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MEMORANDUM FOR THE PRESIDENT

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SUBJECT: Climate change scenarios

I. INTRODUCTION

This memorandum is the first of several we will be submitting over the next month on climate change policy. As you know, many consider this issue to be the premier environmental challenge of the next century. As the world's largest emitter of greenhouse gasses, our country's actions will be watched closely: If we act prudently, we can take steps to reduce emissions over the long term without undue adverse effects on economic growth. But the issue is particularly difficult -- both analytically and politically -- because the environmental and economic consequences are potentially momentous and yet highly uncertain.

The complexity of the issue is reflected in four different sets of constituent constraints that we face:

- Environmental. The environmental community is pushing for an aggressive stance on reducing greenhouse gas emissions.
- International and diplomatic. The international negotiations have focused on relatively aggressive approaches; adopting a less aggressive approach would therefore have adverse diplomatic implications.
- Economic. Economists recognize the severity of the problem, but argue that a more gradual approach can achieve similar environmental objectives at substantially lower economic cost.
- Domestic. Major corporations and labor unions will criticize aggressive approaches as excessively costly and as a large energy tax increase; they will also insist on strong developing country participation in a worldwide emissions reduction system.

The first two of these constraints are roughly consistent, as are the second two. *Our basic dilemma, however, is that the first set of constraints is incongruous with the second set.* An aggressive approach would play well internationally and with environmental groups, but would be sharply criticized by corporations, labor unions, and the Hill. A more gradual approach, however, would garner some support from domestic interests but would be met with derision abroad and by environmental constituents.

In this context, it is worth noting that on substance grounds, your advisers strongly object to the proposals that have been floated by the European Union. In other words, not all international pressures are necessarily consistent with "good policy." In particular, your advisers believe that the EU approach is problematic in three ways:

- Its approach to developing countries, in which developing countries do not have to bear any of the burden of emissions reductions, will undermine the environmental benefits of any efforts in this area;
- Its approach to reducing emissions -- cutting emissions 15 percent *below* 1990 levels by 2010 -- is dangerously front-loaded, and predicated on naive and misleading assumptions.
- The combination of these two factors leads to a credibility problem, that may actually reduce the chances of getting a solid international agreement over the medium-term.

The developing country issue highlights the vast gulf between the dialogue abroad (where previous U.S. proposals on developing country participation are almost uniformly considered too aggressive) and at home (where Senator Byrd's resolution, calling for even tougher demands on developing countries than previous U.S. proposals, passed the Senate 95-0). Your advisers favor a much tougher line on developing countries, even if that necessitates a two-step approach to the international negotiations: reach agreement among the developed countries, but do not submit the agreement for domestic ratification until key developing countries commit to binding targets.

The three illustrative scenarios presented in this memorandum are intended to frame our own decision-making process in the run-up to the Kyoto negotiations in December and beyond. Several key issues pervade these scenarios:

- How to implement a carbon emissions reduction scheme at home;
- How much we can reasonably expect from technological advances without a significant price signal;
- The role of developing economies in reducing global emissions; and
- How the environmental effects *differ* from policy actions within the range being considered.

These four issues are discussed in more detail in Section III of the memorandum.

II. THREE SCENARIOS

The climate change issue involves so many different parts (the target and timetable for our emissions, whether to use a tradeable permits system to reach that target, whether to auction the permits, etc.) that it is easy to become enmeshed in the details while losing sight of larger strategic considerations. The purpose of this section is to present scenarios that try to present some of the trade-offs on that higher strategic plane; subsequent memoranda and meetings will allow us to examine many of the component pieces in more detail.

The three scenarios we consider are:

- Scenario 1: Adopt most attractive policies currently acceptable in international sphere, fight for domestic ratification;
- Scenario 2: Devise more economically efficient domestic policy, even if not internationally acceptable; and
- Scenario 3: Try to bridge the gap

It is crucial to emphasize that the scenarios are meant to be illustrative, to provide a way of thinking about our policy proposals. Similarly, the economic figures presented along with each scenario are highly uncertain. They reflect educated guesses based on economic models. But the issues of disagreement discussed above, along with many others, could have a substantial effect on the precise outcomes. In particular, the estimates of the effects from international trading are especially uncertain.

