targets would be set in the emission reduction stage of Track 1, the Kyoto track, with reference to the need for per capita emissions to converge over the course of the 21st century. Emission reduction targets would be set iteratively every five years. For environmental effectiveness, emission reduction targets must be comprehensive and include all of the Kyoto sources and gases as well the emissions from international aviation and marine bunker fuels, which are currently not included in the Kyoto system. The current Annex B countries would need to achieve emission reductions in the range of 60 to 80 percent by the 2050s⁵, with continuing declines thereafter in order to provide space for developing country emissions, while keeping global temperatures below 2°C. Global emissions would need to peak by the 2020s at the latest,⁶ with substantial global reductions by the 2050s⁷. Within this overall picture some developing countries would continue to increase their emissions for sometime after the 2020s before beginning the stabilization stage.

Each of these tracks has quite different needs and instruments. Track 1 already has the Kyoto Protocol and all of its rules and architecture, including a compliance system. An appropriate

⁵ With respect to the limiting of the global temperature increase below 2°C and taking into account a range of 'reference' or business as usual scenarios for developing countries as well as a range, but not the full range, of scientific assumptions. If the climate sensitivity were in the upper end of the IPCC range of 1.5°-4.5°C for a doubling of CO₂, then larger reductions would be needed by mid-century.

⁶ If global emissions peaked later than this it would imply very large rates of emission reduction and for higher climate sensitivity values may render the achievement of a below 2°C warming limit unachievable.

⁷ An average of seven contemporary climate models, with standard representation of carbon cycle feedbacks, indicates that a global reduction of 20-30% relative to 1990 of all greenhouse gases by the 2050s would be needed.

architecture and instrument or instruments to drive Track 2 is yet to be developed and work needs to begin soon on this. Transitions from Track 2 to Track 1 must be triggered by rules that include both the relative level of developed country action as well as a measure of per capita emissions and per capita income in the developing countries. Track 3 is beginning to develop as a consequence of decisions taken in Marrakech in relation to, *inter alia*, the Special Climate Change Fund (SCCF), the Adaptation Fund and the Least Developed Country (LDC) fund. The elaboration of this is a high priority. Countries requiring assistance under Track 3 would also be eligible for involvement Track 2 and, in appropriate circumstances, Track 1.

A number of systems that would in effect replace the Kyoto system have been proposed and most of these either would not work or could not be implemented effectively. The Bush policy in the USA of a non-binding relative intensity target is clearly not going to reduce emissions and in fact allows emissions to increase very substantially. In this context, serious action proposals within the USA are all based on a cap and trade system and legally binding tradable commitments. Many of the proposals being put forward in the context of discussions about future action, such as the Orchestra of Treaties, technology partnerships or voluntary actions do not offer a viable route to the achievement of the global goal of rapid emission reductions.

In a qualitatively different category, the Contraction and Convergence system could in principle achieve the environmental targets and is based on an equity principle, as expressed in its per capita convergence rules. This system however is not a viable basis for a negotiable and practicable regime because applying the per capita convergence rule in allocating emissions from the beginning presents major problems in relation to equity and fairness. Proposals such as the Per Capita Plus system have been outlined at least at the broad conceptual level that would significantly modify the C&C system and have the potential to fit within the framework outlined here. Such a system would be weighted heavily towards a per capita allocation principle but recognising additional factors such as historical responsibility, ability to pay, different national circumstances and also the need to establish a system that is negotiable and that would be acceptable to all key countries.

Conclusion

Avoiding dangerous climate change compels the international community to move quickly to adopt a viable global framework to turn the trends in emissions growth. The CAN proposal attempts to combine environmental effectiveness with the goals of sustainable development, with an underpinning of equity. The Global Framework should be one that leverages the appropriate national mechanism for change – whether that be cap and trade systems in developed countries or decarbonisation measures in developing countries that are part of national sustainable development plans. By bringing these different tracks together into one framework the principles of historic responsibility, equity, capability to act and environmental effectiveness are combined and therefore provide a tenable and inspiring path forward to avoid the worst impacts of climate change.

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Preventing Dangerous Climate Change I: Position of the Climate Action Network⁸

Paul Baer (EcoEquity)⁹

Summary

The Climate Action Network has concluded that global temperature increase must be kept below a peak of 2°C warming (above pre-industrial levels) and then reduced as rapidly as possible. This paper describes the impacts that can be associated with different levels of global mean warming, discusses considerations on setting climate targets that might prevent dangerous climate change, and concludes by pointing out what these targets mean for emissions.

Introduction

CAN Calls On Parties To Set Limits To Climate Change As A Matter Of Urgency

The primary and ongoing legal obligation on all countries belonging to the Climate Convention is to prevent dangerous climate change. CAN believes that governments should move as a matter of urgency to consider and decide upon the limits to climate change that, if met, would enable fulfillment of Article 2 of the United Nations Framework Convention.¹⁰

In undertaking this work CAN believes that important principles embodied in the UNFCCC, other treaties and generally in international law need to be fully accounted for:

- The precautionary principle must be applied so that scientific uncertainties do not stand in the way of decisions that prevent dangerous climatic changes.
- The general principle of international law must be observed that activities within the jurisdiction of one country must not lead to grave damage on another state's territory.
- The right to sustainable development, in particular access to affordable energy services, livelihoods, food security, health, water and other basic human needs, and the basic right to life and physical integrity, as they are embodied in a number of international treaties and the Universal Declaration of Human Rights, demands the immediate implementation of mitigating climate change.
- The obligations on Parties to treaties must be performed in good faith.

⁸ This text has been adapted and condensed from a longer document approved by the Climate Action Network at its general meeting during the Eighth Conference of the Parties in Delhi, India on the 30th of October, 2002 (available at <http://www.climatenetwork.org/docs/CAN-adequacy30102002.pdf>). Minor rearrangements have been made to improve readability, but every effort has been made to maintain consistency with the original.

⁹ Contact the author at pbaer@ecoequity.org.

¹⁰ See Morgan (this volume) for the relevant citation from UNFCCC Article 2.

Preventing Dangerous Climate Change Is An Equity Issue

Averting dangerous climate change is an equity issue. The IPCC Third Assessment Report has established that developing countries are most at risk of climate change and they will suffer damages at even quite low levels of warming. These damages rise rapidly with temperature. The human activities leading to dangerous climate changes are caused largely by the consumption levels, patterns, and associated production, of the wealthy industrialized countries, but their impacts will, and are, falling disproportionately upon the poor. As a consequence setting strong climate targets is an equity issue, both within the current generation, and in relation to those to come.

Some communities, notably on some small island developing states and in the high Arctic, are clearly already suffering human induced climate impacts today. Drought in Southern Africa and India, recent unusual floods China, Vietnam and other parts of Asia and central Europe have been associated by scientists with projected human induced climate changes and clearly portend much worse to come.¹¹

Due to historical and current greenhouse gas emissions, and the fact that emissions cannot be reduced to zero overnight, we know we are already committed to future warming and sea level rise. This unavoidable commitment will cause increased risk of disease, hunger, water shortage and coastal flooding for somewhere between tens of millions and some billions of people depending on the impact area and the rate and extent of the warming. Major adaptation efforts will be required to minimize the adverse health, food security, water supply, storm and sea level rise consequences of these impacts.

Climate Change Should Be Kept Below A Peak Of 2°C Warming And Then Reduced As Rapidly As Possible.

The Climate Action Network believes that the global mean warming needs to be limited to a peak increase of below 2°C (above pre-industrial times) and that the warming should be reduced as fast as possible from this peak. Temperature increases approaching 1-2°C entail significant damages, however, even if the GHG concentrations were held at present day levels, a warming of 1°C or above may not be avoidable. This committed warming is likely to cause irreversible damage to some unique ecosystems and the extinction of endemic species contained in them. Significant damages to agricultural production in some developing country regions, growing water shortages and increasing exposure to health risks will also occur. This is not 'acceptable' under any definition of the word.

Providing the temperature drops as quickly as possible (after peaking at below 2°C) there is the possibility that sea level rise over the next several centuries can be limited to half a metre, but this cannot be guaranteed. There remains however the possibility that even these warming levels could trigger the collapse of the West Antarctic Ice Sheet with a resulting sea level rise of several metres over a number of centuries. There appears also to be substantial likelihood that even a warming of 1°C could lead to the decay or loss of significant ice mass from the Greenland ice sheet in coming centuries.

¹¹ This document was completed, prior to the heatwave in the summer of 2003 that killed thousands in Europe, India and elsewhere.

Doubling CO₂ Targets Or 450 Ppmv CO₂ Stabilization Targets Will Lead To Dangerous Climate Change

Long term climate targets such as doubling of CO₂ concentration (above pre-industrial levels) would result in temperature increases, when other gases are taken into account, significantly higher than 3°C. The new IPCC “low” concentration scenario results in a CO₂ concentration of 450 ppmv CO₂ and a total greenhouse gas concentration equivalent to approximately double pre-industrial CO₂ levels. This would produce a long-term temperature rise of 2.5°C for the IPCC's old best estimate of climate sensitivity¹² and higher if the climate sensitivity is higher. If the scientific assessments of the impacts of climate change are correct, such increases would impact severely upon the vast majority of the earth's population. Targets such as these are often cited in the economic literature, without formal justification, as “safe”. It is clear that they are not.

The inertia of the climate system means that keeping the global mean temperature increase below 2°C will require rapid global emission reductions, with emissions peaking within the next 20 years and declining quickly thereafter. It is clear that unless urgent action is taken to reduce emissions rapidly, beyond those reductions agreed in the Kyoto Protocol for its first commitment period, the option of limiting the temperature increase below 2°C will disappear from the policy map within the next two decades.

What Are The Impacts Associated With Climate Change?

Setting long-term climate targets involves decisions as to whether or not the impacts projected at different levels of temperature change can be considered dangerous.

The IPCC Third Assessment Report (TAR) provides a very substantial amount of information on the impacts that can be expected from different levels of warming in the future. Below some of the key findings of the IPCC TAR are outlined with identified impacts associated with four ranges of temperature < 1°C, 1-2°C, 2-3°C and 3-4°C or above. They show that even small degrees of warming are very likely to result in substantial damages, and that warming above 1-2°C results in rapidly escalating damages whose magnitude and extent is qualitatively different from lower temperatures. Unfortunately they also show that warming below 2°C, within the band of already committed warming, entails substantial damages to some developing countries and unique natural systems.

Impacts At Different Levels Of Warming

Less Than 1°C Warming

Developing countries

- Net negative market sector impacts in developing countries and net market sector gains in developed countries.
- Livelihoods of the most vulnerable populations adversely affected.

Water

- Shrinking ice and snow cover disrupts hydroelectric capacity and systems

¹² In the Third Assessment Report, the IPCC no longer gives a "best estimate" for climate sensitivity.

dependent on spring thaw timing.

Ecosystems

- Changes in growing seasons, shifts in population ranges, and premature reproduction in plants, insects, and birds threaten the integrity of complex ecosystems
- Extinction of some critically endangered and endangered species. 1-2°C global mean warming

Developing Countries

- Many developing countries will suffer from net market losses in important sectors.
- Globally some regions may have net market benefits and others (principally developing countries) have net market losses.
- Majority of people adversely affected by climate change and livelihoods of the most vulnerable populations dependent on natural ecosystems increasingly adversely affected.

Food security

- There is the likelihood of significant damages to crop production in tropical and subtropical countries.
- Heat waves will damage crops and livestock will suffer from heat stress.

Water shortage

- Decreased water supply and quality will occur in regions already suffering from water scarcity and drought such as the Mediterranean, southern Africa, and arid parts of central and south Asia affecting half a billion people.

Floods

- More flood damage will result from intense storms, especially in areas affected by deforestation, wildfires, insect infestations, and ecosystem degradation.

Extreme events

- Increasing frequency and intensity of extreme weather events will result in increased insurance costs and decreased insurance availability (coastal areas, floodplains).

Health effects

- Direct - Increased heat related deaths and illness, affecting particularly the elderly, sick, and those without access to air conditioning;
- Indirect - more illness and death resulting from increased frequency and intensity of extreme weather events.
- Increased risks to human life, risk of infectious disease epidemics, and many other health risks where floods, droughts or storms increase in frequency and/or intensity.

Ecosystems

- Wildfires and insect infestations will disrupt relationships in complex ecosystems already undergoing stress from direct effects of heat. Increased disturbances of

ecosystems by fire and insect pests.

- Coral bleaching events will increase in frequency and duration, leading to destruction of brain corals and loss of related reef ecosystems.
- Loss of up to 10% of coastal wetlands globally from sea level rise will eliminate habitat of major migratory bird populations.
- 30-40% of nature reserves will be adversely affected.

Ice Sheets and Sea Level Rise

- Meltdown of the Greenland ice sheet is likely with global mean warming above 1-3°C, and would lead to several meters sea level rise over several centuries with disastrous consequences for millions.

2-3°C Global Mean Warming:

Developing Countries

- Most regions (developed and developing countries) will suffer net market losses in important sectors that will affect global economic aggregates e.g. net global economic losses are likely.

Food security

- 50-120 million more people at risk of hunger, and food prices will increase throughout the global economy.
- Crop yields will drop in regions affected by more drought conditions and there is likely to be a general decrease in cereal crop yields extending beyond the tropics to mid-latitude and temperate regions.

Water shortage

- More than 3 billion more people at risk of water shortage.

Floods

- 100 million more people at risk of coastal flooding

Extreme events

- Floods, droughts and other extreme event would further increase

Health effects

- It is likely that 300 million people would be at greater risk of malaria and much increased exposure to dengue fever.

Ecosystems

- Losses of unique ecosystems and their endemic species (e.g. Cape region of south Africa and some cloud forests)
- Substantial damage to coral reefs, reduced species biodiversity and fish yields from reefs.
- Significant damage or disruption to arctic ecosystems, boreal forests, mountain ecosystems.

Ice Sheets and Sea Level Rise

- Rapid decay of the Greenland ice sheet for appears likely in this temperature range

leading to 1-2 metres sea level rise by 2500 and 2.3-3.5 metres over the next thousand years depending on the extent of the heating.

- The model range for sea level rise induced by thermal expansion is 0.44-1.96 metres by 2500 and for greater than 1000 years 0.53m-1.96m (for doubling of CO₂).
- Increasing risk of instability or decay of the West Antarctic Ice Sheet

3-4°C Global Mean Warming:

- The IPCC was unable to assess impacts in details for temperatures much in excess of the 2-3°C warming range due to lack of literature. However, nearly all impacts can be expected to worsen significantly and perhaps rapidly, and the melting of the Greenland ice sheet appears to be virtually certain at this level of warming.

