

WASHINGTON ROUNDTABLE
ON SCIENCE & PUBLIC POLICY

***Climate Change Policy
after the G-8 Summit***

Roger Bate, Lee Lane and Marlo Lewis

GEORGE C.
Marshall
I N S T I T U T E

The George C. Marshall Institute

The George C. Marshall Institute, a nonprofit research group founded in 1984, is dedicated to fostering and preserving the integrity of science in the policy process. The Institute conducts technical assessments of scientific developments with a major impact on public policy and communicates the results of its analyses to the press, Congress and the public in clear, readily understandable language. The Institute differs from other think tanks in its exclusive focus on areas of scientific importance, as well as a Board whose composition reflects a high level of scientific credibility and technical expertise. Its emphasis is public policy and national security issues primarily involving the physical sciences, in particular the areas of missile defense and global climate change.

The Washington Roundtable on Science and Public Policy

The Washington Roundtable on Science and Public policy is a program of the George C. Marshall Institute. The Roundtable examines scientific questions that have a significant impact on public policy and seeks to enhance the quality of the debate on the growing number of policy decisions that look to science for their resolution.

The opinions expressed during Roundtable discussions do not necessarily represent those of the Marshall Institute or its Board of Directors. Additional copies of this transcript may be ordered by sending \$7.00 postage paid to:

The George Marshall Institute
1625 K Street, NW Suite 1050
Washington, D.C. 20006
Phone: 202/296-9655
Fax: 202/296-9714
E-mail: [info @marshall.org](mailto:info@marshall.org)
Website: www.marshall.org

*Climate Change Policy
After the G-8 Summit*

with

Roger Bate, Lee Lane and Marlo Lewis

The George Marshall Institute
Washington, D.C.

Roger Bate is a Resident Fellow at the American Enterprise Institute and the director of the health advocacy group Africa Fighting Malaria. He researches water policy in developing countries, health policy and endemic diseases (AIDS and malaria), international environmental and health agreements, and the role of aid agencies and NGOs in developing countries.

Lee Lane, the Executive Director of the Climate Policy Center, has written and spoken extensively on environment, intergenerational politics, transportation policy, and international trade. He has more than 20 years of senior executive experience in the corporate sector, including as Vice President of CSX Corporation. He has also worked with trade associations and as the president of a policy and advocacy-consulting firm.

Marlo Lewis is a Senior Fellow at the Competitive Enterprise Institute where he writes on global warming, energy policy, and other public policy issues. His areas of study include the science, economic and politics of global warming policy, the precautionary principle, environmentalism and religion, and the moral basis of free enterprise.

Climate Change Policy After the G-8 Summit*

Roger Bate, Lee Lane and Marlo Lewis

August 2, 2005

Jeff Kueter: Good afternoon everybody and thank you for spending part of your summer day with us today to talk about climate change policy after the Group of Eight (G-8) Summit. My name is Jeff Kueter and I am the President of the George Marshall Institute and it is my pleasure to welcome you all here today. I have assembled a panel of experts on climate change policy to have an open discussion about what implications and inferences we can draw from the G-8 Summit, review what happened there, what the accomplishments are and then speculate about where climate change policy might be headed here in the United States and abroad. To invigorate the discussion, I invited Roger Bate, a Fellow at the American Enterprise Institute and the Director of the health advocacy group Africa Fighting Malaria, Marlo Lewis from the Competitive Enterprise Institute is also here and he will be talking about the inferences we can draw from the G-8 Summit on US climate change policy and then Lee Lane, the Executive Director of the Climate Policy Center, whom I have asked to talk about technology policy and specifically where US policy might be headed vis-à-vis climate change. Roger will kick off the discussion, followed by Marlo and then Lee. They will each have a few prepared remarks and then we will open the conversation to questions and answers.

Roger Bate: Thank you very much, Jeff, and thank you everyone for being here. Last month's G-8 meeting was momentous for several reasons. Not only did it manage to compete with the worst terrorist attack London has endured, but remarkably a few concrete agreements were made. Most of all I would say it was a triumph for US diplomacy. In many respects, the US position on aid and debt relief, notably tying future assistance to freedom reforms for African nations and pushing total debt relief rather than partial relief through debt servicing, were adopted by the G-8 and welcomed in the main by most African nations. It was asserted the G-8 discussions were entirely straightforward. Can you imagine people saying, "We

* The views expressed by the authors are solely their own and may not represent those of any institution with which they are affiliated.

know you are not going to pay this back, so let's get real"? It was the first meeting, at least that I have been to, of its type where the ongoing debt game came to a halt. You know the kind of thing, "We'll pretend that you are going to pay back loans and we will pretend you are going to pay us as well." Fortunately that appears to be over, at least temporarily, and I would argue that something there is a similar movement in that direction on climate negotiations. I don't think we are there yet, but I think we are moving in that direction. Of course, there was the usual rhetoric about preventing dangerous anthropogenic interference with the climate system, but there was no over-and-above attempt within the IPCC to identify what such interference would look like. I would say the leaders very sensibly pushed the problem out until the 2007 Fourth Assessment Report of the IPCC and later G-8 meetings, notably the G-8 meeting in Japan in 2008, where I understand a climate report will be prepared. On the whole, there were few platitudes and more calls for realistic action. I would say the new approach goes something along this line: "Let's agree there is a problem, but let's get real about what we are actually going to do about it."