SCENARIO 1
ADOPT POLICIES CURRENTLY ACCEPTABLE IN INTERNATIONAL SPHERE

Overall strategy

- Reach internationally feasible full agreement in Kyoto.
- Fight to sell and ratify agreement domestically over the next few years.

Components

Target and timetable	1990 emissions levels by 2010
Domestic implementation	Tradeable permits. R&D and Federal energy efficiency programs.
Developing country participation	Agreement in principle on joint implementation. Unlikely to get international agreement -- even in principle -- on Annex B (voluntary limits for developing economies) or evolution (a mandatory graduation system for adopting quantified targets).
International trading	Agreement in principle on a trading regime within Annex I (developed economies).

Energy price effects

U.S. carbon dioxide emissions are projected to grow by almost 30 percent between 1990 and 2010. Thus, reaching 1990 levels in 2010 would require significant reductions in energy use. Some have noted that the cutbacks would be of the same magnitude, or greater, than the reductions in energy use during the two oil shocks of the 1970s. During this period, aggregate energy prices roughly doubled. Similarly, the implied increase in energy prices needed to reach 1990 emissions levels by 2010 could entail a significant inflationary shock, with an associated rise in the CPI and decline in real wages.

However, others note that the analogy with the oil shocks of the 1970s could be misleading. The oil shocks came suddenly and unexpectedly -- in contrast, the economy would have time to prepare for emissions limitations under a climate change regime. Also, a significant share of the increased cost of energy was captured by OPEC countries -- in contrast, only a small fraction of increased energy costs would leave the U.S. under a climate change regime.

We present two alternative sets of estimates. The first assumes that international trading among the developed countries (Annex I) becomes operational. The second assumes that it does not. Your economic advisers note that the first set of estimates involves more arbitrary assumptions that the second.

With Annex I (developed economy) trading

- Permit price. Carbon prices in 2010 up between $50 and $90 per ton.
- Gas prices. Gas prices in 2010 would rise by between 10 and 25 cents.
- Coal prices. Coal prices in 2010 would rise by between $30 and $70 per ton, relative to the current price of about $20 per ton.
- BTU-equivalent. In terms of oil prices, the energy price increase is equivalent to a tax of between $1 and $2 per million BTUs in 2010. (In 1993, the Administration proposed a tax of $0.26 per million BTUs plus a $0.34 per million BTUs tax on oil.)
- Effects on families. These price increases imply that the average family would either have to reduce consumption or pay $500 to $1,000 more in 2010. Effects would be regressive in the first instance, although this could be offset by using revenue to reduce other regressive taxes.
- International transfers. There is substantial uncertainty over the size of net international transfers of the permits. However, under some scenarios, purchases of permits from other countries in 2010 could amount to $5 to $10 billion. Some of your advisers believe that this deficit could prove to be a large political liability.

No Annex I trading

- Permit price. A carbon price increase of between $80 and $140 per ton in 2010.
- Gas prices. Prices in 2010 would rise by between 20 and 30 cents per gallon.
- Coal prices. Coal prices in 2010 would rise by between $50 and $100 per ton, relative to a current price of $20 per ton.
- BTU-equivalent. In terms of oil prices, the energy price increase is equivalent to a tax of between $1.80 and $3.15 per million BTUs in 2010.
- Effects on families. These price increases imply that the average family would either have to reduce consumption or pay $900 to $1,500 more in 2010.

International reaction

- Kyoto agreement feasible, albeit not guaranteed.
- Some criticism from Europeans and other countries.

Domestic reaction

- Hill. Kyoto agreement *extremely* unlikely to be ratified (Byrd resolution); attacked as massive energy tax hike. Even without ratification vote, Congressional anger could manifest itself in many ways.
- Corporations. Major concerns over costs imposed on the economy, as well as developing country stance. Firms in energy-intensive industries will argue (regardless of the evidence) that their operations will flee the United States for other countries. Strong support from renewable energy and energy-efficiency firms.
- Environmental groups. Many environmental groups will support a 1990 by 2010 target, but would prefer a more aggressive path.
- Labor. Strong opposition, driven particularly by coal workers
- Elite media. Likely to support Administration for tackling critical issue
- Outside critics. Many economists who have studied climate change are likely to be extremely critical of the 1990 by 2010 target, as will be discussed under Scenario 2.