Abrupt And Irreversible Changes

The impacts cited above consider the risks of melting the Greenland and West Antarctic Ice Sheets, but do not in general assess the prospects of other possible abrupt and irreversible changes in the climate system. One such potential change is the shutdown of the North Atlantic thermohaline circulation system which could occur, at thresholds that are uncertain, well within the range of temperatures projected over the next century and beyond. Such a shutdown is likely to have global implications with precipitation declines in the northern hemisphere and particularly large and rapid changes in South America and Africa, according to one model assessment.

Considerations On Setting Climate Targets That Might Prevent Dangerous Climate Change

As outlined above the IPCC in its Third Assessment Report has identified a range of impacts corresponding to different levels of global mean temperature increase however a decision as to what is dangerous is clearly a political issue and one driven by values.

The impacts outlined above for different ranges of temperature increase in global mean surface temperature show clearly that virtually any level of warming will result in adverse effects on developing countries and ecosystems. However it is clear that even if the atmospheric concentrations of CO₂ and other greenhouse gases were held at present day levels a warming of 1-1.5°C above pre-industrial levels is most likely not avoidable. Thus there will have to be substantial focus on adaptation in the most vulnerable regions.

Most of the impact analyses have focused on the 21st century and not considered the inertia in the climate system which would continue to warm and result in rising sea levels for centuries after stabilization of atmospheric concentrations of CO₂ and other greenhouse gases.

As a consequence of these and other considerations the conclusion reached by CAN is that the global mean temperature will need to be brought down as rapidly as possible from any peak reached in the coming century. The factors leading to CAN concluding that global mean warming should be kept below 2°C and be reduced as fast as possible after peaking include:

- Need to absolutely minimize and if possible limit long term sea level rise to permit the continued survival of a number of countries and coastal ecosystems.
- Minimize damage to many natural ecosystems by limiting the period of peak warming and to avoid and/or limit the potential for large-scale positive feedbacks from the carbon cycle.
- Limit the risk of major and irreversible ice sheet decay or even collapse which could lead to many metres of sea level rise in future centuries.
- Minimize damages to health, agriculture and water supply.
- Avoiding potentially irreversible non-linear climate impacts requires that atmospheric greenhouse gases return as close as possible to pre-industrial levels in the next few centuries.

Limiting the rate of change is also important, in order to allow natural ecosystems to “adapt” - if they can adapt at all. We need to keep the rate of temperature change at no more than about 0.1°C/decade as much as possible, realising that we have already broken that barrier and will almost inevitably move well out of that range in the coming decades, with the corollary that the long term rate of change should approach zero and (hopefully) move into the negative range late this century or early next, until the anthropogenic influence on global temperatures is reduced below the level of natural variability.

Operationalizing Article 2

CAN believes that in spite of drawbacks, global mean temperature is the most appropriate surrogate for impacts of all kinds in operationalizing Article 2. Policy needs to have a relatively simple measure to guide action and there is no other obvious measure that can be used in setting global targets. It seems clear, given the complexities of the climate system and the remaining uncertainties in climate science, particularly in the area of climate sensitivity, that setting a specific long-term GHG concentration target to correspond to such limits is not feasible and may not be wise.

Furthermore, as described in the preceding section, CAN has concluded that global mean warming will need to be reduced over time from whatever peak is reached. This means that a stable atmospheric concentration of CO₂ and other greenhouse gases may not be approached for several centuries.

What Do These Targets Mean For Emissions And Concentrations?

To meet this target, CO₂ concentration would have to peak no higher than 450 ppmv and probably somewhat lower¹³, and then have to be reduced. In practical terms emissions

¹³ Other non-CO₂ greenhouse gases would add approximately 100 ppmv CO₂ equivalent to give an effective CO₂ concentration of around 550 ppmv CO₂ equivalent. The equilibrium warming that would result from this is in the range of 1.5-4.5°C for the IPCC estimate of the range of climate sensitivity to a doubling of CO₂ or 2.5°C for the IPCC's old best estimate. With a transient peak in greenhouse gas concentrations the equilibrium would of course

corresponding to progress towards meeting the temperature targets will need to be calculated at each time step (e.g. five year commitment period) taking account of increasing knowledge. Article 3.3 of the Climate Convention requires the application of the precautionary principle in this context to ensure that emission reductions in each period are consistent with the achievement of the climate targets and ceilings.

It is beyond the scope of this paper to describe the range of emissions that would correspond at each five-year period, however some important conclusions can be reached as to the overall shape of the global emission reductions needed.

The slow rate of uptake of CO₂ by the ocean means that global CO₂ emissions to the atmosphere will need begin to drop quite rapidly well before the peak concentration is reached, and will need to be close to zero by 2100. Absolute reductions of about 80% by Annex 1 countries by mid-century relative to 1990 are needed, followed by further reductions towards zero by 2100. Per capita emissions in Annex I countries have to fall quickly as a consequence. Rapid decoupling of economic growth and emissions in developing countries will also need to start soon to ensure that global emissions of CO₂ reach close to zero by the end of the century. In achieving full account must be taken of the rights of people to sustainable development and in particular the provision of affordable energy services.

Preventing Dangerous Climate Change II: Some Additional Thoughts¹⁴

Paul Baer (EcoEquity)¹⁵

There is little that needs to be added to the analysis provided in the CAN position paper in regard to the reasons why global warming should be held below 2°C above pre-industrial levels; these reasons have been well documented by the IPCC and elsewhere.¹⁶

Indeed, the CAN position paper and the sources it draws on point out an obvious truth: any amount of anthropogenic climate change is dangerous. Every human life lost is an irreversible harm, as is the loss of a culture or the extinction of a species. That we can be talking about how much of these irreversible damages we're willing to tolerate – mostly harms to people and species not represented in this discussion – is itself a marker of the strategies and languages of "realism," and of their weight.

We'd all vote to stop climate change immediately, if we believed that doing so would be so cheap that no country or bloc of countries could effectively object. Obviously, we do not so believe. The 2°C target is in itself a compromise, as we are forced to start trading away lives and species in order to advocate a "reasonable" definition of "dangerous."

Yet the emissions targets implied by even a "reasonable" 2°C target are (and are recognized to be) beyond the willingness to pay of the relevant global actors, whether they be portrayed as countries, corporations or individuals. Thus advocates of climate justice - that is, the right to protection from harm caused by greenhouse pollution - are immediately forced to argue on the terrain of cost-benefit analysis, to try to show that these damages are in monetary terms greater than the costs of preventing climate change, and that it is possible for countries to agree to a "self-enforcing" climate treaty in which all countries are economic winners.

Within these frames of economic and political "rationality", however, it is not possible to take a precautionary approach to climate change. First, it is not "rational" for the current generation to pay to prevent harms that will occur far in the future; discounting at ordinary rates (3-5%) ensures this. Second, it is not "rational" for countries to pay to prevent climate damages that will occur in other countries; this follows from the assumption that countries act like utility-maximizing individuals (and that governments will only be reelected if they maximize their own country's GNP).

¹⁴ The ideas reflected in this essay were presented together with the Climate Action Network position on dangerous climate change in my slide presentation in Tokyo on February 20, 2004. For clarity on what is CAN's position and what are my own opinions, I have separated them here.

¹⁵ Contact the author at pbaer@ecoequity.org.

¹⁶ In addition to the IPCC's Third Assessment Report, good analyses of climate impacts and their implications are available in Hansen (2004), O'Neill and Oppenheimer (2002), Parry et al. (2001), and WBGU, (2003).

There is of course an alternative way to consider the problem, which is from an ethical framework within which equity and sustainability take precedence over the maximization of national income. From this perspective, the need to prevent dangerous climate change is an imperative, and the range of costs typically cited for low stabilization targets – on the order of four to five percent of global economic activity – is simply the cost of bringing our global consumption and production within the limits of sustainability. And the necessity for the already wealthy countries to pay the vast majority of this cost is simply a consequence of the "ecological debt" accrued by those countries which have used the global greenhouse gas sinks at levels far beyond sustainability.

The fact is, notwithstanding the evident "victory" of economists in the debate over "limits to growth" that occurred in the 1970s, the climate crisis proves the ultimate inevitability of limits. The economists' argument was simply that the response of economic actors to price signals would ensure that resources did not run out. However, for reasons that are well known, there is not an appropriate price signal for the damage caused by climate change unless the powerful countries in the present generation choose to create one; neither future generations, nor poor countries today, are able to purchase climate protection from the polluters. We in the present generation can choose not to pay the cost of preventing climate change, but this makes a mockery of the commitment to sustainability.

Of course, whether "4% of GDP" is a high cost or not is itself a matter of perspective. As noted by Azar and Schneider (2002), in a world of 2% annual economic growth, a 4% reduction in GDP implies a two year delay in reaching a given level of per capita income. Most of us, if asked to delay our pay raises for two years in order to prevent catastrophic climate change, would say yes. However, because there is no precedent for countries paying such large amounts largely to prevent harm to other countries, this is perceived as unrealistic, even wildly so.

Even among those who have settled on the 2° target, there is a tendency to soft-peddle the implications for emissions targets. As it is put in the CAN position paper, "a plausible range of parameters indicates that CO₂ concentration would have to peak no higher than 450 ppm and probably somewhat lower". My own analysis suggests that a 450 ppm CO₂ stabilization target has only a roughly 20% chance of keeping equilibrium climate change below 2°C, and even stabilization at 380 ppm - today's level! - implies a 30% chance or higher of exceeding 2°.¹⁷

Thus the debate that needs to take place, and has not yet been begun even by the advocates of a precautionary approach, is what we consider to be an acceptable probability of exceeding a given target. We're ill prepared for this kind of debate; no one would fly on an airplane that had a 1 in 100 risk of crashing, but risks on the order of 10% of long-term climate catastrophes – such as a 5 to 10 meter rise in sea level – seem to be viewed as acceptable.¹⁸ Implicitly, the long time frames before such damage would be realized make it seem unnecessary to take such risks seriously. However, this is essentially an article of faith, rather than an analysis which suggests

¹⁷ This work, which is part of my dissertation research, uses monte carlo analysis with alternative probability density functions for climate sensitivity and future non-CO₂ forcings. For further information contact the author.

¹⁸ Stabilization targets of 550 ppm CO₂, which are widely considered plausible and even considered economically too stringent in many cost-benefit analyses, imply risks on the order of 5-25% that equilibrium temperature increase would exceed 5°C, the difference in temperature from the peak of the last ice age, and a temperature nearly certain to melt the Greenland and West Antarctic Ice Sheets.

how, if emissions continue to rise and the climate sensitivity turns out to be high, we might actually prevent these kinds of catastrophes from coming to pass.

Along with a debate over acceptable probabilities for exceeding various climate thresholds, there needs to be a serious discussion about the establishment of financial liability for adaptation to anthropogenic climate change that will not be avoided, and compensation for climate damages that actually occur. Again, "realism" implies that this kind of liability, which necessarily will fall primarily on the industrialized countries, will never be taken seriously in a world of sovereign nation states. Yet the principle of liability for harm caused by pollution of a "life support commons" is ethically unavoidable, and is already reflected in practice in national pollution regulations and rhetorically in international law in the Stockholm Declaration and elsewhere.¹⁹

In short, while it is essential that debate over preventing dangerous climate change take place with full recognition of the reality of current global politics, it is essential that we take note of an alternative "realism": global climate change, and the associated harm to vulnerable members of current and future generations, will not be prevented without an honest confrontation with the demands of sustainability and equity. The industrialized countries of the North must acknowledge that basic fairness requires them to take responsibility for reducing their own emissions to sustainable levels, to pay for the harm those emissions cause, and to enable the developing countries of the south to "leapfrog" past the fossil energy systems that have driven economic development to date.²⁰ It's time for countries to begin to be held to the same ethical standards internationally that guide domestic law and regulation. The difficulty of the challenge does not reduce its importance.

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¹⁹ I address both the ethics of the "life support commons" and the financial implications of establishing legal liability for adaptation and compensation in Baer (In Press).

²⁰ Athanasiou and Baer, (2002) discuss at length the need for a historical compromise between North and South, based on equal rights to benefit from the global commons, as a necessary condition for preventing dangerous climate change.

U.S. Climate Change Policy and Pathways to Re-Engagement

Jeff Fiedler (Natural Resources Defense Council)²¹

The U.S. position against mandatory global warming policies is unstable and can be expected to change over time. The Bush administration is out of step with U.S. domestic trends, especially the development of mandatory policies at the state level and the consideration of such policies in Congress. These trends lead to the conclusion that a domestic political consensus is emerging in favor of mandatory policies. This political consensus will then permit reengagement in the international regime. Indeed, the desire for international emissions trading linkages will provide a clear incentive for the U.S. to reengage in an international regime with basic architecture similar to the Kyoto Protocol.

The majority of work to build political support for real action must occur within the U.S. The most important contribution for other countries is to continue with successful implementation of domestic policies and support for the Kyoto protocol architecture. Positive momentum will be delayed if Kyoto fails, other countries avoid mandatory domestic policies, or the U.S. voluntary and long-term research policies are taken seriously as alternative approaches.

U.S. Domestic Policy – Current Status and Trends

Bush Administration Position

The Bush Administration has strongly opposed any binding limits on greenhouse gas emissions, even opposing the mandatory reporting of emissions from major sources. In place of binding limits, the administration has created the appearance of action with a voluntary national emissions goal that is indistinguishable from business as usual emissions growth and, even if achieved, would leave U.S. emissions more than 30 percent above 1990 levels by 2012. The administration argues that the cost of action and competitiveness concerns justify its position, yet has blocked government economic analyses and failed to engage in policy discussions to address these issues. The administration routinely exaggerates the scientific uncertainties in order to confuse the case for action.

The Bush Administration announced its national global warming policy in February 2002. The main short-term element is a non-binding goal of improving emissions intensity (i.e., emissions per unit GDP) by 18 percent by 2012. Voluntary industry commitments are intended to play a central role. Ongoing revisions to an existing national greenhouse gas registry are designed to support these voluntary commitments. Longer-term efforts focus on technology research and development, and science research. The two premier technology programs are advanced coal generation and geologic sequestration, and hydrogen fuel cell technology for vehicles.

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The bottom line is that under the Bush Administration's plan U.S. carbon dioxide emissions will continue to grow at 14 percent over the next decade, the same rate as the previous decade.²² Emissions are estimated to be more than 30 percent above 1990 levels by 2012.²³ According to the Administration's own analysis, the national goal would result in emission reductions of only 100 MMTC below 2012 levels. This represents less than a 4 percent reduction from 2012 levels. Not surprisingly with a policy that at best is a minor deviation from business-as-usual, most of the elements of the policy are simply repackaged pre-existing programs. A recent government report found that only 3 of 30 programs in the plan have quantified results and are new.²⁴ Furthermore, there is no planned review of progress towards the national goal.