What we in the Western world are going to do in terms of energy reduction is not an awful lot. The vast majority of EU nations will miss their Kyoto targets, albeit the large ones are much closer to them than the targets originally agreed to by the United States and Australia. But there doesn't appear to be appetite for drastic reductions in emissions to stabilize atmospheric concentrations and there won't be until there is greater evidence than there currently is that there will be significant harm from man's activities. I would argue that this is a significant success for the United States because it is bringing policy action far closer into line with US policy rhetoric than European policy rhetoric. I would also say that public opinion is moving in that direction. It is notoriously difficult to characterize public opinion and therefore this is an unfalsifiable, unscientific statement, so you can disagree with me – and I will prove you wrong! But I would say that there is greater certainty now than there was a few years ago that there is a problem. It is also acknowledged that the process enclosing the presentation of scientific evidence is highly politicized, that the cost of action will be very high, and that it is absolutely essential that the largest developing countries, Brazil, China and India, are in the mix.

Of course, it is difficult to gauge public opinion, but let me give you the example of a story that was in the news over the weekend. A famine is now striking Niger, where it is estimated 3.5 million people are starving and thousands are expected to die daily. This can be and has been spun into a climatologic story. Alternatively it could be spun into a green-

bashing story, because it depends on one's particular viewpoint. Some commentators, such as the BBC's David Loyn, who states that he is currently in Niamey, Niger, cited mainly climate change as a contributor. He said, "Climate change has made Niger a more precarious place to live." His implication is that the chief causes of the current famine are along the lines of the great famine in 1973, where there were three years of low rain and that, with the drought now, has brought a plague of locusts. That is it, as far the evidence is presented, and so the current drought is caused by climate change. He failed, of course, to note that the drought in 1973 coincided with a time of pretty low global temperatures. But media opinion notwithstanding, the link made between manmade emissions and drought in Niger, as this audience knows, is largely theoretical and tenuous. What is certain, however, is that the western environmental policy has banned the insecticide Yeltrin, which is the cheapest form of protection against the locusts which are causing devastation and so that solution is lost to Niger. So a story's design can be dictated by what kind of solution or what kind of opinion you might wish to drive it with. In any case, I would say that the BBC is firmly behind the "climate change is causing a-b-c, x-y-z, you name it."

It is therefore perhaps understandable that my countrymen in Britain, including Lord May, the President of the Royal Society, said that the G-8 Summit was, in his words, "a disappointing failure." I think for those who want urgent action along Kyoto lines, it was. But it is apparent, and it has been for quite a while, that the Kyoto-style targets and timetables are not likely to be sustainable. To be fair to the opponents of energy restrictions, those who attack Kyoto for being costly and not having impact, I think they miss a point or miss the key point: *any* restrictions on greenhouse gas emissions will be extremely costly and any action will have to begin relatively slowly, and hence having little impact at first. Indeed, proponents of the Kyoto Protocol have always argued that it was just the first step, and I buy that. And it is not a bad idea as a way to start climate action, if you accept two premises: that climate change is an urgent problem and it is the duty of rich countries to act first. The problem is that climate change is not perceived as a large enough problem, as I have already touched on, and secondly, rich nation politicians are not going to undertake domestically damaging action, as has now been acknowledged by the G-8. They are not going to undertake action which is going to harm them and exporting benefits to other countries. And here we are talking about real exporting of jobs through legislation and regulations, rather than the outsourcing through efficiency gains, which is entirely different, even if Lou Dobbs will disagree with me.

While I can argue that more people believe that climate change is a problem than did ten years ago, I think the same people are also becoming more aware that public opinion is becoming skeptical about the veracity of the process. The House of Lords report *Economics of Climate Change* published recently is worth quoting two sentences from: “The Kyoto Protocol makes little difference to rates of warming, and has a naïve compliance mechanism . . . We urge the Government to take the lead in exploring alternative architectures for future protocols, based perhaps on agreements on technology and its diffusion.” Other people are going to talk more about technology, but I think these solutions seem to be gathering steam, and for good reason. They actually provide benefit to the large current and future emitters of the developing world. The G-8 communiqué talked about working with “developing countries to enhance private investment and transfer of technologies, taking into account their own needs and priorities.” Into this vein falls the US initiative agreed to last week by Australia, China, South Korea and others. If these clauses are adopted, and others will talk about them in more detail, it will probably slow the rate of growth of greenhouse gases by making these developing countries (whose development is inevitable) both faster and cleaner. The G-8, led in this instance by the United States, has been promoting freedom initiatives for other reasons, but there is a by-product, a positive exponentiality if you will: everything shows that freer countries produce fewer emissions per unit of GDP produced. But – and I stress the but – the Greens are right in one thing, that clean coal making fossil fuel use more efficient is certainly not going to be enough to reverse greenhouse gas growth. IPCC exaggerations, poor economic modeling, and the politicization of science have played into the hands of those who argue that Kyoto-type action is not warranted. There is, as I said, no appetite for a new Kyoto-style treaty today, despite the talk and rhetoric coming out of Europe.

So while the G-8 pushed forward for greater technology transfers, I think they missed one or two opportunities. There was no discussion, as far as I can see from the documents centering on the communiqué, of the prudent expansion of nuclear power, which I think is probably the only way of not only reversing greenhouse gas emission growth, but of actually reducing them, at least in the relatively short run. Of course as I said, the G-8 has pushed off business transfers, tax credits, advantages, and a variety of other proposals until their meeting in Japan in 2008, when they will report back on technology. I will conclude by saying that I think the G-8 was pretty successful. It missed opportunities to tackle things like agricultural subsidies, but then that is nothing new. Most meetings for the last decade

have failed to deal with agricultural subsidies. It tied debt relief and aid to economic reform and it made climate change policy approaches much more realistic for that. We owe Tony Blair something for organizing and putting climate change on the agenda, but most of all George Bush a considerable amount of credit. I am going to stop there.