SCENARIO 2

DEVISE CHEAPEST DOMESTIC POLICY WITH POSSIBILITY OF KEEPING CARBON CONCENTRATIONS AT TWICE PRE-INDUSTRIAL LEVELS

Overall strategy

- Devise cheapest domestic policy with possibility of keeping carbon concentrations at twice pre-industrial levels.
- Allow more time for capital stock to turn over naturally, while providing signal for technological development and dissemination.
- Since this scenario will not be remotely acceptable in the international sphere, it is provided more as a benchmark than a true scenario.

Components

Target and timetable	Reduce emissions *growth* to zero ten years after ratification. Then, determine when emissions would return to 1990 or other base year level.
Domestic implementation	Tradeable permits (auctioned), or equivalent measures (e.g., $5 per ton initially, rising over time). R&D and Federal energy efficiency programs.
Developing country participation	U.S. would insist on mandatory, binding targets for developing economies with relatively large total emissions or relatively high per capita incomes.
International trading	U.S. would seek international trading system among all participating countries.

Energy price effects

The overall cost of this approach is approximately 1/10 to 1/3 as expensive as under Scenario 1.

- Permit price. A carbon price increase of between $5 and $10 per ton by 2010, scheduled to increase further over time.
- Gas prices. Gas prices in 2010 would rise by an estimated 2 to 3 cents.
- Coal prices. Coal prices in 2010 would rise by between $5 and $7 per ton, relative to the

current price of about $20 per ton.

- BTU-equivalent. In terms of oil prices, the energy price increase is equivalent to a tax of about $0.10 to $0.25 per million BTUs.

- Effects on families. These price increases imply that the average family would either have to reduce consumption or pay $10 to $100 more in 2010.

International reaction

- Kyoto agreement impossible. The U.S. will be blamed for undermining the current round of international negotiations (Rio II). Given this international reaction, agreement on international trading system unlikely.

- Developing country component of this approach is unrealistic, because developing countries will not agree.

Domestic reaction

- Hill. Less chance of intense attack.

- Corporations. Many firms could decide that the gradual approach to emissions reductions is the best they will be able to achieve.

- Environmental groups. Environmental groups sharply criticize.

- Labor. The AFL-CIO does not object.

- Elite media. Criticism from many editorial boards. More criticism likely if severe weather events raise prominence of issue.

SCENARIO 3: TRYING TO BRIDGE THE GAP

Overall strategy

The difficulties with Scenarios 1 and 2 are clear: Scenario 1 represents a strong and credible committment to address the climate change problem, but only at a potentially significant cost to the U.S. economy. Scenario 2 substantially mitigates the economic costs, but would do would be met by immense criticism abroad and among environmental groups at home as insufficiently responsive to the scale of the climate change challenge.

The central question is whether a strategy can be found for bridging the gap between these approaches, providing a credible comittment to taking the environmental problem seriously without imposing untenable costs on the U.S. economy. We suggest three approaches that, to differing degrees, bridge the gap.

Components

Target and timetable	A) 1990 by 2010-2020 B) 1990 plus 15 percent by 2010, 1990 plus 7.5 percent by 2020, 1990 plus 5 percent by 2030, and 1990 by 2040 C) 2000 by 2010, 1995 by 2020, 1990 by 2040
Domestic implementation	Tradeable permits, with an "escape clause" on the permit price, or equivalent measures. R&D and Federal energy efficiency programs.
Developing country participation	U.S. would insist on mandatory, binding targets for developing economies with relatively large total emissions or relatively high per capita incomes.
International trading	U.S. would seek international trading system among all participating countries.

As indicated in the table above, all the alternatives below would be predicated on binding commitments from key developing countries. One possible way to address the developing country issue is a two-step approach: we could try to reach an agreement among the developed economies, but no such international agreement would be submitted for ratification before the key developing economies agreed to their commitments.

Also, under any of these approaches, we could build in an "escape clause" to limit the economic costs. The escape clause would involve government sales of permits at a fixed price -- that fixed price would then define the maximum price for the permits, thus limiting the potential economic costs. For example, if the government were willing to sell unlimited permits at a fixed

price of $50 per ton, it would guarantee that gas prices did not rise by more than 15 cents per gallon in 2010. However, if the "escape clause" were triggered, the U.S. would not meet its ostensible target and timetable.

Approach A: 1990 by 2010-2020

This approach would attempt to soften the criticism of Scenario 1 by stretching out the 2010 deadline to lower the economic costs. Instead, the U.S. commitment would be that average emissions between 2010 and 2020 would be equal to the 1990 emission level.