The voluntary targets being adopted by business are very weak. Consider the electric power sector, which is the largest single contributor to global warming emissions. The power sector announced a voluntary target in support the Bush Administration's plan that would reduce the emissions intensity (emissions per unit of generation) by 3 to 5 percent by 2010. Using the Department of Energy/Energy Information Administration (DOE/EIA) projections of future generation levels, power sector emissions would increase by 13 to 16 percent if this goal were to be achieved. In contrast, DOE/EIA projects that power sector emissions will increase by only 11 percent. That is, the power sector's voluntary target involves an emissions intensity improvement that is less aggressive than the DOE/EIA's baseline assumption.²⁵ (Moreover, DOE/EIA projections tend to be conservative in their assumptions about the rate of technological improvement.)

The long-term technology research programs may lead to important developments but they ignore existing technologies and the policies needed to deploy them in the short term. Fuel cell vehicles may have significant long-term potential and deserve research funds. However, it is clear that for the next 20 years or more improvements in fuel economy will yield the vast majority of emissions reductions. This is because of the lead-time before fuel cell vehicles (and low-emissions fuel) are commercialized and achieve significant market penetration. Modeling by NRDC has found that by 2030, improved fuel economy yields more than five times the cumulative oil savings than could be achieved with fuel cell vehicles. Yet the Administration has steadfastly opposed legislation to significantly improve passenger vehicle efficiency.

A similar situation exists for electricity generation. The FutureGen program will build a single demonstration plant for coal gasification and geologic sequestration over ten years. However, the Bush Administration opposes any mandatory limit on emissions that would provide a market incentive for rapid investment and deployment. The administration also opposes laws that would improve the efficiency of existing coal plants, and opposes renewable energy standards that would help deploy zero-emissions electricity sources.

²² World Resources Institute (2002). Analysis of Bush Administration Greenhouse Gas Target, February 14, 2002. http://www.wri.org/pdf/analysis_bush.pdf

²³ RIVM (2002). Evaluating the Bush Climate Initiative. <http://www.rivm.nl/bibliotheek/rapporten/728001019.html>

²⁴ GAO (2003). Preliminary Observations on the Administration's February 2002 Climate Initiative, Testimony before the U.S. Senate Commerce Committee, October 1, 2003. Page 7. <http://commerce.senate.gov/pdf/stephenson100103.pdf>

²⁵ *Compare*, Edison Electric Institute (2002), EEI, Industry Allies Launch Power Partners to Support President Bush's Climate Initiative, <http://www.eei.org/issues/news/releases/030212.htm>, with Energy Information Administration (2003), Annual Energy Outlook 2003, Reference Case Forecast, Table 19.

The Bush Administration continues to exaggerate scientific uncertainty in order to justify delays in taking real action. At COP-9 in Milan, Undersecretary of State Dobriansky released a Financial Times commentary stating, “the extent to which the human-made portion of greenhouse gases is causing temperatures to rise is still unknown.”²⁶ While of course there are uncertainties surrounding the exact attribution of global warming to human causes, to say it is unknown is simply out of step with the IPCC, the U.S. National Academies of Science, and the majority of climate scientists. The administration appears to have little interest in setting climate research priorities to reduce uncertainties. The NAS found that the draft Climate Change Science Plan “lacks clear guiding vision and does not sufficiently meet the needs of decision makers.”

The administration’s international and domestic policies have been remarkably consistent over the last three years, providing the appearance of action and presenting false policy choices. The Financial Times commentary attacked the “Kyoto straightjacket” and instead advocated the “technology breakthrough” from research programs. Of course we need technology research, but we also need mandatory emissions limits to drive private sector investment in future technologies and deployment of existing ones. There is no logic or analysis supporting a choice between one or the other. The previous examples of domestic actions make clear that the administration’s international statements are in no way a negotiating position or an alternative policy approach. They are part of a calculated strategy of delaying action for as long as possible.

Encouraging Signs

In the absence of national leadership, there are many encouraging signs of growing political momentum for binding limits. Public opinion surveys consistently show that over two-thirds of Americans support taking action on global warming. The McCain-Lieberman bill, which would place a binding limit on roughly 75 percent of U.S. emissions, recently received 43 votes in the Senate. Several states have established mandatory caps on either power plants or vehicles, and these efforts are expanding regionally within the US. The business community is increasingly realizing that policy uncertainty is hampering long-term planning and creating potential risks for their investors, and business opposition to mandatory policies is weakening. The scientific community is increasingly vocal in opposition the misuse of scientific information by opponents of mandatory policies.

Two of the most significant state actions are described briefly here: California’s vehicle standard for carbon dioxide emissions, and the Northeast state’s development of a regional emissions trading system. Additional information on state and local actions can be found in recent reports by the Pew Center on Climate Change, World Wildlife Fund, and the Center for Clean Air Policy.²⁷

²⁶ Financial Times, Commentary, December 1, 2003.

²⁷ See www.pewclimate.org; www.ccap.org/pdf/State_Actions.pdf; http://www.panda.org/downloads/climate_change/uswwfreportrisingtide.doc

In 2002 the California state legislature passed the first mandatory regulations of greenhouse gas emissions in the transportation sector.²⁸ The law directs the California Air Resources Board to promulgate regulations that will “achieve the maximum feasible reduction of GHG emissions” from passenger vehicles. These regulations are expected call for 25 to 30 percent reductions in emissions, and to affect the 2009 model year. The law was passed despite vigorous industry lobbying and a significant advertising campaign. The new (Republican) Schwarzenegger administration has supported full implementation of the law, one example of the bipartisan nature of the state-level action.

The ten Northeast and Mid-Atlantic states have joined together to form the Northeast Regional Governors Initiative (RGGI). Six of these ten states have Republican governors. RGGI has the overall commitment of reducing emissions to 1990 levels by 2010, and 10 percent below 1990 levels by 2020. The initiative will build off existing efforts in several states. Massachusetts and New Hampshire already limit their power plant emissions, and Maine has a state-wide limit on emissions. Several other states have formal plans in place to reduce greenhouse gas emissions. The first step under development by RGGI is a power plant cap-and-trade system for carbon dioxide, and additional regulatory policies are also anticipated.

State-level action cannot be a substitute for national action by the U.S., but it can make a significant difference. State-level action is important for several reasons. Many U.S. states have large emissions. New York has larger emissions than Taiwan or Venezuela. If California and the ten Northeast states were a single country they would be the sixth largest emitter of carbon dioxide. The Northeast states alone have more emissions than Canada. Mandatory policies in these states are a real first step.

In addition to reducing emissions, state action helps prepare businesses for national policies and spurs important technology development. States often copy successful policies from each other, and this can be expected with global warming policies as well. Four states and Canada have stated that they intend to follow California’s new vehicle standards, which would extend these standards to 26 percent of the North American automobile market. The Northeast regional effort is an example of how states often seek to adopt common policies. Similarly, the governors of California, Washington and Oregon have begun to explore joint policies.

In U.S. environmental policy state laws have frequently led to major national legislation. The 1970 air quality law and 1980 acid rain law both followed state laws in these areas. Along with the increase in state climate legislation there are increasing proposals for national legislation. Most significant among these is the Climate Stewardship Act introduced by Senators McCain and Lieberman.

The McCain-Lieberman bill would establish a mandatory limit on roughly 75 percent of total U.S. GHG emissions, reducing emissions to 2002 levels in 2010.²⁹ The limit would cover power plants, the entire transportation sector, and large industrial and commercial sources. All six

²⁸ California: *Assembly Bill 1493*, signed into law by Governor Gray Davis 22 July, 2002.

http://www.energy.ca.gov/global_climate_change/documents/ab_1493_bill_20020701_enrol.pdf

²⁹ A second phase reducing emissions to 1990 levels by 2016 was included in the original bill (S.319), but not the version voted upon in 2003 (S.A.2028).

Kyoto gases are included. The entire limit is implemented through an emissions trading system, which includes a limited pool of project-based offsets from uncovered sectors (primarily forestry and agriculture) and international allowance purchases. Non-compliance is dealt with through legal enforcement with penalties.

The McCain-Lieberman bill was narrowly defeated in the Senate by a vote of 43-55, in October 2003. The Bush Administration issued a formal position statement strongly opposing the bill. Nevertheless, the support was bipartisan (including six Republicans) and geographically diverse with votes from industrial, coal-dependent, and agricultural states. The vote count was much stronger than expected by many, and exceeding by 40 votes supporters of the legislation have the strength to use procedural rules to block hostile action in the Senate. At the time of writing a second vote is expected in the near future, and the cosponsors have declared their intent to continue building support for the bill. A companion bill has been introduced in the House.

There are two key lessons to draw from this state of play in U.S. climate policy. First, the U.S. needs mandatory policies because over ten years of voluntary policies have failed to curb emissions. Second, the Bush Administration's policies are out of step with the emerging political will demonstrated by state level action and in Congress.

Voluntary global warming policies have been in place for over ten years, during which time U.S. emissions have increased 14 percent per decade. Methane emissions are one area of success, with emissions below 1990 levels. However, this success is largely due to mandatory regulations of landfill gas emissions for air quality reasons. In fact, no major environmental problem has ever been solved in the U.S. with voluntary measures. The problem with the voluntary approach in the U.S. is that no industry-wide consensus has emerged to participate in voluntary programs with credible targets or reporting.

The distinction between voluntary and mandatory policies is a critical one for U.S. policy. Given this, it is highly encouraging that serious legislative proposals have emerged that include mandatory and legally enforceable emissions limits. In addition to the McCain-Lieberman bill, several proposals to cap power plant emissions have been introduced. (It is also worth noting that mandatory proposals all involve an emissions trading regime, and include at least some trading linkage to international emission reductions.) These proposals have spurred detailed hearings, floor debate, and policy discussions.

The current U.S. administration's national and international policy is unstable as the political will develops within the U.S. to move beyond the current national policy of relying on weak voluntary targets, and long-term technology and science research. The ability and willingness of Congress to act independently from the President and Executive Branch is a hallmark of U.S. government. Similarly, U.S. states have considerable authority to develop policy regardless of federal policy direction. The state and Congressional moves beyond voluntary action is a classic signal of emerging political will. A clear statement that change is coming was made by Susan Tomasky, the Chief Financial Officer of American Electric Power (the largest user of coal in the U.S.): "We don't expect Kyoto timeframes to be enforced in the United States but we do expect the international consensus on this issue will prevail in the United States."³⁰

³⁰ <http://www.planetark.com/dailynewsstory.cfm/newsid/23858/story.htm>

It is important to be realistic that the timing of this “tipping point” is quite uncertain. Nevertheless, this instability exists regardless of the outcome of the Presidential election at the end of this year, although that will clearly influence future U.S. policy.

Pathways for U.S. International Re-engagement

It is almost certainly the case that domestic policies must come first in the U.S., before re-engagement in the international system is possible. It is hard to imagine how support could be mustered for an international target until there is support for mandatory domestic policy. On a practical level, two-thirds of the Senate is required for treaty ratification whereas a simple majority is required for passing domestic policy. The history of the Kyoto Protocol negotiations shows that an international agreement is not a motivator for U.S. domestic policies (or ratification).

As a result, it is virtually impossible for the U.S. to re-engage in the first commitment period. Even with a complete shift in Administration policy there is probably not enough time to pass domestic legislation in the U.S. and finalize negotiations for the second commitment period. The U.S. cannot be a constructive negotiation participant until there is a clear mandate from the domestic policy process.

It is possible that a binding U.S. emissions cap could be in place in this time frame. This leads to the interesting situation where there may be parallel mandatory regimes (Kyoto, and the US) within the 2008 to 2012 timeframe. If the U.S. regime is mandatory and credibly designed, then this should be viewed as a positive outcome relative the Kyoto Protocol proceeding alone without the U.S.

The entry into force of the Kyoto Protocol will encourage linking these two regimes with mutually agreed emissions trading, and this is one pathway to future integration and U.S. re-engagement. There will be a natural desire by business and policymakers to link these systems. The Kyoto Protocol has fundamentally the same architecture as proposed U.S. policies, with mandatory limits and emissions trading, and it will be system that the U.S. can easily rejoin.

How Can the Rest of the World Speed Up U.S. Policy Trends?

The previous assessment has argued that the vast majority of the effort to change U.S. policy must continue to come from within the U.S., to continue to build the political will to act. This limits the influence of the rest of the world on U.S. policy. The main influence will be by providing a positive example of successful enactment and implementation of mandatory policies (both domestic and international). Entry into force of the Kyoto Protocol and successful domestic policies in other countries are invaluable examples in U.S. policy discussions, both technically and politically. In contrast, failure of these policy regimes would greatly strengthen the current administration’s position and delay progress within the U.S. It is the unfortunate reality that the rest of the world must provide leadership in the absence of U.S. engagement.

Attempting to engage the U.S. at this point will be counterproductive because it will merely add legitimacy to the current policy of denial. Voluntary targets should under no condition be considered, as they have proven ineffective both in the U.S. and internationally. It is a false hope that intensity-based targets would engage the U.S. Administration, when they have made abundantly clear that they oppose any mandatory targets of any sort. In engaging the U.S. partnerships on long-term technology and science research it should be made clear that research can only be one part of an adequate global warming policy. If the current U.S. policy continues then other countries should consider their options for aggressive use of diplomatic options to apply pressure, including recourse under trade and other international law.

Given the huge instability in U.S. policy (and upcoming elections) it is not very productive to predict too much about post-2012 policy. The preferred outcome would be for the U.S. to re-engage in extending the Kyoto architecture beyond 2012. However, if the U.S. domestic political will is not developed rapidly, a premature attempt at U.S. engagement could be a destabilizing influence on post-2012 negotiations. This could also have negative effects on domestic policy making. Careful consideration should be given to whether there are conditions under which the extension of the parallel systems discussed above beyond 2012 would in fact be the optimal scenario.