Marlo Lewis: I would like to thank Roger and Jeff and thank the Marshall Institute for having me here today. Today I am going to do something that I have never done before. I am going to quote Chris Mooney (author of the "Republican War on Science). It is something that I don't plan to make a habit of, but when the man is right, he deserves to be quoted. He has had several pieces on his website on the G-8 Summit and in one of them, called "Gleneagles Grounded," he quotes the first paragraph of the communiqué: "Climate change is a serious and long term challenge that has the potential to affect every part of the globe. We know that increased need and use of energy from fossil fuels, and other human activities, contribute" to more emissions over time and so on. "While uncertainties remain in our understanding of climate science, we know enough to act now to put ourselves on a path to slow and, as the science justifies, stop and then reverse the growth of greenhouse gases." Now one of the things that Chris Mooney points out in this column, and I think all of you know that he is very critical of the Bush Administration's climate policy, is that the Bush Administration already acknowledged as much about global warming in the past as the G-8 did here. That is significant because in the buildup to the G-8 Summit, there was buzz that there might even be a divided communiqué, that all the EU nations would be on one side, led by Tony Blair, and Bush would be the odd man out. And yet, the communiqué, as it was finally agreed to, basically said what President Bush has been saying about climate for years. In fact Mooney gives a detailed analysis showing that in many ways the communiqué mirrors Bush's speech on global warming that he gave in the Rose Garden on June 11, 2001.

In terms of the science of climate change, the G-8 communiqué does not go beyond the Framework Convention, which, of course, the US is a party to. We know that even though there was great expectation that somehow Bush would be rolled on the issue of targets and timetables or as the House of Lords put it, I think very appropriately, "targets and penalties," in fact, there is no affirmation of targets, numerically quantified, specified reduction goals. Mooney also points out that even the link between greenhouse gases and global warming is not explicitly affirmed in the communiqué, unlike the joint communiqué by the National Academies that was designed to influence the G-8 communiqué. As my colleague Ian

Murray pointed out, this was a most shameful act of scientists becoming special pleaders and advocates. They try to wrap themselves at the same time in the policy-neutral garb of science, but call for action in terms of mandatory reductions on greenhouse gas emissions. Instead, all the communiqué basically said is that greenhouse gases are associated with global warming. This really bent Chris Mooney out of joint and he even described the communiqué as a Bush talking point. I was moved to then email him and say, "Brother, you don't know the half of it." He also posted this on his web log.

Just to give you a specific point here, the pertinent phrase in the communiqué is "While uncertainties remain in our understanding of climate science, we know enough to act now to put ourselves on a path to slow and, as the science justifies, stop and then reverse the growth of greenhouse gases." Now where have we heard those words before? They come straight out of President Bush's global climate change policy book from February of 2002, available on the White House website. Bush describes his own climate policy as follows: "It sets America on a path to slow the growth of greenhouse gas emissions and as the science justifies, to stop and then reverse the growth." Later in the same policy book, "This sets America on a path to slow the growth of greenhouse gas emissions and as the science justifies, to stop and reverse that growth." We have similar language on the CEQ website and also in the Chairman of CEQ James Connaughton's July 11, 2002 testimony before the Senate when he said this, "The President's policy will put America on a path to slow the growth of our greenhouse gas emissions and if the science justifies, to stop and reverse the growth of those emissions."

My colleague described this as a "triumph of White House diplomacy" and that is exactly right. The communiqué really was very much a Bush talking point elaborated even to the point of noting, "Around 2 billion people lack modern energy services. We need to work with our partners to increase access to energy if we are to support the achievement of the goals agreed to at the Millennium Summit in 2000." Can anyone tell me how we do that? How do we provide expanded access to energy to those 2 billion people around the world who are living on the edge, who are living in energy policy, while expanding the Kyoto cap-and-trade mandatory target approach? I would submit that the two are completely incompatible and that if in fact we are determined, as a member of G-8, to bring affordable energy to people who lack it around the globe, then we are on a collision course with ourselves if we try at the same time to expand and entrench the Kyoto approach. Others have pointed out that the language of this com-

munique was considerably tamer than in previous G-8 communiqués. David Sandalow of Brookings observes that in the Houston summit of 1990, presided over by George Bush Sr., the summiteers agreed that climate change was of key importance: “we are committed to undertaking common efforts to limit emissions of greenhouse gases such as carbon dioxide.” This was far stronger in terms of regulation or mandates than anything in the recent communiqué. I could list others. Sandalow actually works through all the statements of the past decade and shows that they were all more regulatory in their flavor or alarmist in their tone than anything agreed to at Glenneagles.

What can account for this? It is very possible that George Bush simply has not only got a tall hat, but he has got a lot of cattle, that the man is a serious force to be reckoned with and that those who have written him off as some kind of cowboy who doesn't understand the realities of international politics are sorely mistaken. But maybe also reality is setting in. That would be very encouraging, if it is true. I don't have any direct evidence of that, but as my colleague Chris Horner, who is here today, has pointed out, thirteen of the fifteen EU countries are on track to miss their Kyoto target, even under their burden sharing agreement, by considerable percentages. The numbers are pretty astonishing in some cases. For example, Denmark is projected to exceed its burden sharing agreement emission target by 47 percent, Spain by 27 percent, Italy by 11 to 25 percent, and so on. This is really very significant because, unlike the United States, the European population is not growing. In fact, Europe's population is projected at 2025 to be exactly where it was in 1990, which is the Kyoto baseline year. So on a per capita basis, Kyoto is a lot easier on the Europeans than it is on the United States, which is projected to have a population 40% larger in 2025 than it had in 1990. Then also we know that the European economies are really quite stagnant, by and large, and even though they have stagnant growth and static populations, they are having a tough time limiting their use of energy. So maybe that is starting to trickle in. We know, for example, that electricity prices in Germany are at an all-time high, just because of the emission trading system which hasn't even fully kicked in yet. But they are starting to find out that this is not a free lunch.