Economic Effects

- The economic effects of this approach are very similar to those of Scenario 1. In particular, models suggest that the economic costs of the emissions reductions required under this approach are about 90 percent of the costs from Scenario 1.

- Depending on the international trade regime, the permit price in 2010 under this approach would be somewhere between $30 and $100. Gas prices in 2010 would rise between 10 cents and 25 cents per gallon.

Environmental and International Ramifications

- This approach would probably satisfy the concerns of environmental constituencies, but would still subject the United States to criticism for being "too weak."

Approach B: Phasing in 1990 targets

This approach delays the year at which emissions are reduced to 1990 levels, but also builds in intermediate targets that provide a glidepath to that goal. Relative to Scenario 2, this approach allows us to maintain credibility by committing to some target by 2010 -- by at dramatically lower cost than under Scenario 1.

Economic Effects

- Relative to Scenario 1, this approach would once again mitigate the economic costs of the program. But it requires a substantial lengthening of the timetable to induce substantial reductions in costs. Because of the slow turnover of the capital stock, economic costs are not dramatically reduced without lengthening the timetable to 2040 or later.

- The intermediate target of reaching 15 percent above 1990 levels by 2010 implies a permit price of about $15 to $30 in 2010.

Environmental and International Ramifications

- This approach would be met by some dissatisfaction from the environmental community, since we would be seen as pushing our 1990 commitment off into the distant future. It is unclear how successful the interim commitments would be in mollifying these concerns.

- The international community would similarly be worried about our long-run commitment, and it is once again unclear whether these concerns could be reduced by the intermediate commitments. Many of your advisers worry that the delays in reaching 1990 levels embodied in this approach would undermine U.S. leadership on a critical issue, and make it even more difficult for us to convince developing countries to participate.

Approach C: Shifting base year in intermediate commitments

This approach would shift the intermediate commitments in Approach B to a new basis: for example, we would commit to reaching 2000 levels by 2010, 1995 levels by 2020, and 1990 levels by 2040.

- In one sense, the target year 1990 is disadvantageous for the United States. Between 1990 and 1995, our emissions grew 6.5 percent, while those in Western Europe *fell* by 0.2 percent. Thus, the choice of 1990 instead of a later year can be seen as a transfer from the U.S. to the rest of the world, a transfer made explicit in the case of Annex I trading.

- However, viewed from a broader perspective, the 1990 baseline is highly advantageous for the United States. Since the United States is the world's largest emitter of greenhouse gases, *any* baseline based on total historical emissions offers us significant advantages relative to other countries. (Compare, for example, a baseline based on per capita shares of global greenhouse gas concentrations). The 1990 baseline has generated momentum within the international negotiations; trying to shift the base year could re-open the question of whether historical emissions are the appropriate metric, and thus risks long-term damage to U.S. interests.

Economic Effects

- The economic effects of this approach are very similar to those of the previous approach: the intermediate target of reaching 15 percent above 1990 levels by 2010 implies a permit price of about $15 to $30 in 2010.

Environmental and International Ramifications

- The disadvantage of this approach is that there is much negotiating history invested in the 1990 target. A move off of that target by the U.S. would be sharply criticized

internationally, since there would be relatively little gain for any country other than the U.S., and even some loss in countries such as Germany and Russia. There would probably be less international censure for an increase in the 1990 target, even at the same economic cost to the U.S.

- This approach would also be met with some disappointment from the environmental community -- but we would receive some credit for taking a concrete step over a relatively short horizon.

III. KEY ISSUES

As discussed above, there are four key issues that pervade these scenarios: domestic implementation, technology, developing countries, and environmental effects. We will undoubtedly discuss these issues with you in more detail over the coming weeks, but wanted to flag them for you now.

A. Domestic implementation

Under the system to be negotiated in Kyoto, each participating country would be able to choose its own method for ensuring emissions reductions. The potential "domestic implementation" methods differ markedly in terms of their economic efficiency and political feasibility. We are committed to a market-based approach to reducing emissions, rather than a command-and-control regulatory approach.