Ten Principles: A Critique of Climate Policy in Canada

Alex Boston (David Suzuki Foundation)³¹

The Canadian government envisions building an innovative 21st century economy and turning the challenge of climate change “to advantage through leadership in green technologies.”³² As Minister of Natural Resources, Ralph Goodale articulated “a national goal – for Canadians to become the most sophisticated and efficient consumers and producers of energy in the world.”³³ These aspirations are all critical for Canada to safeguard its long-term economic, social and environmental interests, and accept its share of responsibility in protecting our global climate. Indeed, Prime Minister Paul Martin renewed Canada’s commitment to meet its obligation under the Kyoto Protocol.³⁴

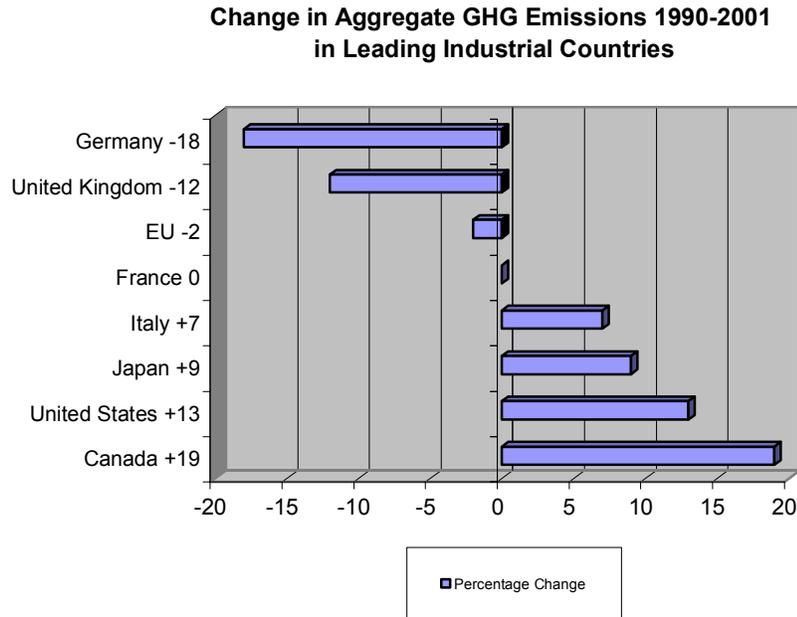


Figure 1. Source: UNFCCC. 2003. *Greenhouse Gas Inventories*.

The litmus tests for assessing performance on Kyoto implementation are emission and energy trends. Canada has one of the industrial world’s least energy efficient and most carbon intensive economies.³⁵ Canada’s economy is 33% less energy efficient than the United States.³⁶ Canada’s

³¹ Contact the author at xboston@davidsuzuki.org.

³² *Speech from the Throne to open the Third Session of the Thirty-Seventh Parliament of Canada*. February 2, 2004.

³³ This was eventually enshrined in the *Climate Change Plan for Canada*, 2002.

³⁴ *Speech from the Throne to open the Third Session of the Thirty-Seventh Parliament of Canada*. Ibid.

³⁵ Canada ranks 27 out of 29 OECD nations in terms of energy use per capita. Canadians annually consume more 6.19 tonnes of equivalent per capita. This is almost double the OECD average of 3.18 tonnes of oil equivalent per capita, and more than five times the world average. Only Iceland and Luxembourg use more energy per capita than

uptake of renewable energy is one of the slowest in the G-8. According to the most recent figures, Canada's emissions are growing faster than any other G8 country. Even Kyoto opponent, United States is in a better position to achieve its Kyoto target.³⁷ (Figure 1.) In fact, Canada's Kyoto gap (the difference between current emissions and its Kyoto target) is wider than any other country in the industrial world.

The inadequate, slow implementation process is increasing mitigation costs, putting Canada at a disadvantage in key emerging sustainable energy markets, and threatening to position Canada as the ultimate free-rider in global climate protection.

The following Ten Principles emerge from evaluating the *Climate Change Plan for Canada*. The principles do not comprehensively delineate the most expedient policies. More importantly these Principles articulate an approach – a modus operandi – for developing and implementing the next generation of the Plan. These Ten Principles are similarly important for the next generation of technologies, cities, Canadians, and the next generation of Federal Government:

1. Use Smart Regulations That Encourage Technological Innovation

A range of policy instruments must be deployed in an integrated manner to achieve synergies in emission reductions and innovation. Central to this policy suite must be regulations, and they should be supported by a variety of market incentives and disincentives for the private sector, other levels of government and individuals, other innovative fiscal reforms, government procurement policies and social marketing.

Voluntary measures and spending have dominated the Canadian response to climate change – on their own, they have proven economically and environmentally ineffective. The Federal Government spent \$3.7 billion on Kyoto implementation and emissions have grown 20% between 1990 and 2000. No money was spent on climate change in the previous decade and emissions grew by only 6%. This trend is consistent with a recent OECD report: “the economic efficiency of voluntary approaches is generally low.”³⁸

2. Establish A Central Implementation Agency

A central agency is needed in the Privy Council Office with the authority and knowledge to engage departments on Kyoto implementation in an integrated manner, and foster the development of an innovative, low-carbon economy. Working closely with Treasury Board, a climate change agency would apply a Kyoto lens to government programs and ensure departmental accountability for reductions committed to in budgets and programs. Only such an agency can break through the interdepartmental impasses, particularly between the two lead

Canadians. See Boyd, David. 2001. *Canada vs the OECD: An Environmental Comparison*. University of Victoria Eco-Chair of Environmental Law & Policy.

³⁶ Ibid.

³⁷ UN Framework Convention on Climate Change. 2003. *Counting Emissions and Removals: greenhouse gas inventories under the UNFCCC*. www.unfccc.int

³⁸ OECD. 2003. *Voluntary Approaches for Environmental Policy: Effectiveness, Efficiency and Usage in the Policy Mixes* OECD

departments, Environment Canada and Natural Resources Canada, and take on the challenge of coordinating such a cross-cutting file. Neither has the authority to integrate and harness the immense opportunities in transportation, fiscal reform, government purchasing, industrial innovation, regional development, etc. The engagement of numerous other departments is critical for successful implementation.

3. Design A Transparent, Fair And Effective Large Final Emitters System

Two key objectives are protecting environmental integrity and promoting a low-carbon future. The largest and most significant policy measure in the Plan is a system of negotiated agreements with large final emitters combined with a system of emissions trading to reduce emissions by 55 MT. This cornerstone could crumble if Natural Resources Canada fails to include key design elements: reporting transparency for industry, provisions beyond emission-intensity to ensure targets are achieved, safeguards against double counting, commitment to halt the shifting responsibility from industry to taxpayers. Management of the large final emitters system should be moved to Environment Canada or the Privy Council Office if Natural Resources Canada is unable to promptly demonstrate a commitment to a system with environmental integrity and fair burden sharing.

The overall target is too small considering some of the easy reductions. For example, the Ontario provincial government's commitment to close all coal-fired power plants could result in a 38 MT reduction alone.

Unfortunately, regardless of how conservative the target is, a number of decisions and developments seriously compromise the integrity of the LFE system. Industry has been promised that if reductions cost more than \$15 a tonne, the government would pay the surplus. This decision shifts the liability for reducing greenhouse gas emissions from Canada's largest greenhouse gas polluters to taxpayers.

Because the government plan counts emission reductions from industry under numerous other measures in the plan (and has already spent heavily in some of these areas), there is a real risk that government and industry double-count emission reductions, failing to genuinely meet the 55 MT target on its own, and the overall target in the Plan.

Rather than negotiating absolute emission reductions, the government has to date conceded to industry pressure to negotiate "emission intensity" targets. Atmospheric stability and our international Kyoto target, however, are not influenced by the amount of greenhouse gas emitted per unit of production. The climate is affected by net emission reductions (or increases). So, if output is much higher than expected, the intended emission reduction targets could be overshoot, forcing taxpayers to buy emission reductions.

Industry is resisting reporting anything more than greenhouse gas emission levels, concealing production output numbers from the public. This will make it impossible to assess progress on the emission intensity target. The lack of transparency makes an inadequate indicator – emission intensity – almost meaningless.

The first emission intensity target the government established was with the oil and gas industry at a level not more than 15 per cent below projected business-as-usual forecasts for 2010. Now, Natural Resources Canada appears to be making this target the default for all sectors. A 15 per cent improvement in emissions intensity over business as usual is woefully inadequate to meet targets in the Plan without double counting. It also fails to put Canada on track to genuinely protect atmospheric stability – emissions have to be reduced by at least 50 per cent by at least mid-century according to even conservative estimates. The 15 per cent intensity target for the oil and gas sector is particularly inappropriate given its growth in emissions – already more than 50 per cent above 1990 levels. Canada has one of the most greenhouse gas intensive oil and gas industries in the world. Extracting and refining tar sands oil is so energy intensive it produces two-and-a-half times the greenhouse gas emissions as conventional oil. Ultimately, this single agreement undermines the measure and the entire plan.

Industry is currently advocating the weakening of targets in exchange for promises for future reductions or research investments. This form of “deficit financing” has been rejected by government and industry in fiscal management; borrowing from the future to resolve a growing ecological, economic and social catastrophe that demands immediate mitigation, is not acceptable.

4. Renew The Principle Of Equitable Burden Sharing

Equitable burden sharing threatens to be fundamentally violated by the rapid growth of emissions in key sectors shifting the burden unfairly onto other regions, sectors or from industry to taxpayers. Provincial, territorial and federal governments agreed to this principle in the wake of signing the Kyoto Protocol.

Because of the endless concessions, and continued federal subsidies granted to the oil and gas sector, 47 per cent of the growth in Canada’s emissions has come from one provincial jurisdiction alone – Alberta.³⁹ For Canada to meet its target under the current emissions trajectory with the concessions extracted from the oil and gas industry, other provinces, sectors of the economy, and taxpayers would be forced to accept a much greater share of the responsibility.

From the perspective of sectoral burden sharing, inadequate regulations and standards are encouraging the rapid growth in emissions from the electricity and transportation sectors, as well as oil and gas. Once again, without demanding more from these sectors, the burden will be shifted to other sectors.

5. Contain Canada’s Major Drivers Of Climate Change

The main areas of emissions growth – electricity, oil and gas production and extraction, and transportation – must be contained. This involves advancing efficiency, renewable energy and sustainable transportation as per Principle 6. The success of these agendas, nevertheless, is influenced by the price of fossil fuel which is highly subsidized and excludes external costs. It

³⁹ Olsen, Ken et al. 2003. *Canada’s Greenhouse Gas Inventory: 1990-2001*. Environment Canada: Greenhouse Gas Division

is, therefore, important to reduce fossil fuel subsidies, tie existing subsidies to performance-based improvements in efficiency, and support, through market signals, an industrial transition towards renewable energy and efficiency.

The electricity sector's 42 per cent growth in greenhouse gas emissions is largely due to increased use of coal and natural gas. The centralized approach to electricity production is hugely inefficient, and demand is driven by one of the industrial world's least efficient residential, commercial and institutional building stocks, inefficient industrial operations, and low standards for appliances and equipment. To address this challenge, demand-side management and renewable energy development are key priorities in the recommendation: Develop a sustainable energy agenda.

The petroleum industry's 40 per cent growth in emissions is from rapid expansion of natural gas, offshore deposits, and the tar sands. A lot of this growth is export led: 139 per cent increase in natural gas exports and 309 per cent increase in oil exports over this period. Canada has become the world's largest source of foreign oil and gas for the world's largest energy consumer – the United States. Oil from tar sands is the world's worst oil from an atmospheric perspective. Extracting and refining tar sands oil is so energy intensive it produces two-and-a-half times the greenhouse gas emissions as conventional oil. Current projections have tar sands being the single largest addition to Canada's greenhouse gas emissions.⁴⁰ The federal government's explicit support for continued expansion of oil and gas in the tar sands, offshore and the Arctic does not bode well for reversing this trend and implementing Canada's Kyoto plan. This support only adds fuel to the climate crisis.

The transportation sector's 21 per cent increase in emissions has a number of drivers. The growth in the absolute passenger vehicle fleet is combined with a shift from light duty cars to light duty trucks (SUVs, mini vans, pick ups) which, on average, emit 40 per cent more GHGs per kilometre. A shift in freight transport from rail to road is also a significant factor. Moving an item by truck over a given distance requires almost four times more energy, compared to moving it by rail.⁴¹ There is rapid growth in heavy-duty diesel and gasoline truck fleets and net emissions increases of 57 per cent and 31 per cent respectively in those categories. Voluntary and weak fuel efficiency standards, inadequate investment in public transit, significant road and highway expansion, and an unequal playing field between freight and rail are all factors in the rapid growth of emissions in the transportation sector. To address this challenge, a sustainable transportation strategy is an important priority in the recommendation: Develop a sustainable energy agenda.

6. Develop An Innovative Sustainable Energy Agenda

This is largely the corollary of containing the major trends. It involves integrating economic instruments and voluntary measures around core smart regulations and standards. Because Canada has one of the world's most inefficient and energy-intensive economies, and most

⁴⁰ Price, Matt & John Bennett. 2002. *America's Gas Tank: the high cost of Canada's oil and gas strategy*. Natural Resources Defense Council and Sierra Club of Canada

⁴¹ Canadian National based on data from Transport Canada and Federal Railroad Administration: *CN: Committed to a Clean Environment*. 1999. available at www.cn.ca.

underexploited low-impact renewable energy resources, the opportunities for deep emission reductions are immense. Developing a meaningful sustainable energy agenda is part of an industrial vision that can strengthen Canadian competitiveness, protect human health and renew our cities.⁴²

A conservation and efficiency agenda: Rather than the traditional focus on supply to address environmental and economic objectives in the energy sector, it is critical to examine how to reduce demand through efficiency (technological improvements) and conservation (consumer behaviour). With electricity crises in different parts of the country, the federal government's role in setting performance standards can play a decisive role in helping provincial and territorial governments literally keep their lights on. Well-developed standards enable consumers to offset increased costs through savings in energy bills. Existing programs such as the retrofitting of commercial and residential buildings are exemplary measures that must be built upon.

A renewable energy agenda: The fastest growing source of new energy in the world is renewable, led by wind which has grown at a rate of above 40 per cent per year during the past five years. Renewable energy technologies are technologically mature and in many locations cost-effective generation options. Unfortunately, while Canada was once a pioneer in advancing low-impact renewables, today programs, policies and deployment are more advanced in much of the industrial world and some of the developing world.

Canada must use a range of policy instruments to take advantage of this growing domestic and international market opportunity. Current support is inadequate to reap the benefit of increased investment, and in turn domestic manufacturing and job creation. It is not beyond the federal mandate to establish renewable energy targets. The European Union has a goal to generate 12 per cent of its energy from renewables by 2010 and 20 per cent by 2020. Canada should establish a similar target.

It is imperative to increase the support of the Wind Power Producer Incentive for wind developers, and extend a similar incentive to other renewable energy sources. Various fiscal incentives can help kick start deployment, for example, GST rebates or tax credits on capital investments. The federal government can be an enabler and help leverage provincial government engagement in the form of renewable portfolio standards (targets), and guaranteed prices for renewable energy (the very successful feed-in laws of Europe). Canada enjoys an incredible comparative advantage over most other nations in both its amount and variety of renewable energy sources, its highly versatile workforce, and research and development capability.

A sustainable transportation agenda: According to a 1997 World Bank study, supporting sustainable transportation infrastructure improves economic performance. It also greatly improves local air quality. The most important priority in reducing personal transportation emissions is protecting people's mobility through well developed public and alternative transportation options in urban areas. Stable funding for investment in public transit can help

⁴² The framework and delineation of technological capacity to achieve this vision, Canada's Kyoto target and a 50 per cent reduction by 2030 are mapped out in: Torrie, Ralph et al. 2002. *Kyoto and Beyond: the low emission path to innovation and efficiency*. David Suzuki Foundation and Climate Action Network-Canada

stop urban sprawl, which in many parts of Canada, is the biggest reason for growing emissions in both electricity and transportation.