Then we have, as Roger mentioned, the House of Lords report. Just as the National Academies statement was timed, I think, to influence the G-8 Summit, the House of Lords report was timed to deliver a wakeup call to the negotiators. It lays out very clearly that the Kyoto approach of trying to solve global warming by putting the world on an energy diet is a

dead end. They very clearly say that more of the same can't possibly work. If you couldn't get the United States, China and India, which are the countries with the most greenhouse gas emissions, especially in the long term, to sign up to Kyoto, how are you going to get them to inflict upon themselves even tougher energy restrictions? It is just not going to work. The House of Lords report says essentially that we need to go beyond Kyoto by developing and diffusing technologies that over time will reduce greenhouse gas intensity and emissions.

I have just one concluding point here, which is that the best part of the G-8 Summit communiqué is reflected and magnified in the Asia-Pacific Partnership for Clean Development and Climate that we have just seen with Australia, South Korea, Japan, China, India and the United States. The whole emphasis here is to develop technologies that will allow us to bring affordable energy to those 2 billion people who lack it and over time produce energy in a cleaner and more efficient ways. Based on my readings as a non-scientist, but as someone who tries to keep up with research on climate change, global warming is a long-term challenge rather than an immediate threat. Therefore if this is truly the big problem that some people think it is, the solution is also long-term and will consist in fundamental breakthroughs in the way that we produce and consume energy. Such breakthroughs cannot be produced by regulatory fiat and are more likely to be achieved if the world is allowed to grow and prosper according to the imperatives of a free marketplace, rather than according to bureaucratic dictate. Thank you very much.

Lee Lane: Good afternoon. I would like to thank Jeff and the Marshall Institute for the opportunity to be here this afternoon. My remarks pick up on some of the comments of the first two speakers. I see the same kind of thing that I think that Roger does in the Summit, that is, that it is at least in part in the climate issue, a recognition of the importance of technological development as a *sine qua non* of any real successful response to the challenge of climate change. In that sense, I think that the Summit was a positive factor as a recognition of the importance of technology and perhaps a de-emphasis on cap-and-trade, the beginning of a more promising strategy. At the same time, through the last couple of years when I have been focusing with some interest on how our research and development programs, both in the United States and Europe, are actually addressing the issue of developing technology to deal with climate change, I have become increasingly convinced that we are not doing those things very well. In fact, we have government R&D programs on both sides of the Atlantic that are not really structured in such a way that it is very plausible that they are going to

successfully develop the sorts of large technological breakthroughs that would really be required to deal with climate change. The Summit did nothing to address any of these institutional problems in our R&D programs, hence I conclude that on the climate issue, it is a lost opportunity more than anything else.

I suppose that before going any further I should make both a caveat and a clarification about those comments, which obviously are to a degree critical. The first is, I don't mean to suggest that there aren't lots of good people doing research and development, both in government and in the private sector, on both sides of the Atlantic and in Japan, too, for that matter. There are, and I don't mean to be critical of all of that work by any means. At the same time, I recognize, as Roger suggested, that there are all sorts of follow-on reports and subsequent work and so on, so that I suppose you really would have to say that the Summit isn't finished. Something may emerge that hasn't emerged so far and maybe at some point it will produce the sorts of institutional reforms that I think are necessary to improve our chances of research and development success. That is a possibility, but I am skeptical. The reason I am skeptical is that this Summit failed so completely to address or even to raise any of these institutional problems. What do I mean by institutional problems? Well, it is not the sort of thing that one hears in election speeches; it is not that I think that there is great waste, fraud and abuse in our R&D programs and that people are using the research and development money to throw parties – as far as I know. At least I haven't been invited to those parties, if it is happening. My concern is that there is an absence of the kind of institutional structures that I would expect to see if we were taking the task of developing these new technologies more seriously.

What do I mean by that? Let me give you a very concrete example of something. I thought that the Bush Administration proposed a terrific idea several years ago. They called it a competitive research program and it was directed at developing and finding climate-relevant, climate-friendly technology. It was a little bit like creating a Defense Advanced Research Projects (DARPA) for climate. One of the DARPA's terrifically successful features is that it looks for and tries to foster truly revolutionary new technologies, and it does that recognizing that if you go after big, revolutionary changes, a lot of times you are going to fail. But it doesn't matter; if you try enough times, you hit enough home runs to offset the fact that you strike out fairly frequently. Essentially what the Administration proposed was to create a climate version of this concept. Terrific idea. What happened? Effectively nothing. The Congress resisted it, the Administration

didn't push it very hard and the idea died. It has now been dropped from the budget and we don't have anything like the competitive research program, leaving a huge hole right in the middle of our climate change technology program and a hole that we haven't institutionally been able to fill.

The second problem is the absence of any real central control and direction in the US government's climate change technology program. Here we are almost three year after the program's initiation. Maybe this week, the Department of Energy (DoE) will finally release the vision statement for what the strategic plan of the program will be. The people involved, whom I know, have worked very hard on it. But does that sound to you like a serious program? It is now three years after it was initiated and we haven't yet released a strategic plan. The objective here presumably is to re-orient the \$3 billion worth of spending that's part of the climate change technology program into a rational pattern designed to develop these new technologies. Not only have we not proven that we change our spending priorities, we haven't even released the strategic plan suggesting the directions in which we are going to do that. That doesn't sound like a very serious program to me, even though a lot of money is being spent and no doubt a fair amount of good research is being done.