The primary non-tax market-based structure for domestic enforcement is a system of tradeable permits. Under this approach, the Federal government would issue a limited supply of permits for emissions, and these permits would be tradeable. *One key issue with permits is the allocation mechanism.* There are two approaches to allocation: auctioning, or grandfathering. Your economic advisers have grave concerns about the cost -- and even the feasibility -- of a grandfathering system. Others dispute this claim, arguing that such mechanisms are both feasible and crucial for garnering corporate support.

1. An auction-based approach

The United States and most other countries have long used auctions to sell government securities, and governments have also used auctions to allocate other resources -- such as oil leases, timber, and portions of the spectrum. The auction mechanism for distributing carbon permits has two main advantages:

- First, it would raise revenue that could be used to reduce other taxes, offset the regressivity of the emissions reduction scheme, raise national saving, or fund adjustment programs. Depending on the stringency of the control regime and other factors, the auction could generate relatively small amounts of money or as much as $150 billion per

year. If those funds were used to reduce distortionary taxes, the so-called double dividend may result: improved environmental protection *and* less distortionary overall taxation.

- Second, it would ensure that permits are placed directly into the hands of those who value them most highly.

The main disadvantages to an auction approach are that it would be characterized as a tax much more easily than an approach based on grandfathering, and that it would make it much more difficult to garner corporate support.

- Auctions would force most businesses to pay large costs simply for the right to maintain their business-as-usual operations. Despite the fact that many these firms would likely pass most of the cost through to consumers, a firestorm of opposition will arise from these businesses.

- Corporate opponents would undoubtedly attack the auctions as a tax, even if the revenues were recycled to reduce other taxes. The success of the auction approach would depend critically on building constituencies for the tax reductions made possible by the auction revenues.

2. Grandfathering

Instead of forcing emitters to pay for permits at an auction, the government could grandfather them administratively, based on a pre-determined formula. The most likely system would involve granting permits to existing emitters based on historical fuel use or emissions; permits are allocated in this manner in the SO_2 trading program.

This approach has significant political advantages over an auction:

- The prospects for support from key businesses -- such as those you met with last month -- are much higher with an allocation scheme than an auction. The theoretical benefits of auctions as a means of distributing the permits will be much less salient to the CEO of a large corporation than the necessity of having to purchase permits to continue operations.

This approach brings with it several disadvantages, however.

- An administrative system would confer a substantial amount of wealth on those to whom the permits are awarded. Such an approach would reward those who were biggest polluters in the past.

- The value of the permits would attract many claimants. Deciding which claimants deserve the permits could prove very difficult. Treasury and CEA have grave concerns

that the lobbying behavior inherent in attempts to capture the permit wealth will make the entire system grossly inefficient.

- Administrative allocation schemes forgo the opportunity to raise revenues -- and thus to use the revenues to cut other taxes.

Significantly, it may be possible to combine an auction and an administrative allocation approach -- for example, by auctioning some percentage of the permits, and administratively allocating the rest.

B. The role of technology

Over the long-run, all your advisers concur that advances in technology are crucial to reducing greenhouse gas emissions. Since the world economy is likely to grow by several multiples during the next century, the ratio of greenhouse gas production to economic activity must be cut dramatically to reconcile continued economic growth with reduced greenhouse gas emissions. According to your science advisers, three kinds of technologies seem promising:

- Technologies that use energy and materials more efficiently -- like the PNGV car;
- Technologies that produce energy using solar cells, plants and wood waste, and other methods that do not result in net production of greenhouse gases; and
- Technologies that can sequester or permanently store greenhouse gases in deep acquifers or in other ways.

There is agreement that a package of technology options should be a component of any U.S. climate strategy. *But your advisers have sharp disagreements about how much we can reasonably expect of technological advances without the spur of a price increase.*

- Some of your advisers believe that the cost estimates presented above are too high because even without an increase in the price of energy, there are numerous opportunities for energy-saving technologies to be developed and applied. For example, one controversial study conducted by five of the Department of Energy's national laboratories concluded that even without an increase in the price of carbon, "cost-effective energy efficiency alone can take the nation 30 to 50% of the way to 1990 levels" by 2010.
- Your economic advisers raise a series of significant methodological objections to the study mentioned above. They also stress the importance of market incentives for technological advances, and the substantial body of evidence that markets respond to such incentives. They argue that technology will clearly be one of the conduits for meeting an emissions reduction target, but that both theoretically and historically, the most rapid technological advances come in response to significant increases in the

relative price of energy.