Improving fuel economy of passenger vehicles is absolutely critical. Canada's commitment to improve fuel economy by 25 per cent must include a suite of policies, central to which is regulation. Moreover, the priority for fuel-efficient passenger vehicles should become a Canadian industrial strategy. The recommended standard for passenger cars has not changed since 1986, for light-trucks not since 1996. And current legislation has huge loopholes that exempt light-trucks and SUVs. (In fact, the federal government's failure to implement the 1981 Motor Vehicle Fuel Consumption Act means all these standards are voluntary.) Using existing technology, mid-size cars could be 50 percent more fuel efficient and SUVs could be up to 70 per cent more fuel-efficient. The five per cent increase in cost would be made up in reduced spending on fuel.⁴³

In the freight transportation sub-sector, it is important to level the playing field between rail and truck freight by pricing and taxation changes that include in the price of moving freight all the external costs such as highway damage, air pollution, public health and climate change. Moving an item by truck over a given distance requires six times more energy compared to moving it by rail. The use of fleet efficiency standards and incentives for freight truck manufacturers should be explored, along with improved training programs for drivers to enhance fuel-efficient driving practices, and regulated preventative maintenance programs like Quebec's PEP program.

7. Design Measures To Support Deep Emission Reductions

Scientific evidence shows reductions in the order of 50% or more before the middle of the century are necessary to prevent dangerous climate change. A deep emission reduction target also helps inform a sophisticated industrial strategy. Canada should soon adopt a deep emission reduction target and develop a long-term implementation plan in order to honor its United Nations Framework Convention on Climate Change commitment under Article 2. Countries like the UK, Germany, and Sweden with reduction targets of 40-60 per cent before the middle of the century have put climate protection into a broader agenda for economic revitalization, industrial development, improved air quality, and urban renewal. Canada should do the same.

8. Assess Opportunities Based On Efficiently Sustaining Economic Activities

The current Plan looks at general emission reduction targets relative to a somewhat arbitrary forecast of emissions growth and assumes energy is used for its own sake. A superior approach is energy end use analysis. This involves forecasting the activities that will take place in our society and economy and then calculate emissions based on a realistic deployment of efficiency, conservation and renewables and reduced conventional energy.

9. Consult On Measures In A Timely Manner That Fairly Engages

⁴³ DeCicco, J., An, F., and Ross, M. 2001. Technical Options for Improving the Fuel Economy of U.S. Cars and Light Trucks by 2010-2015. American Council for an Energy-Efficient Economy. <http://www.aceee.org/pubs/t012.htm>

Stakeholders

Consultations must focus on “how” to make emission reductions not “if.” The practice of consultations intentionally or unintentionally delaying implementation must end. Focused, timely consultations are needed. Processes must equitably include NGO and independent climate and sustainable energy analysts.

Canadian government and industry have made “consultations” an effective tool for delaying progress. Between 1998 and 2002, the federal government spent more than \$22.3 million on consultations including an extensive process involving 16 issues tables, regional workshops, cross-country consultations on a draft plan, extensive federal-provincial consultations including regular meetings with all energy and environment ministers, and much, much more.⁴⁴ Prior to 1998, the federal government had already developed a National Action Plan on Climate through extensive consultations. Since 2002, there have been more consultations.

The current trend towards backroom industry consultations to the virtual exclusion of the environmental community risks designing poor public policy. Consultations on the development of the Large Final Emitter system have inadequately included many sustainable energy and climate change analysts from non-governmental organizations. These insights are critical in effective public policy development.

10. Take Leadership

Prime Minister Paul Martin has a rich appreciation of climate change and a vision for an innovative 21st century economy. While some progress is possible regardless, the Prime Minister’s leadership will determine the extent to which a really successful and visionary Plan is developed and implemented to achieve Canada’s Kyoto target and prevent dangerous climate change.

And we will go beyond Kyoto to strengthen our environmental performance.
Speech from the Throne. Governor General. February 2, 2004.

It is clear that Prime Minister Paul Martin has a deep appreciation of the threat climate change poses to the prosperity of Canadians today and in the future. In the early 1990s he had already laid out some of his thinking to meet these objectives: “The rules of business need to be changed so that it pays to protect the environment and so that it costs to pollute and deplete resources.”⁴⁵

Leadership at the top is essential in meeting the long-term challenge of preventing dangerous climate change. Leadership is critical in shaping the next generation of the Climate Change Plan for Canada. It is also necessary for the next generation of technologies, cities, Canadians, and the next generation of Federal Government.

⁴⁴ Spivak, Mira. November 6, 2002. F.O.I finding presented to the Senate of Canada.

⁴⁵ Martin, Paul. 1992. *The Environment: A Liberal Vision*.

EU Climate Policy, Now... and Tomorrow?

Matthias Duwe (Climate Action Network Europe)⁴⁶

In the European Union, acting on climate change is a political priority. Considerable media interest and continuous public concern have put pressure on Europe's politicians. In addition, recent years have demonstrated that many EU countries are vulnerable to a variety of impacts that are expected to increase in severity with a changing climate (eg. the floods in the summer of 2002, or the drought of the summer of 2003), which have caused human suffering as well as considerable damage to property and agricultural production.⁴⁷

Today, the EU has enshrined the problem as a top agenda item that features prominently as a determinant in current and future EU policy. EU action on climate change is also a matter of political credibility internationally, because Europe proclaimed itself a leader on the issue among industrialised nations. EU leaders made this particularly clear in their vehement response to the announcement that the USA would withdraw from the Kyoto Protocol (KP) in March 2001. In a joint statement they reaffirmed their "commitment to delivering on Kyoto targets and the realisation by 2005 of demonstrable progress in achieving these commitments." More recently, the United Kingdom, which is preparing for its important role in 2005, when it will hold both the EU Presidency that of the G8, has already announced that climate change will be one of its priorities.⁴⁸

However, the EU faces internal discussion over the details of how to best implement the Kyoto commitments and as the details are being argued over, most policies have yet to prove they will realise the emission cuts they were intended to achieve. In addition to this hurdle, there is an issue of policy coherence, because other EU policies continue to generate additional emissions.

Targets and Emissions

The European Union⁴⁹ is a Party in its own right to the international climate treaties and it has thus taken on a quantified emission reduction obligation under the Kyoto Protocol. It has pledged to reduce its 1990 emissions of six greenhouse gases (GHG) (CO₂, CH₄, N₂O, SF₆, HFCs, PFCs) by 8% by the five-year Kyoto commitment period between 2008 and 2012. All the then EU Member States (MS) have the same 8% target under KP, but internal differentiation within the EU was allowed under Article 4 of the KP. This has led to an arrangement, adopted in 1998, where the bigger polluters and economically stronger countries have taken on deeper reductions, while those that were catching up economically are allowed to raise their pollution levels, and

⁴⁶ Contact the author at matthias@climnet.org.

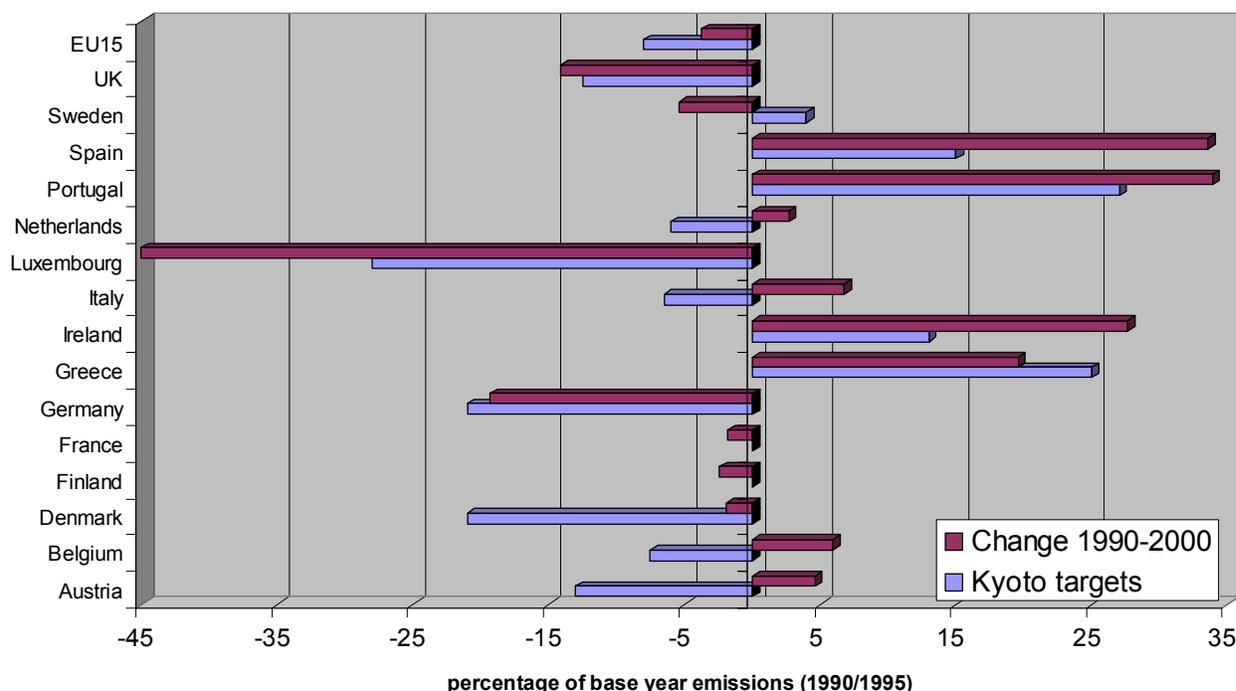
⁴⁷ For more information on these signs of potential climate change impacts, visit <http://www.climnet.org/signals/>

⁴⁸ UK Prime Minister Blair calls climate change "[in the long term], the single most important issue that we face as a global community". (27th April 2004 <http://www.number10.gov.uk/output/page5716.asp>)

⁴⁹ It is the European Community (EC) that as a legally constituted body is the signatory to international treaties, but the terms EC and EU are used interchangeably in this context for simplification.

others have to stabilise at 1990 levels. This so-called “burden sharing agreement” (BSA) includes a range of individual targets from –28% (Luxembourg) to +27% (Portugal).⁵⁰

Development EU15 GHGs 1990-2000 compared to Kyoto targets



Source: EEA 2002, Annual European Community Greenhouse Gas Inventory 1990-2000⁵¹

Current emissions show similar spread of emission trends from –45% Luxembourg to +34% for Portugal, but the Member States have contrasting track records (see Graph above). While some have already developed meaningful domestic policy and are on track to achieving their targets already, others have waited for EU-wide instruments, so-called Common and Coordinated Policies and Measures (CCPMs), which are only now getting into gear. Details of some of these instruments will be elaborated in the next chapter.

EU Wide Policies And Measures

The European Climate Change Program (ECCP)

The European Climate Change Program (ECCP) is the EU’s Kyoto implementation strategy. The elaboration of some priority actions to fulfil the KP target was requested by the Environment Council in October 1999, and the European Commission first announced the program in June 2000.⁵² The ECCP is a comprehensive political approach of actively developing CCPMs to reduce the EU’s GHG by 8% compared to 1990. It started off with a twelve months long

⁵⁰ For a full table on the detailed targets, see <http://www.climnet.org/resources/euburden.htm>

⁵¹ Available from http://reports.eea.eu.int/technical_report_2002_75/en. More recent emission data (incl. 2002) should be available soon from http://themes.eea.eu.int/Environmental_issues/climate/reports

⁵² For more information visit the following websites, <http://www.climnet.org/EUenergy/ECCP.html> and <http://europa.eu.int/comm/environment/climat/eccp.htm>

stakeholder consultation process in working groups (2000-2001). These groups looked at many sources of emissions (energy, industry, transport) and types of measures (standards, taxation, trading, voluntary agreements etc.).

The final report of the groups was published in June 2001 and listed over 40 CCPMs which had been identified in the course of the consultation process. These policies showed a combined potential for cost-effective domestic reductions at a cost of less than 20€/ton CO₂eq (including zero or negative cost) of 664-765 Mt CO₂eq, twice the Kyoto reduction effort required in the EU measured against the 1990 base year. Out of this initial list of possible policies, a set of priority measures was chosen for implementation in the near-term.⁵³ While some of these measures are already in place now or preparations are well under way, others have suffered setbacks both in their content and timing. Some of these will be elaborated on in the following sections.

Key Elements Of The ECCP

a. Renewable energy support

The main instrument for the support of renewable energy sources (RES) is the Renewable Electricity (RES-E) Directive⁵⁴, which was already well advanced during the ECCP stakeholder phase and finally adopted in September 2001. The overall EU target of doubling the share of renewables in primary energy demand by 2010 was translated into a target for renewable electricity of 22%.⁵⁵

The RES-E directory sets “indicative” targets for the consumption in the EU Member States, how this is achieved is left to their discretion. The MS must choose a mechanism for the promotion of green electricity and report their progress regularly to the European Commission. The directive includes a rather broad definition of RES, including the organic part of municipal solid waste and large hydroelectricity.

One way of visualising the RES growth so far and getting an indication on which measures have been most successful is the distribution of installed windpower capacity in the EU countries. Latest figures from the end of 2003 (see map below) show the countries that are currently in the lead, Germany (accounts for about half of the EU’s total), Spain and Denmark (the European pioneers in windpower). All these three have put in place so-called feed-in tariff systems, which guarantee green electricity producers grid access and a minimum premium price for their electricity, thus overcoming traditional market entry barriers and creating investment security. Other countries are starting to use similar systems (Italy, Austria). Other RES promotion policies like the Renewables Obligation in the United Kingdom, seem not to have had the same success.