I asked several European governments if they had anything better, since they are a little bit critical of the US climate change technology program. They couldn't even tell me, in the case of two major governments, the UK and Germany, and in the case of the EU itself, they couldn't even tell me how much money they were spending on climate change technology development. So it doesn't sound to me as though those plans are any more strategic and any more coherent than the American plans are. I have reached a tentative conclusion based on this – I hope to be proven wrong at some point – that although the Administration has proclaimed exactly the right strategy, which is to emphasize the development of new technologies, it really isn't implementing that strategy in a very thoughtful or a very thorough way. Nothing that happened at the Summit did anything to change that situation. In fact, the only initiative that I heard of at the Summit that might have changed things was that the Brits wanted to offer a prize for climate change technology development. I think that is a pretty good idea. In the US, we are increasingly experimenting with inducement prizes as a tool for technology development but in the US, I am told, the one real management innovation that was proposed didn't make it into the work plan.

Why should we care? Well, if you think that climate change is a long-term concern, and especially if you think that technology is an important part of the solution, I would argue that with the existing management structures are much less likely to have successful technology development than we would be with improved and more thoroughly thought-through organizations and structures. It's also clear that the US is spending about \$3 billion a year on climate change technology development. That is not a trivial amount of money and I don't think anybody can really claim we are getting the maximum dollars' worth for the taxpayer out of what we are doing. Finally for those in the room who are adamantly opposed to cap-and-trade kinds of solutions, I think the Bush Administration has rightly said that the alternative to those kinds of solutions is an R&D program. But the credibility of that R&D program depends heavily, I would argue, on whether it is organized in such a way that it is likely to produce results. So I think that the credibility of the Administration's strategy, right as it is on its fundamentals, is compromised by some of these mismanagement problems. I will be glad to respond to comments, questions and brickbats as they may occur.

Questions and answers.

Kueter: Thank you gentleman, and I am going to ask the first question, as is my prerogative, and direct it at Lee. You focused on institutional factors as the critical aspect of success or organizing principle of an effective R&D program. Setting that aside, what are some of the other factors that one would want to look at in order to judge the effectiveness or potential effectiveness of the technology development program? As a corollary, are these factors present in other nations or is the lack of them a common characteristic across the G-8? I would invite Roger and Marlo to jump in on that general question as well.

Lane: Let me say that I think that one of the obvious factors is that since we don't know at this point what technologies are likely to be successful, and since such a huge volume of energy will need to be generated fifty years from now, it is awfully important at this point that we do not foreclose technological options. I think the United States is doing a relatively good job in maintaining a pretty broad portfolio of technologies. I think some of the Europeans are actually doing that a lot less well, specifically Germany and some of the other European countries that are inclined simply to foreclose the nuclear option on what seems to me to be largely ideological grounds. That looks to me as though it is a case where US practice is really significantly ahead of some of the European countries, though not

France and certainly not Japan. It may be that the German practice on this is going to change after September with the likely change of government, but that would be one of the things at which I would look, Jeff, as another factor increasing the likelihood of success: maintaining a diversified energy portfolio.

Bate: I can draw a parallel with one of the other aspects of the G-8 debate which was largely overlooked until it was pushed by the US G-8 coalition. The US doesn't perform very well on the international aid tables if you just look at the public transfers, but when you look at private transfers, it is up there much higher. In dealing with the technology question, I want to quote again from the G-8 communiqué. It talked about working with developing countries to enhance private investment and transfer of technologies, taking into account energy needs and priorities. I would very much want to take an audit, if possible, of the private initiatives that are already taking place, because that is usually where the US has had a significant lead. But I do not disagree with what Lee was saying; I think some kind of architecture for government-funded research in this area is probably warranted, especially if you are going to spend as much money as is being spent; perhaps the spending in that area would be better. I realize I didn't actually thank the Marshall, Jeff and Elle for putting this together, so I do that now.

Lewis: Well, I certainly think the Bush Administration is correct on a number of grounds to try to help developing countries adopt more modern forms of energy. But even though major technological breakthroughs and technological transformation are the solution to this problem, if it is a problem, I am skeptical about the extent to which government, however organized, can promote technological change. Just to give one small example here, in the Asia-Pacific Partnership statement, which I approve of by-and-large, there is a discussion of helping developing countries adopt integrated coal gasification and carbon sequestration for power plants. That would indeed lead to far fewer emissions as they develop more energy capacity than would otherwise be the case, but we should recognize that we haven't really adopted those commercially here in the United States yet. That is a nice goal, but we haven't proven that it's commercially viable here and we are quite rich and those countries are quite poor.

If you cast your glance backward over the decades to the '70s and '80s, you might remember the syn-fuels program. My friend Randy Randal, who used to be with a major energy company, reminded me that at the behest of the Carter Administration, that that company once invested \$500

million in solar research because that was the patriotic thing to do, and also because a lot of people in government were saying that was the next big thing. Several decades later, solar still produces less than 1/10 of 1 percent of all US electricity. There is a very fine book written by three gentlemen from MIT, Ben Ball, Jr., Thomas Lee and Richard Tabors and Thomas Lee called *Energy Aftermath*. They were involved in those Carter era programs, they worked on them, and they concluded that if an energy technology is commercially viable, then no government support is necessary. If the technology is not commercially viable, then no amount of government support will make it so. I think that is a useful caveat to keep in mind as we go forward in trying to figure out how the federal government can best organize itself. I agree with Lee, obviously we have to think about this and not just spend money without thinking first. But the tendency of politics is for these programs to develop clients who are then strong enough to lobby for funding to benefit them rather than some competitor. In the House of Lords report on the economics of climate change that Roger and I referred to, they decry the fact that most of Britain's effort in technology development is going into wind farms, even though this is a lot less promising than nuclear power in delivering emission-free kilowatts per dollar. But the wind folks are stronger and better organized politically there than the nuclear people. That's the way of politics and as my old mentor Aristotle used to say, "The nature of the political often defeats reason."