For instance, over the entire postwar period, the fossil-fuel efficiency of the U. S. economy has improved at slightly more than one percent per year. Between 1970 and 1986, during which time the economy suffered two oil-price shocks, fossil-fuel efficiency grew by more than 2½ percent per year. The pace of efficiency improvement has slowed down, but not stopped, since the late 1980s, as the relative price of energy has fallen.

The degree of disagreement on this crucial topic, however, can easily be exaggerated. Despite ongoing debates over the precise role of technology, therefore, *there is broad technical agreement that a significant price signal is crucial to achieving emissions reductions of the sort being considered in international fora.* In other words, it is impossible to achieve 1990 emissions levels by 2010 without a substantial increase in carbon prices.

C. Joint implementation

Another source of disagreement among your advisers is the role of joint implementation (JI). JI is a mechanism by which a private entity in the United States could invest in greenhouse gas mitigation projects in developing countries without emissions budgets. In exchange, the investor (and the U.S.) would receive credit towards its emission budget. The Vice President has signed framework agreements on this subject with several Latin American countries. In addition, the business community strongly supports joint implementation and some companies -- especially in the utility sector -- have been making joint implementation a reality over the past few years. But some of your advisers are concerned that the program will either prove ineffective in lowering costs to mitigate climate change, or will undermine efforts to reduce *global* emissions.

In principle, JI provides a very low cost mechanism for reducing emissions, by "trading" emissions here for emissions abroad, where the cost of reduction is much lower. In practice, however, JI requires a mechanism for guaranteeing that emission reductions that qualify for credits are "additional" to -- above and beyond -- reductions that would have happened anyway in the baseline case. How can we tell whether the low emissions power generation plant built in a developing country would have been built in the absence of JI incentives? If credit is given for investments that would have happened anyway, then the use of these credits to meet developed country obligations will result in higher global emissions. On the other hand, if the standard of "additionality" is set too high, or if projects are choked off by transaction costs associated with resolving baseline and additionality questions, then the large potential savings associated with JI will be lost.

D. Environmental effects

A final source of uncertainty and disagreement is over the size of the environmental effects from different government policies. Our best models suggest that under business-as-usual

(BAU), concentration levels of carbon are expected to rise from approximately 360 parts per million by volume (ppmv) today to over 500 ppmv in 2050 and over 700 ppmv by 2100 -- the highest in more than 50 million years. Pre-industrial concentrations were approximately 250 ppmv, and concentrations are expected to reach twice these pre-industrial levels in about 2060. The increase in carbon concentrations is expected to produce an increase in mean global temperature of between 2 and 6.5 degrees Fahrenheit.

Associated with this increase in temperatures will be a rise in sea levels that will inundate more than 9000 square miles in the United States (with Florida and Louisiana most vulnerable). According to a NOAA study, average July temperatures in Washington, D.C. will be 5 to 15 degrees Fahrenheit higher by the end of the next century.

The relevant question in evaluating our policy choices, however, is not this environmental baseline. Rather, we must compare the likely environmental costs averted under one set of our actions to the likely costs averted under some other set of actions.

- One set of your advisers recognizes the potentially substantial costs inherent in the baseline. But they argue that the best models available suggest that *differences* in the targets and timetables of the type discussed in this memo have little effect on the ultimate global concentration of carbon, and therefore on climate change. For example, one controversial conclusion is that the differences in possible developed country paths -- assuming that such differences have no impact on developing country emissions -- between the most aggressive and least cost paths discussed above produce only 0.1 degrees Fahrenheit difference in the temperature increases by 2100. In other words, these advisers argue that by changing the shape of the emissions path to a given ultimate concentration, it is possible to achieve the same environmental benefit at a much lower economic cost.

- Other advisers believe that such comparisons are fundamentally misleading, because delayed action by the U.S. will further delay action by the developing countries. Delayed U.S. emissions reductions -- even if balanced by steeper reductions in the out-years -- therefore imply that contrary to what is asserted by the first group of advisers, ultimate concentrations will be higher (with the concomitant worsening of climate change).

  Furthermore, this argument continues, even if a delayed emissions path to the same ultimate concentration could somehow be achieved, there is an (admittedly very small) probability that the different emissions paths will matter for the climate system. The conclusion is that the environmental differences among the scenarios (particularly Scenario 1 and Scenario 2) are potentially momentous..

Dev'ing country
strategy
Annex B