The map also shows the relative absence of wind power in the new EU members from Central and Eastern Europe, who have so far little installed capacity. Implementation of policies that have proven successful in other countries could unearth a great potential for wind power. Indicative targets for these ten new countries were agreed in 2003.⁵⁶

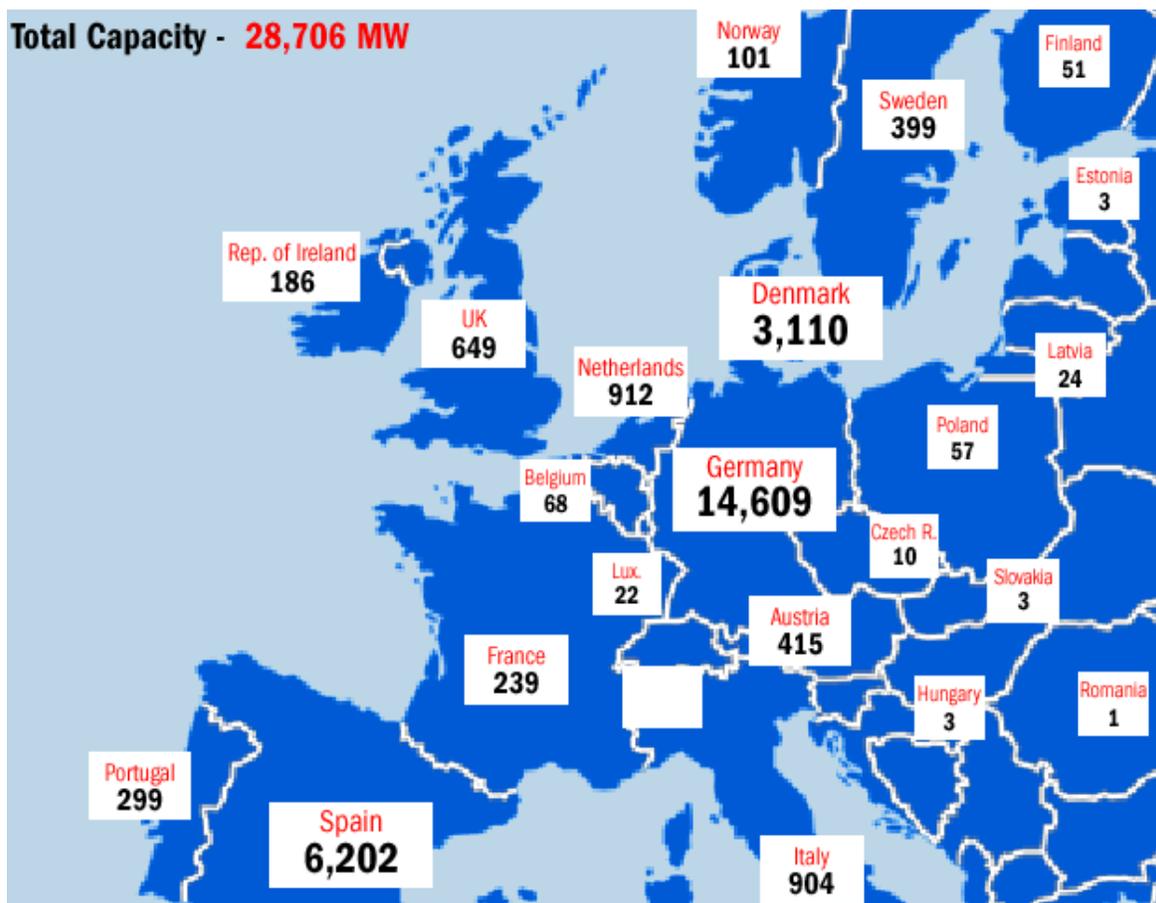
⁵³ COM (2001) 580 – most official EU documents are identified by a mixed set of abbreviations and numbers. The best online tool for getting hold of these is PreLex (<http://europa.eu.int/prelex/apcnet.cfm?CL=en>)

⁵⁴ COM (2001) 77

⁵⁵ Non-electricity use of renewables for heat or as a transport fuel is meant to be supported by other measures, such as the biofuels directive or possible future legislation on heat production from renewable sources.

⁵⁶ The World Wide Fund for Nature (WWF) has published studies monitoring the progress for the EU15: <http://www.panda.org/downloads/europe/renewablesdirectiveoctober2003.pdf>

Wind power installed in the EU at the end of 2003



Source: European Wind Energy Association (EWEA), www.ewea.org

b. Fluorinated gases

Fluorinated gases (HFCs, PFCs, SF₆) are highly potent greenhouse gases and emissions of these gases as a group are expected to grow considerably with increased use in refrigeration, foams, etc. A draft legislation⁵⁷ on limiting their emissions is currently under discussion in the European Parliament and the Council. The European Commission has proposed to amend a regulation on ozone depleting substances (ODS) to include these non-ODS fluorinated gases, which have often been employed to replace ODS. At present, the policy risks concentrating on improving the containment of the gases (e.g. leakage prevention via monitoring) rather than phasing-out substances for which there are clear alternatives.

c. Energy efficiency

A number of policies have been proposed and also already adopted to improve energy efficiency in the EU. On the supply side a Cogeneration Directive⁵⁸ was adopted in January 2004, which seeks to support the cogeneration of heat and electricity, thus improving the overall energy balance. It now includes provisions to remove barriers for cogeneration (e.g. on grid access) and

for the EU+10: <http://www.panda.org/downloads/europe/easternpromise.pdf>

or click your way to climate and energy from <http://www.panda.org/epo>

⁵⁷ COM (2003) 492

⁵⁸ COM (2004) 8

asks all MS to evaluate their potential for the technology and report it to the Commission. Alas, unlike in the RES-E directive, no direct targets for increasing the share of cogeneration have been agreed.

On the demand-side, a directive on Energy Efficiency in Buildings⁵⁹ was adopted in December 2002. It includes minimum standards to be elaborated by the Member States which will apply to new buildings and those undergoing major renovations and foresees inspections to check on energy performance. Sadly, its timetable has been set so that its impact for the Kyoto period will probably not be significant. Two other pieces of legislation are currently under discussion: an Energy Services Directive⁶⁰ was proposed in December 2003, which sets a target of 1% annual energy savings in each Member States. Another EU directive on minimum efficiency standards for energy consuming products, the so called Eco-Design Directive⁶¹, was published by the Commission in August 2003 and is on its way through the legislative process.

d. EU Cap-And-Trade Directive - Emissions Trading for EU industry

The EU Cap-And-Trade Directive⁶² (known as the EU emission trading system (ETS)) is meant to be a centrepiece of the EU's climate strategy. Over three years since initial discussion on such a system final adoption of the directive by both Parliament and Council took place in July 2003.⁶³ Trading is set to start from the 1st of January 2005, a first phase will run until January 2008, from then the ETS operates parallel to Kyoto's first commitment period. It caps CO₂ emissions from industry at an installation level from 2005. The sectors and activities listed in the directive cover around half of EU CO₂ emissions. The sectors covered are electricity generation (from 50 MW), the production of steel, cement, glass, ceramics and pulp and paper. Non-compliance with the directive (not being in possession of sufficient emission allowances compared to actual emissions) invokes a penalty of 100 € (2005-7: 40€) plus restitution of the allowances in the following year.

The directive also allows the use of external credits from Kyoto Project Mechanisms (JI/CDM) for compliance with the system's provision. Details for this link were agreed in a separate document (the so-called Linking Directive) following a Commission proposal in July 2003.⁶⁴ The compromise reached between Parliament and Council in April 2004 does not put a quantitative limit on the use of such credits in the EU ETS and the qualitative restrictions are weak. Credits from sinks projects are to be excluded (subject to review in 2006) and hydro power projects over 20 MW should "respect" the criteria developed by the World Commission on Dams (WCD).

Targets are being set by the EU Member States, which allocate allowances to the installations covered. An initial NGO analysis of these National Allocation Plans (NAPs) published at the time of writing suggests that most European countries are not making full use of the instrument for its first period. In most cases, the emission allowances presented for the sectors covered by the directive would lead to national emission levels above the Kyoto targets of these countries. While this is allowed in principle, a generous first period allocation does not set a good

⁵⁹ COM (2002) 92

⁶⁰ COM (2003) 792

⁶¹ COM (2003) 453

⁶² COM (2003) 403

⁶³ For more information, also check <http://www.climnet.org/EUenergy/ET.html> and <http://www.europa.eu.int/comm/environment/climat/emission.htm>

⁶⁴ COM (2003) 403

precedent for much stricter reductions for the second phase. The NAPs have to pass a review by the EU Commission before they become official.

e. Transport – voluntary agreement - Non-ECCP element

The transport sector is becoming more and more important for the control of Europe's greenhouse gas emissions. No other part of the EU economy has seen such strong increases over the last 10-15 years. Nevertheless, the EU has so far relied mainly on just one main tool to keep this emission growth in check, a voluntary agreement with the car industry. European car-manufacturers (ACEA) pledged in 1998 to reduce average emissions per kilometer for their fleet of new cars by 2008 to 140g CO₂/km (on average about 5.8 l petrol/100 km or 5.25 l diesel/100 km). The official EU target, however, is 120g CO₂/km by 2010. The additional saving is supposed to come from fiscal measures, such as vehicle taxation and road-pricing (the so-called "Euro-Vignette"). Japanese (JAMA) and Korean (KAMA) car manufacturers joined the agreement in 1999 with the target date 2009. Recent figures indicate there is progress being made,⁶⁵ but on the other hand, industry statements are questioning that the target can be achieved.

On The Down-Side...

Despite the comprehensive and systematic approach the EU has chosen to limit its GHG emissions and fulfil its Kyoto obligations, there are a number of other policies that run counter to this effort. The EU has a policy consistency problem when it comes to climate change. Countries like Germany and Spain are allowed to continue their subsidies to the coal industry (in Germany, these amount to 80,000 Euros per employee in the coal sector), others give significant money to nuclear power and even natural gas receives subsidies. In addition, the EU's spending policy creates greenhouse gas emissions. The structural funds are biased in favour of road transport. Export credits, and bilateral aid are going into projects with a negative climate impact. As part of the 6th Environmental Action Program, the Commission has noted these inconsistencies and wants to evaluate both subsidies as well as the funding policy.⁶⁶

International Co-Operation - EU Climate Leadership Abroad?

The UNFCCC and the Kyoto Protocol have been and remain the top priority of the EU's international policy on climate change. While staying engaged in the continuation of the process, the EU is keeping up the dialogue with Russia, asking it to finally ratify the Kyoto Protocol, and Europe is engaged with its Annex-I partners, especially Japan and Canada on the implementation of the Kyoto targets. However, the EU also puts considerable effort into a number of multilateral initiatives other than the UN process. When the EU's goal to agree on targets for renewable energy was not achieved at the World Summit on Sustainable Development in Johannesburg in summer 2002, it became part of a group of countries, who formed the Johannesburg Renewable Energy Coalition (JREC), which seeks to increase the share of renewables globally. Also in Johannesburg, German chancellor Schröder invited all interested countries to a conference on renewable energy in Germany in 2004, the Renewables2004 conference in Bonn (1st to 4th July).

⁶⁵ In 2003, a progress report stated that new European cars were emitting over 10% less than in 1995. (EU Press Release 12th February 2004, IP/04/195)

⁶⁶ See <http://europa.eu.int/comm/environment/newprg/>

Another important forum that emerged from the WSSD was the Renewable Energy and Energy Efficiency Partnership (REEEP) in which the EU is also active.⁶⁷

The EU has also joined US-led international Technology Fora such as the Carbon Sequestration Leadership Forum or the International Partnership for a Hydrogen Economy. At the same time, it has started an effort to integrate climate change aspects into its development co-operation policy.⁶⁸

EU Climate Policy Post-2012

Having reviewed some of the core elements of the current EU strategy to achieve its emission targets for the first commitment period of the Kyoto Protocol, an important question to ask is what will come after that. The latest EU studies project that the Kyoto targets can be achieved, but making further cuts after 2012 is an undisputed necessity.⁶⁹ The ECCP process already identified the potential for emission savings beyond the 8% Kyoto target. And some EU Member States are putting future targets on the table (UK, Germany, NL).

First of all, the *existing* set of policies and measures that are meant to ensure reductions by 2012 can be strengthened. However, *additional* policies are needed to realise further cuts or to reverse the trend in sectors that are currently experiencing growing emissions or are not reducing sufficiently. The transport sector will need particular attention in this regard. In addition to political instruments, research and development efforts could play a significant role in opening up new options.

It is clear that future EU climate policy will not take place in an isolated space, but that the EU must seek to agree with others on an international framework for reducing global emissions of greenhouse gases in line with the ultimate goal of the UNFCCC to stabilise their atmospheric concentration at a level that prevents dangerous climate change. In fact, the EU has demanded that the impact should be limited to a maximum warming of two degrees Celsius.⁷⁰

Strengthening Existing Measures: ECCP “Reloaded”

The ECCP policy portfolio is not limited in its application to the period 2008-12. CCPMs such as the directive on energy efficiency in buildings will in fact only start to show an impact in the long-run, as more new and renovated buildings have to comply with the energy standards. However, the standards can also be raised in the future, leading to a strengthening of the impact of the measure. A number of other instruments could be improved similarly. New targets beyond 2010 must be set for the RES-E directive. NGOs are currently advocating a 25% goal for 2020. Stronger targets could be agreed beyond that. The same principle applies to the cap-and-trade directive. The system is designed in a way that allows continuous operation, which only requires new national allocation plans for periods beyond 2012.

⁶⁷ On the web, see JREC: <http://forum.europa.eu.int/Public/irc/env/ctf/library> - REEEP: <http://www.reeep.org>

⁶⁸ COM (2003) 85

⁶⁹ EEA 2003 Environmental Issue Report No 36 “Greenhouse gas emission trends and projections in Europe” (http://reports.eea.eu.int/environmental_issue_report_2003_36/en)

⁷⁰ This target was officially recalled at the Environment Council on 17th October 2002

(<http://europa.eu.int/rapid/pressReleasesAction.do?reference=PRES/02/320&format=HTML&aged=1&language=EN&guiLanguage=en>)

New Policies And Measures: Tackling Transport

The emission growth observed in the transport sector makes it a key target for future emission cuts. While the existing measures such as the voluntary agreement with the car manufacturers need to be enforced and could, if successful, be extended, additional policies are apparently necessary. The planned road-pricing instrument must be designed with sufficient bite and with a view to strengthening it in the future. A number of other measures could be envisaged to encourage modal shift from road to rail for example. In other areas, additional policies could include support for heat production from renewable energy.

Technology Development

Environmental technologies can help significantly improve the use of natural resources and reduce pollution. The EU is trying to support their development as part of the Environmental Technologies Action Plan (ETAP), adopted in January 2004. A list of priority actions was created, featuring so-called Technology Platforms on Hydrogen and Photovoltaics, performance targets, help in mobilising capital et al. The Technology Platforms (TP) are stakeholder driven processes which are meant to bring together the relevant industry and researchers plus civil society organisations in an effort to form a coherent research agenda and dissemination strategy from the fragmented national programs in individual EU Member States. The Hydrogen and Fuel Cell TP is the central element in the EU's strategy for a sustainable hydrogen economy, which Commission President Prodi characterised as follows: "It is our declared goal of achieving a step-by-step shift towards a fully integrated hydrogen economy, based on renewable energy sources, by the middle of the century." Hydrogen technology is not inherently climate –friendly, its potential benefit lies in the use of renewable sources for hydrogen production. In the US, the current hydrogen support program focuses on coal as a hydrogen feedstock.