Question: I have a question for Roger Bate. How are countries that honor their debt reacting to the forgiveness of debt for other countries? Bangladesh, for example, is an example of a poor country that has been very scrupulous in trying to honor its debt. And is anything going to be done to revamp the international organizations such as the World Bank and the IMF? They have created a tremendous amount of debt and much of it being poor loans.

Bate: Debt relief is always problematic. In the instance of the heavily indebted poor countries, they have an indebted poor countries agreement that was put forward and agreed prior to the G-8 meeting. I recall complaints not only coming from Bangladesh, but also from Kenya and one or two other countries that had been paying their debt. The notion behind debt relief is difficult to justify in some instances. I think what happened at this meeting, which I was very pleased about and mentioned, is that there was a good dose of reality. They recognized that some of these countries are not going to pay their loans back. Why don't we just acknowledge that? I think that all of the G-8 and the various other countries involved have been pretty strong on that. I think the US has led well, but other

countries have reined themselves in when they wanted to write off even more debt. Writing off debt can send a very bad signal, to say that past bad behavior will be condoned in the future. What the US State Department and the economists with the Treasury have indicated, and I think very well, is that for many of these countries, there will be no future aid money until they democratize. And I think developing nations would be ill advised to ignore this. The whole point of the Millennium Challenge Account, which is under significant problems at the moment, is that it is only lending money for writing off debt. Debt write-off and also future loans to countries historically move in those directions. What is unfortunate is that parallel to that, there are nations which are either getting more aid or getting their debt written off who are not democratizing. With that dichotomy, I think you have a problem in the making. On the whole, the countries which have had their debt written off were not going to pay it back anyway and this decision is a realization of that. What's being said behind closed doors and sometimes overtly is, "Don't expect to get any more money from us until you start democratizing. We are writing this off so you can borrow money from the capital markets if you can. But you have to make a move now." I think the realism at least in that part of the battle – I mean, it is only the G-8 meeting – was one of the most satisfying parts of it. But if you are a country that has been paying its debt back, there are reasons to be somewhat annoyed by it. That is undeniably true.

On the second part of your question, is anything going to be done to revamp the IMF or the World Bank which have been the conduit for much of this stuff? I think there is, at least within the World Bank; there is the attention to reducing mission creep. I will give you an example from the field that I work very closely in. The World Bank currently spends something like \$250 million a year, which is tiny compared to the \$23 billion it distributes every year. But it spends that money on malaria programs. It doesn't have any competence in distributing money for malaria. It doesn't have any clinical expertise at all. What it does have on staff are many hundreds of good economists who are good at health systems analysis. Hopefully any money that the World Bank is going to be lending in the future will be in the area that it has competence in. Part of the problem with all of these agencies is they always want more money and they always end up being involved in areas that they actually don't have much competence in. I am hoping that the Bank under Paul Wolfowitz will at least rectify that problem. Whether it can be overhauled significantly, I doubt very much. I know far less about the IMF, but I think it is far less likely that change will take place there, simply because the IMF never wants to stop loaning money to desperate countries. It still hasn't thrown Zimbabwe out,

even though it has been owing \$200 million for the last year and a half and has no intention of repaying them. They were supposed to make a decision this week, but it has gone back now I think to September 9th. So the IMF is more of a basket case, I think than many of the nations it helps.

Question: I am puzzled by this general acceptance that climate change or warming is harmful. I went through the IPCC report page by page, other than the Executive Summary. The major effect of CO₂ in the IPCC report is beneficial. Food production will increase 20 to 50 percent; forests haven't died in Europe, they have grown 40 percent since this warming. Shouldn't there be a serious analysis undertaken? What are the consequences? Usually in the debate we say, "Oh, all these islands will be flooded." But that is a long-term trend. It has happened now for the past 5,000 years and we are not going to stop it. It is not something we can change. Thinking you can stop the melting as long as the sun or something warms is not relevant to the debate. I fail to find evidence of damage by global warming in particular since the Museum of Natural History, until a few years ago, had a whole room dedicated to the awful effects of global cooling. The dangers from global cooling are identical and the effects of global cooling, famine, pestilence and so on, are identical to what is now being claimed for global warming. Are we not making a mistake in accepting the very premise? I think somebody owes us the proof, because I haven't found it.

Lewis: That is a very fundamental kind of question and I would note that the House of Lords report also points to the same problem, although as not as boldly as you just did. It talks about the difficulty of verifying long-term climate model projections: who is going to be around in order to tell us whether the models were correct or in error? Also it notes that, at least for some countries, especially the industrialized ones in the Northern Hemisphere, warming up to a certain point is expected to produce net benefits and that should definitely be taken into account in policymaking. CO₂ per se is a plus. That is probably the best-authenticated part of the scientific debate: the more CO₂ you put in the air, the faster and stronger plants grow and of course all animals depend on plants directly or indirectly. So it is definitely a big plus for the biosphere, just considered in itself. Of course, the theory of catastrophic global warming says that CO₂ is going to so alter the energy balance of the earth that the earth will sustain catastrophic climate impacts which will outweigh any benefit from putting more plant food into the atmosphere. It's all rather speculative. It depends on many assumptions, as you know. Some of them are economic assumptions, not just scientific assumptions.