This goes to show that development and dissemination of new technology cannot be seen in isolation from political priorities and the regulatory framework. Future energy technology is thus not a substitute for policy today, but rather a potential part of a long-term strategy to achieve deep emission cuts, that will only take place with policies that regulate GHG emissions

Summary

The EU has embarked on a strategy to comply with its Kyoto targets, covering many sectors and a variety of policy instruments. Rather than asking if it should fulfil its obligations, it has asked how best to do that. However, impacts of these measures are not visible yet in current emission figures. In addition to gaps in the implementation and contradictory policies in other areas, this has led to a low international credibility.

The existing set of policies is designed so that it could be strengthened to form the backbone of a post-2012 climate strategy. Still, additional policies would be needed, especially for the transport sector. Furthermore, a strategy to develop environmental technology to help cut emissions in the long-run has been initiated.

The Status and Challenges of National Policies in the United Kingdom

Catherine Pearce (Friends of the Earth International)⁷¹

The UK is a major contributor to climate change. Britain has a population of just under 60 million, we each emit just over 9 tonnes of CO₂ annually – slightly higher than the average emissions of a Japanese person. That means our per capita emissions are nine times higher than those of India and over one hundred times those of Malawi. The UK is ranked as the seventh biggest emitter of carbon dioxide in the world and the second biggest in Europe. As the first country in the world to develop a coal and steel-based industrial economy, our historic liability for climate change is as high as anyone's.

Impacts At Home

Climate change is expected to lead to wetter warmer winters in Britain, with an increased risk of flooding. Five million people live in flood risk areas. In the 1980s, the Thames Barrier, which protects London from flooding, was used less than once a year. Between 2000 and 2001, the barrier was lowered 24 times to stop London flooding. Climate change is also expected to lead to hotter dryer summers. 2000 people in Britain died in last year's heat wave.

Awareness of climate change amongst the public is quite good. Government surveys show that virtually everyone has heard of the problem, that over one half think it a very important issue, that over eight out of ten people are convinced it is happening and seven out of ten believe it to be due to human influence. Two-thirds of people surveyed believed that the UK floods in 2000/1 were due to climate change.

Impacts Abroad

We recognise that adverse impacts on the UK are likely to be minor compared to the impacts overseas. The UK has a strong state capable in theory of planning detailed adaptation strategies. The Intergovernmental Panel on Climate Change has said that the poorest people in the poorest countries are most vulnerable to climate change. Yet they have done the least to create the problem. Awareness and concern over this injustice is low but it is growing.

Early Action

The UK's progress towards reducing our emissions has been fortunate. The former Conservative Prime Minister, Margaret Thatcher was surprisingly an early champion and Environment Ministers like John Gummer MP for the Tories and Michael Meacher MP for Labour have been

⁷¹ Contact the author at catp@foe.co.uk.

prominent advocates for action. Even the new leader of the Conservative Party, Michael Howard MP has a track record on the issue. He was our Environmental Secretary at Rio. We are also fortunate to have scientists like Sir John Houghton and Sir David King to raise awareness and the Hadley and Tyndall Centres to carry out research. Sir David King, the Chief Scientific Adviser to the Government, recently made well publicised comments on climate change, mainly directed to President Bush, stating recently that “climate change is the most severe problem that we are facing today – more serious than the threat of terrorism.”

As a result of our track record, Britain was one of the few industrialised nations that actually met its Rio target to stabilise its emissions at 1990 levels by 2000. To be fair to other countries, this achievement was largely because British electricity generation was so inefficient and because Mrs Thatcher and her colleagues were happy to introduce measures to reduce the use of coal in favour of natural gas – known as the ‘dash for gas’.

To be fair to ourselves, though, this was not uncontroversial. It was also accompanied by other measures that were justified on climate grounds – measures that have been politically risky for both Conservatives and Labour. The ability of successive Governments to introduce such measures reflects in part the consensus there is in the UK over the need to tackle the problem. To give an example, from 1993 to 1999, road fuel duties were increased every year by at least five per cent above the rate of inflation. This led to Britain having amongst the highest petrol prices and by far the highest diesel prices in Europe. In 2000, the straw finally broke the camel’s back and British lorry drivers protested by blockading ports and oil depots. The nation rapidly ground to a halt as panic-buying led to shortages of fuel. The Government buckled. Duties were reduced, especially on diesel. But that being said, they are still amongst the highest in Europe and have since been increased to reflect inflation.

What Is Planned For The Future?

The centrepiece of Britain’s strategy is its Climate Change Programme and particularly the new Energy Policy. Britain is committed to cutting its greenhouse gas emissions by 12.5 per cent from 1990 to 2010 – under the Kyoto Protocol. The Labour Government has promised to go further – cutting UK emissions of carbon dioxide by 20 per cent over the same period.

The Energy White Paper, ‘Our Energy Future-creating a Low Carbon Economy’ which came out in 2003, sets a further objective – to pave the way for cuts in carbon dioxide emissions of 60 per cent from 1990 levels by 2050, with significant progress by 2020. For the first time, environment and sustainability were placed right at the heart of our energy policy objectives. The Government were widely recognised for this bold shift in its energy policy.

The Government objective is cuts in carbon of 15-25 million tonnes by 2020 – half of that is forecast to be met through energy efficiency. The Government widely recognises energy efficiency to be the cheapest, cleanest and safest way of meeting the White Paper objectives. A number of Government energy efficiency policies have proved successful in both the domestic and business sectors, but much more needs to be done. An Energy Efficiency Implementation Plan – one of the 130 commitments from the White Paper came out in April 2004. The measures set out in the Plan are expected to deliver over 12 million tonnes of carbon by 2010. However,

many have dismissed the Plan as breaking the previous commitments made on delivering emission savings through domestic energy efficiency.

Emissions Trading

A massive contributor to the achievement of these objectives will be the EU emissions trading scheme which is currently being introduced and due to go live in January 2005. This currently applies to electricity generation and industry which between them are responsible for about half our emissions.

The Government regards emissions trading as one of the most important tools, a 'central plank' of our future emissions reductions policies. In January, the Government published its proposed Draft National Allocation Plan, setting out how greenhouse gas emissions will be allocated to the operators of UK installations. In spite of great hostility from British industry, our Secretary of State for the Environment stood firm, saying "the targets are at a challenging yet achievable level that will encourage industry to cut emissions and take advantage of the opportunities that trading has to offer".

The Plan indicated however that we were not on track to meet our 20 per cent cut in CO₂ target (compared to 1990) by 2010 but instead would make a 16.3 per cent reduction. In May, the Government announced its revised emission reductions for the trading scheme, making its previous rhetoric seem empty. Predictions were revised down further to a 15.2 per cent reduction. Within this overall reduction in ambition was a more serious reduction as industrial emissions' contribution to this target between now and the end of 2008 (the first phase of the trading scheme) have been seriously watered down. In the proposed draft Allocation Plan in January, 5.8 per cent fewer allowances were being granted than were emitted in the baseline years (which is the average of 1998-2002). In the new version this reduction is only 0.2 per cent - a disappointing and insignificant cut in industrial emissions. It is certainly hard to see how the UK will meet our 2010 domestic targets, making tougher emissions reduction mechanisms for transport and the domestic sector necessary. Pressure will also mount on the second phase of the trading scheme, from 2008 to seriously deliver emissions.

Nuclear Power

Meanwhile the Government has closed the door to the construction of new nuclear power plants. The cost of nuclear power, its inflexibility, the lack of any coherent strategy for dealing with its waste and the fact that Britain has a surplus of generating capacity were all factors in influencing the decision. However the Government has reserved the right to use nuclear power in future. The policy is more one of moratorium than phase out.

Green Power

Meanwhile it has opened the door to renewable energy. Britain has abundant and diverse supplies of renewable power. The shallow seas around our extensive coastline are ideal for off-shore wind and wave power. We have some of the highest tidal ranges in the world and lots of potential for biomass. Wind power is now cheaper than nuclear in Britain and the costs of other

renewable power sources are falling. Only our surplus of old coal-fired capacity, and the relative cheapness of gas, limits the growth of renewable power.

The Government is trying to overcome these obstacles by subsidising renewable development. Under the Renewables Obligation, all electricity suppliers are required to source 3 per cent of their supply from renewable sources. This figure will rise to 10 per cent by 2010, with a recent announcement to increase it to 15 per cent by 2015. The Government has indicated it will set further targets such that 20 per cent of our electricity will be generated renewably by 2020. It is also devising new measures to promote bio-fuels for transport.

Transport

Transport remains a big headache for our Government. Protests against road building and concern over pollution and congestion led to radical changes in transport policy in the last 1990s. John Prescott promised that by 2002, more people would be using public transport and fewer using cars. His integrated transport White Paper, published in 1998 was supposed to deliver these changes. It hasn't happened. More people are using public transport, but more people are using cars as well. Only the European voluntary agreement with motor manufacturers to cut the fuel consumption of new cars sold by 25 per cent from 1998 to 2008 and a slowdown in traffic due to congestions has stopped a surge in emissions from transport.

Motoring costs, in real terms are falling despite increased duties. They are expected to fall further. Meanwhile the cost of public transport has risen. A number of fatal accidents have led to a crisis in confidence in the railway industry. Meanwhile the costs of maintenance and improvement have rocketed due to privatisation. This has scuppered the Government's Ten Year Plan for transport and undermined public support for curbs on car and lorry use.

One courageous politician, Ken Livingstone, the Mayor of London, has shown the way forward. He outfaced opponents and introduced congestion charging to enter the centre of London. The scheme isn't particularly sophisticated. It comprises simply a flat fee, with exemptions for alternatively fuelled vehicles, but it has worked and reignited interest in similar schemes in other cities.

Some motor manufacturers at least have shown signs of introducing radical new technologies to improve car fuel efficiency. Most of the gradual improvement in the consumption of the European car fleet over the last few years has been due to the wider introduction of diesel engines and to incremental changes to vehicle design.

If surface transport has been a headache for the Government, aviation policy is an area where the need to prevent climate change has been largely ignored. The growth of low cost airlines and the absence of taxes on fuel consumption have led flights to increase by 5-6 per cent a year. Despite protests from residents near airports and environmental groups, Government policy, through the recent aviation White Paper, is merely facilitating further growth. A third runway is to be built at Heathrow and a second at Stansted. Land is being set aside at Gatwick for another runway there.

Internationally

Britain's action internationally has been mixed in other areas as well. Although it has a reputation as a champion of action against climate change – based on its enthusiasm for Kyoto – the UK's record is actually more mixed. It has yet to back calls for the World Bank and other international financial institutions to phase out support for coal and oil investment, as the Bank's Extractive Industries Review has called for. The UK decided to support BP's proposed pipeline from Baku in Azerbaijan to Ceyhan in Turkey – despite opposition at home. Shell recently announced it has been forced to delay construction of undersea pipelines in the Sakhalin II oil and gas project, one of its most important gas projects, largely due to its immediate impact upon the Western grey whale which are already perilously close to extinction. The European Bank for Reconstruction and Development has decided against any investment into the project at this stage. Intensive action and lobbying by Friends of the Earth certainly played a significant role in forcing this delay. No strategic environmental impact assessment has been carried out of the impact of oil development in the Okhotsk Sea – on climate change or on the birds and animals that live there. We are campaigning to stop UK Government finance being used until such an assessment has been made.

2005 will be a busy year for the UK. We formally take the Chair of the G8 at the beginning of the year and for the latter part of the year take the Presidency of the EU. Prime Minister Blair has already determined climate change to be a key priority for these roles. To have credibility on the international stage, the PM will have to be confident the UK can meet national and international commitments in the short and long term.

The Case of Germany

Manfred Treber (Germanwatch)⁷²

General

The discussion about climate change started very early in Germany: In 1987 the German Meteorological Society and the German Physical Society gave a warning on the foreseeable dangerous climate change. After a federal parliamentary commission on preventing climate change in 1990 had unanimously proposed a reduction of the CO₂-emissions of Germany by 30 % until 2005, by 50 % until 2020 and by 80 % until 2050 compared to 1987 levels, the German government decided in the same year to reduce its CO₂-emissions by 25 % until 2005.

On the international level Germany has been very proactive in convincing further countries to join the efforts against global warming. During the negotiations of the United Nations Framework Convention on Climate Change, Germany (on the EU level) has in most cases has been a major driver for enhanced climate protection. The German Government negotiated for ambitious targets, e.g. for the fulfillment of the commitments domestically and for the exclusion of sinks.

The Kyoto-Protocol has always been supported by the German government as the only existing multilateral legally binding instrument to combat climate change. This was the case for the conservative government during the 1990s as well as for the acting coalition of social-democrats and the green party.

After the adoption of the Kyoto Protocol in December 1997, Germany agreed in 1998 to its legally binding national target as part of the EU burden sharing in implementing the Protocol: minus 21 % greenhouse gas emissions (until 2008-12, on the basis of 1990).

Emissions

Germany has seen a decrease in greenhouse gas emissions since 1990 (see figure 1). This is partly due to the unification which has led to a closure of a lot of old inefficient power plants and industrial production sites with high energy consumption. On the other side a significant part of the declining industrial production in Eastern Germany was compensated by a production increase in the West, as well as migration of several hundred thousands of inhabitants from the eastern to the western part of Germany took place.

⁷² Contact the author at treber@germanwatch.org.

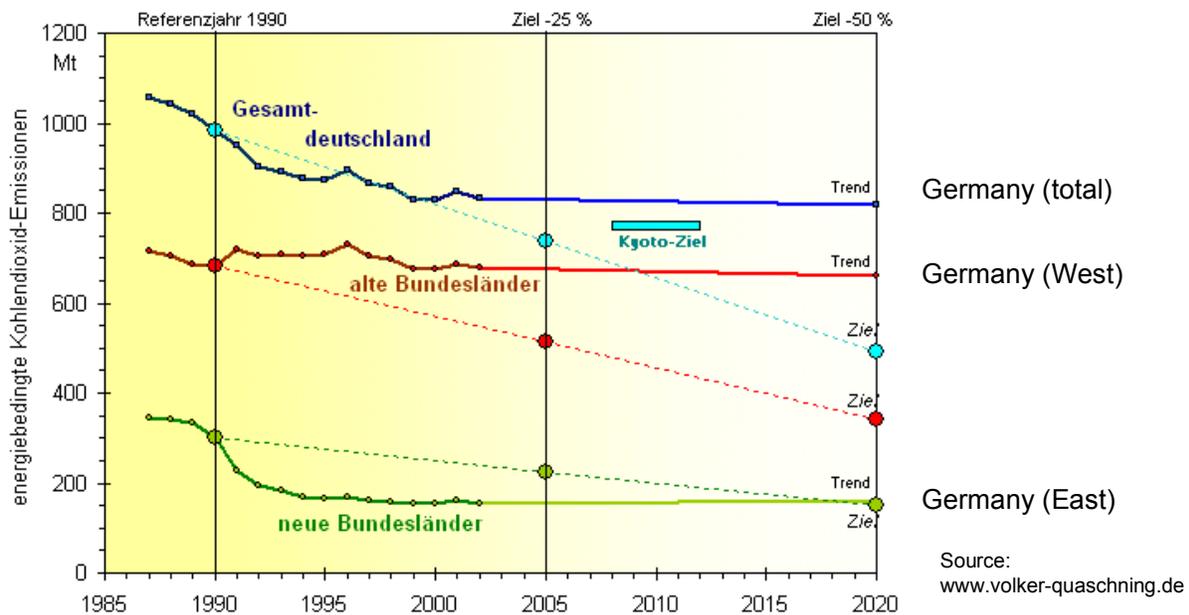


Figure 1: Overview of German CO₂-Emissions from Energy Use

Indeed, the remaining percentage of the emission reductions, which in fact is the majority, resulted from policies and measures to combat climate change. Figure 2 illustrates that nearly all sectors have shown an emissions decrease since 1990.