One interesting point that my friend Pat Michaels makes and as far as I know, not one scientist has responded to his argument, is what he calls the “Implications of Linearity.” I think it would be nice to get other scientists to address it. He has published this in a peer-reviewed journal. The argument is that of all the climate models that are out there, and climate models are driving the sense of alarm, there is only one – or at least until recently there was only one; maybe there are more now – that predicts that global warming will accelerate over time. In other words, all the models differ from one another in terms of how much warming they predict, but all but one predict that once the warming starts, it continues at a constant rate, not an accelerated rate. If you chart it out on a graph, the slope is linear, not exponential. So Pat says, “Let’s accept that as the consensus of science, what all the models agree on and the only thing that they all agree on, with that one exception.” You might wonder which model was the exception; it was the Canadian Climate Centre model, which just coincidentally was the basis for the US National Assessment on Climate Change. That is a pure coincidence; nobody knew what they were buying when they picked that. Anyway, all of the models except that one predict a constant rate of warming. Well, how much has it warmed? According to the IPCC, the rate of warming over the last thirty years – and that allegedly is the period that is unprecedented and that is clearly driven by greenhouse gases rather than natural variability – is $.17^{\circ}\text{C}$ degrees per decade. So if we are to expect a constant rate of warming at $.17^{\circ}\text{C}$ per decade, what do we get over a century? 1.7°C degrees. Now people will say, “Yes, but there is drag from the ocean and so on.” But this is what the models say that we can likely expect, at least up to about 2080. Does anyone really want to stand up and say that 1.7°C degrees is a catastrophe in the making? I do think that there are fundamental questions that need to be raised about the basis for alarm. It seems to me that a lot of the literature suggests that if all we are going to get is about 1.7°C degrees, then much of the world, or at least the industrial world, will achieve net benefits. And as the developing countries industrialize, then they too would achieve net benefits or at least very low negative impacts on balance.

Bate: I have one thing to say to that, which is that we are now seeing in certain European countries a far greater belief that climate change is problem. But there is going to have to be far greater evidence of harm before many of these countries take on board even more significant stringent energy restriction policies, because they are beginning to see that they would cost is so significantly high. So I think there is a political-economic test. It is a bit like the argument that the Soviet Union eventually collapsed, but it

took seventy-odd years. It would have better if it hadn't existed all or had only taken ten years. I accept that. But I think at some stage, there is a prudent political debate taking place about climate change and so far, at least, the economic actions have not been catastrophic. I agree in terms of evidence of harm being absolutely critical; there has not been any significant evidence of harm and therefore I don't think there will be significant policies. And that buys you enough time to find out what the real case actually is.

Question: I wonder if the panel could address the third question that you raise here and that is, where is US national policy headed after the G-8 Summit? I agree that the G-8 communiqué could have been written at the White House. Nevertheless the other G-7 did not forsake emission timetables and controls in accord with the Kyoto Protocol. So will future negotiations be undertaken under the Framework Convention? They are going to have a meeting in Montreal to start that process to discuss post-2012 architecture for climate change. What do you envision happening henceforth?

Lane: Let me actually answer that with respect to Europe, since I have spent a little time thinking about what the likely course of European climate policy is. You have heard a couple of comments to the effect that the Europeans do not seem in general to be on course to meet their Kyoto targets and at the same time the real costs of the abatement policies that they have imposed are starting to appear. My own guess is that the Europeans are so far committed politically to the existing cap-and-trade program and to their goals that you are almost certainly not going to see them completely abandon the process and the institutions that they have adopted. My guess is that this is a perfect instance where symbolic politics are the ideal answer and we will see a continued absolutely firm, ideologically solid commitment to the existing policies that somehow will be circumvented and undermined and their worst consequences avoided. But that is just a cynical prediction.

Lewis: The G-8 communiqué says that the Framework Convention is the only game in town, yet the Asian-Pacific Partnership on Clean Development is not an outgrowth of the Framework Convention process. So it is an alternative regime, if you will, that is a-borning only now. Who knows exactly how robust it will prove to be? But I think it is significant, and here I owe this insight to my colleague Chris Horner, who points out that Japan is part of it. Japan was, of course, the host country for Kyoto and I think the last thing that the Japanese would want to do is do anything that would in some way slight Kyoto. Our own State Department says that the Asian-Pacific Partnership is complementary to Kyoto, but I would argue that in

fact it is really competitive with Kyoto, because it is not static. The participating countries are interested in bringing other members into the group. We know that it has accomplished something that Kyoto was unable to, namely it brought together the two industrial nations that refused to ratify Kyoto, the United States and Australia, and also China and India, two developing countries that, even though they ratified Kyoto, refused to accept Kyoto's emission limitations. So what we may see developing over time is an international climate policy regime that is in fact a competitor to Kyoto and that doesn't pose the harsh choice that Kyoto does, which is, if you want to be part of this, you have to sacrifice your economic growth and development. I think most countries, when push comes to shove, will decide that they don't want to sacrifice their development for the sake of infinitesimal, unverifiable reductions in global warming.

That is a point that we should have brought up earlier. The House of Lords report devotes a certain amount of space to this, but it has been known for a long time, ever since Tom Wigley at the National Center for Atmospheric Research wrote about it in July 1998 in *Geophysical Research Letters*. And that is that Kyoto, even including the United States, would avert only 7/100 of a degree of global warming by 2050, which is too small an amount for anyone to verify. So over time I think the reality will sink in with people that Kyoto really buys you nothing in terms of climate protection, but costs you a great deal in terms of your economic potential. I think that will make the Asia-Pacific Partnership approach attractive to many countries and maybe even to some Europeans. Perhaps not in the near term; I think what the State Department is saying about it being complementary is mostly true between now and 2012, but after 2012 I think it might be very competitive.