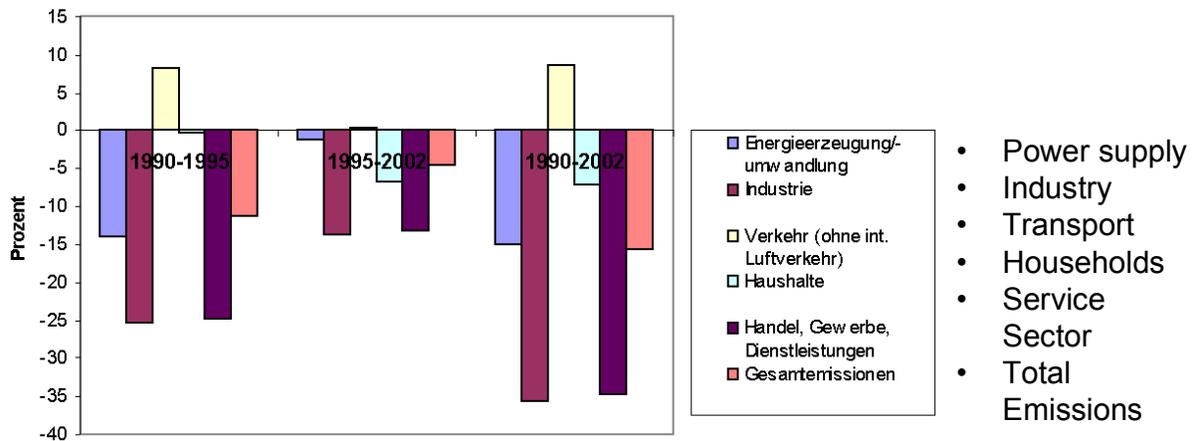


Figure 2: Changes in Sectors from 1990 until 2002 (in percent of total emissions) in two steps from 1990 - 1995 and from 1995 - 2002 (Source: DIW)

Policies and Measures

For the German civil society as well as for the German Government it was clear that industrialised countries had to take the first step to combat climate change. As Germany is heavily relying on industrial exports the chance for new technologies in energy efficiency and use of renewable energies has been identified which comply with the challenge of climate change.

Therefore, the government installed a regulatory framework in the energy sector so that renewable technologies were able to expand in the market without government subsidies: The *renewable energy act*, with a sharp rise of electricity production from wind as its first success story, was a major contribution in that along with increasing wind energy it created 130.000 jobs in the sector of renewable energies.

This was only one of far more than hundreds of policies and measures that are part of the German mitigation approach. Every three to four years the government publishes a report which describes the elements of the national climate strategy.

One of the biggest steps in German climate policy was the introduction of the *ecological tax reform* in 1999. There was an annual increase of energy and fuel prices until 2003 which led to a decrease of fuel consumption (and emissions, respectively). In response the mileage travelled by passenger cars went down, and the market share of rail and public transport increased. The latter was also a consequence of the *reform of the railway system* which has shown its biggest successes in the field of *regional rail* passenger transport.

Furthermore the *energy conservation law* as an important measure has been improved so that new buildings consume much less energy for heating purposes.

But these successes are not sufficient to fulfill the „minus 25% goal“ for 2005 of the German government. Freight transport on the road which is more climate-intense than rail shows steady growth. Further, private consumers do not invest enough in existing buildings to improve heat insulation. In addition, the expected increase in combined heat and power production did not take place because the coal-lobby managed to avoid the introduction of a stronger regulation.

Finally and most recent, the emissions trading system is a major tool of the German government to fight climate change and implement one of the flexible Kyoto mechanisms. The emissions trading system is supposed to start in 2005 as the implementation of a directive of the European Union. It was expected to be the major step for the future to regulate emissions from large point sources like refineries or power plants. This cap-and-trade mechanism restricts nearly half of the overall emissions of the European Union (EU) and is essential to reach the Kyoto-target. But in late spring 2004 the influence of the old industries in Germany managed to weaken the national allocation plan for the emissions trading system. In addition to the agreed CO₂-volume for industry after several months of tedious negotiations extra 15 million tonnes CO₂-emissions per year were given cost free to the industry. As the German Kyoto-target is a fixed absolute number this implicates that the other sectors, apart from the industry (i.e. households and transport), have to make even higher reductions in the first commitment period. This recent decision in mind, the

NGOs do not see how Germany will reach the 40 %-emissions reduction goal for the year 2020 (which was formulated under the condition that the EU reduces by 30 %).

Aviation

One of the weakest points in German climate policy is the aviation sector. This is the mode of transport with the highest specific impacts on global warming because the emissions (contrails) at the high altitude multiply the warming effect of the CO₂ emitted. And a considerable emissions growth in aviation (roughly 4 % per year) is expected globally for the coming decades. There are no limitations for emissions from international aviation, and none are in sight.

Due to this, Germanwatch is promoting the idea of "emissions offset to limit damage from climate change". The first step is voluntary. If a flight cannot be avoided the warming effects from aviation emissions are calculated. Through an additional fee on the ticket price it is possible to finance new projects. They are situated mostly in developing countries and lead to lower greenhouse gas emissions while meeting high quality standards - preferably the Gold Standard - under sustainability aspects.

The Case of Japan

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Can Japan Achieve a “6% Reduction”?

The Japanese government in 1998 issued the “Guidelines for Promotion of Global Warming Countermeasures” (the “Old Guidelines”), and in 2002 issued the “New Guidelines for Promotion of Global Warming Countermeasures” (the “New Guidelines”). The “Progress Report on Guidelines for Promotion of Global Warming Countermeasures” (issued by the Global Warming Countermeasures Promotion Office), published in August 2003, viewed the progress positively, stating that “there has been concrete implementation and progress overall with respect to the policies outlined in the Guidelines, and global warming countermeasures are moving forward.” However, emissions of greenhouse gases in fiscal year 2001 increased as much as 5.2% above the base year (Baseline year for CO₂ is 1990; for HFCs, PFCs, and SF₆ it is 1995.), obviously, “6% reduction” is impossible at this rate. (see Figure 1)

Problems with the “Guidelines for Promotion of Global Warming Countermeasures”

While Japan’s Guidelines make allocations for reductions of greenhouse gases emissions (see Table 1), the Guidelines nevertheless have many significant problems.

First, Japan insists to stabilize carbon dioxide emissions from energy sources at the level of base year and does not respect the measures within the country. Moreover, while increasing nuclear power generation is included within the Guidelines, there is little enthusiasm shown to reduce the demand for energy, to promote renewable energy sources, or to transform the economical system qualitatively.

Second, Japan’s guidelines foresee achieving the 6% reduction through assuming that there will be a 3.9% reduction through the utilization of sinks, a 1.6% reduction through the utilization of the Kyoto Mechanism, and a 2% reduction through “the development of innovative technologies and the promotion of further global warming prevention measures to be undertaken by citizens and all sectors of society.” The problem of these measures is that the sinks, the technological developments and the efforts of the public are all uncertain factors.

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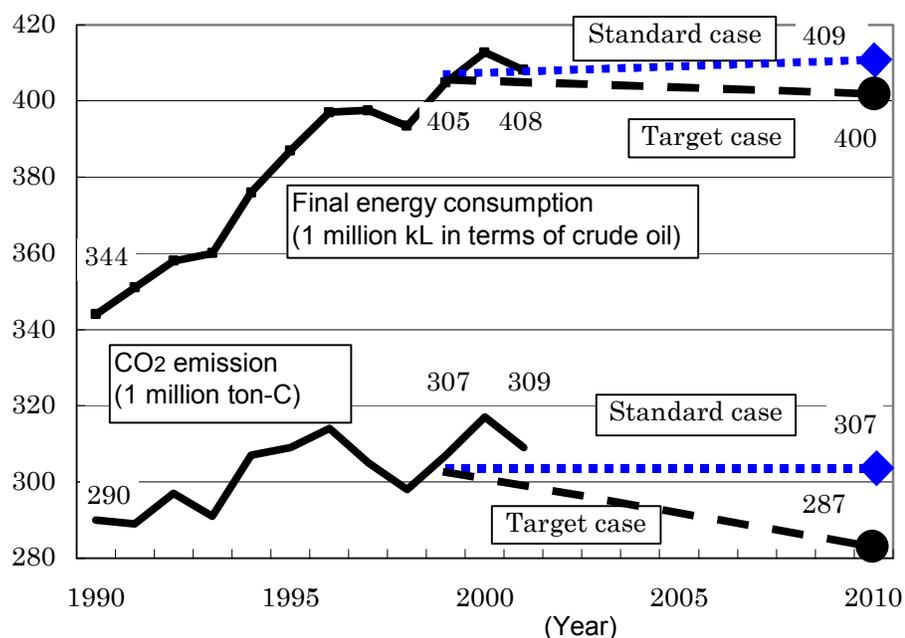


Figure 1: Outlook of CO2 emissions from energy and Final energy consumption (Japan)

Source: Advisory Committee for Natural Resources and Energy (Ministry of Economy, Trade and Industry, Japan), Long-term Energy Supply and Demand Outlook, 2001.

Table 1: New Guidelines for Promotion of Global Warming Countermeasures in Components of 6% Reduction

Description of measures	Numerical values
Measures to cut energy-derived CO ₂ emissions (energy conservation, more nuclear power, new energy sources, etc.)	0 % (industrial -7%, private -2%, transport +17%)
Development of innovative technologies and further efforts by all segments of society	-2.0%
Sinks (maximum use)	-3.9%
Use of Kyoto Mechanisms	-1.6%
Measures to cut non-energy emissions (CO ₂ , N ₂ O, CH ₄)	-0.5%
Measures to decrease emissions of the three gases including CFC substitutes (HFCs, PFCs, SF ₆)	+2.0%
Total	-6.0%

Third, the New Guidelines call for measures in each of three stages (2002-04, 05-07, 08-12); but if we look at the progress during the First Stage (2002-04), efforts have proceeded based on the existing menu of activities, and there are no measures that have been introduced to ensure accountability that success will be achieved.

Fourth, the New Guidelines call for a 7% reduction by the industrial sector, but Nippon Keidanren (the Japan Federation of Economic Organizations, the organization representing Japanese industry) has issued its own “Voluntary Environment Action Plan, ” which calls only for a 0% (stabilization) goal, even including consideration of its energy transformation section - a goal that is far apart from that of the New Guidelines. Furthermore, the effectiveness of the Nippon Keidanren plan is questionable as it is only a unilateral declaration on the part of industry, and is lacking in numerical targets, and has no sanctions for non-compliance. In addition, while industry has expressed their view that the responsibility for increased GHG emissions lies with consumers and the transportation sector, we should not forget that the activities of industry are included within the services and transportation sectors, and there remains much that industry should do in terms of improving the situation, such as improving the performance of products.

Fifth, there are problems with energy policy, including the expansion of nuclear energy and coal-fired power production, and the neglect of renewable energy sources. In recent years, in order to increase the utilization of excess power generated by nuclear plants at night, as seen in the “all electrical appliance home,” a policy has consciously been pursued of having all energy needs be met with electrical power.

Future Issues Related to Achieving a “6% Reduction”

In terms of the re-evaluation of policies, starting with the Second Stage (2005-07) under the New Guidelines (which will be determined in 2004), it will be necessary to consider the following points:

First, concerning the overall framework, it is essential to adopt a long-term policy framework. The New Guidelines are premised on the continuation of the current “high-throughput” societal structure, and a dependence on nuclear power; however, we should create new consultative structures with the participation of citizens and NGOs in order to construct an improved vision for society in the future, such as for 2020 or 2050.

Second, it is essential for there to be complete public access to fundamental information. For example, no explanations are provided for the basis and assumptions for the quantitative targets in the Guidelines, and no detailed breakdown concerning results achieved through implementation of various measures or of subsidies that are being provided have been published; it is thus not possible to judge the effectiveness of these policies, or to analyse their cost and benefits objectively.

Third, even though the long-term projections for energy demand are based on macro models, no “bottom-up” type models are being used. Environmental NGOs, such as CASA, WWF Japan and Kiko Network have made concrete proposals concerning means of achieving reductions (see

Table 2), and rather than only taking a top-down approach, the benefits of bringing together such bottom-up efforts should be examined at the same time.

Concerning implementation measures, first, as has been done in European Union countries, accountability mechanisms should be added to the action plans by Japanese industry (Nippon Keidanren), in addition to strengthening responsibilities of industry in the consumer and transportation sectors. Second, efforts should be made to “green” national fiscal policies, including through the abolition of the electric power development promotion tax and special road financing, as well as through the introduction of carbon taxes and other reforms. Third, it is necessary to strengthen the implementation capacity and responsibilities of local authorities for measures related to the consumer and transportation sectors, in terms of city planning, traffic management, housing and goods distribution activities.

Table 2: Effectiveness of Japan's CO₂ Emission Reduction in 2010 According to CASA Scenarios

Gas type	sector	CASA scenarios		Reference: New Guideline
		(1) Technological measures	(2) Combination of measures	
CO ₂	Energy conversion sector	+ 7.1%	+ 3.5%	—
	Industrial sector	— 9.2%	— 17.3%	— 7.0%
	Transport sector	+ 16.3%	± 0.0%	+ 17.0%
	Service sector	+ 5.0%	— 0.1%	— 2.0%
	Household sector	+ 7.0%	— 0.1%	(Service, household)
	CO₂ total	+ 0.1%	— 9.1%	± 0.0%
HFC · PFC · SF ₆			— 2.0%	+ 2.0%
Total for CO₂, HFCs, PFCs, and SF₆		+ 0.1%	— 11.1%	+ 2.0%

Note: Baseline year for CO₂ is 1990; for HFCs, PFCs, and SF₆ it is 1995.