Question: Are you all skeptical that there will be a second Kyoto budget period with even more stringent reduction targets?

Lewis: I am skeptical, yes.

Bate: I think what you will just see develop are competing protocol architectures. I think ultimately as we continue to emit more greenhouse gases, we will find out if there is a problem and how significant the problem is. But I think the US architecture as it has been described has one advantage and that is that China and India are already going to be involved in it. Frankly, as German unemployment increases and regulations are pushed to restrict emissions further, German business and The German population are not going to accept it. They will not accept being part of wearing a

hair shirt while other large developing nations are not involved. I just don't see that happening. That's why I think the US position will win out, but I think there will be a lot of competition.

Question: When you look at the Asia-Pacific Partnership, one of the things that it does not address is integrated gasification combined cycle power plants or nuclear or other forms of energy. You can do all those great things from technology transfer, perhaps, if you can develop a mechanism to do it. Can anyone comment on the effectiveness or lack thereof of a clean development mechanism to date and what's happening to that? I don't know what the percentage is today, but about ten years ago seventeen percent of households in China had refrigerators. If all those households had refrigerators, just building the basic infrastructure to get more efficient energy to the consumer of energy would be a significant concern and that seems to be just totally glossed over or not addressed. I don't know how we can ever hope to have improvement from technology until we get fundamental infrastructure in place and I don't see any focus on that from any of the discussions to date. Any comments?

Bate: The institutional umbrella is what government agreements can set. I think you can have China, India and the United States at a table discussing climate-type actions relative to the technology and I would imagine it makes private initiatives easier underneath that. From the limited knowledge that I have about technology transfers on the issues that I've worked most closely with, an overarching government agreement does make private transfers very easy. But I am no expert in terms of the nitty-gritty there.

Lewis: I want to make one follow-up point, not to your question, but to a previous question about the competition between Kyoto and the Asia-Pacific Pact as policy regimes and I think this goes to Roger's point. Some of the Europeans, let us face it, thought that Kyoto would be a way of leveling the playing field by dragging the United States down to their level in global trade. I think Germany and the UK thought that because of one-time structural changes that they made, which had nothing to do with climate change, they would have an easy time of complying and the United States would have a very tough time. Germany would have an easy time because it closed down a lot of the Stalin-era energy infrastructure in what used to be East Germany and Britain, because it switched from coal to natural gas. One economist, William Nordhaus of Yale University, estimated that it would cost more for the United States to comply with Kyoto than for all the other developed countries combined. That is how punitive Kyoto would have been for the United States. The Europeans, I think, were

banking on that, they were counting on it, since they thought it would give them a leg up in global trade. Lo and behold, the United States said no. Now what they've got on their hands is a self-inflicted wound; instead of shooting the United States with Kyoto, they have shot themselves in the foot. So you just have to wonder how long they can put up with record high energy prices and unemployment before their own populace says enough is enough.

Bate: Or climate change tends to turn into a big disaster and the United States has to go along with a Kyoto-style approach. I think we have to acknowledge that that is a possibility.

Lane: Actually my comment really picks up to a very large degree on what Roger just said. It seems to me that the premise of the question is exactly right. There is a huge amount of simple inertial growth in energy consumption built into the existing demographic and economic realities, globally. That is an unavoidable fact. We are going to have a very substantial expansion in greenhouse gas emissions over the next fifty to one hundred years and it is almost unstoppable. I just don't believe that we are going to impose Kyoto-like controls to bring that process to any kind of halt. Now there are many things we might be able to do to ameliorate those trends. Roger, I think, co-authored a paper with my friend David Montgomery about some ways that we might change and improve the emissions growth path in East Asia through economic reform. We should do all the things like that that we can. But we have a lot of emissions growth built into the system. That is why I think we should not be entirely sanguine and entirely complacent about the long-term prospect of climate change. It is worth thinking about. We are going to have to find solutions that are within our willingness to pay and within what a rational risk calculation would dictate. Those aren't Kyoto-type solutions. But neither does it seem to me that there are grounds for complete confidence and complacency either.

Question: I want to find a way to turn this into a question; maybe you can derive one from it. Whatever happens post 2012, it can't be Kyoto 2 and it can't be tied to Kyoto. Amend Rio like Kyoto did. But whatever happens post 2012, it cannot be Kyoto 2. In Marrakech, the Europeans insisted on deep, deep penalties, 130 percent for each ton by which you miss the first compliance period, and – something they don't want to talk about – no emissions trading. So if you can't comply the first time with emissions trading, how are you going to do it in a second, deeper round? The Europeans can't do it after 2012; they don't want to talk about it, but

it was there agreement in Marrakech. They are bound by that, they brag about that. We are not. So if there is a second round, and let's say that everyone else jumps on board, guess who is bound by these penalties and who is not. One more problem: if you run the math, and no one in Europe seems to want to, you will find out there are not sufficient or not projected to be anywhere near sufficient greenhouse gas credits to try to buy your way into compliance. And even accounting for the suddenly shifting European 1990 baselines, fifteen years later, what do you know, their baselines are higher, because that helps them out. But you are half a billion tons short. You are not getting into reductions and then round two, if it is Kyoto round two, says it is designed to fail. You get a 130 percent penalty. So Denmark, whose stupid burden-sharing negotiations turned a 16 percent overage for 1990 to a 47 percent Kyoto violation, actually has an effective violation of 61 percent. And this is true across the board for Europe. They are 130 percent penalties are going to bite, even if this second round, if it exists, is not deep. Isn't it true that whatever happens, it can't be Kyoto Round 2 and Europeans, through some political face-saving maneuver, are going to have to throw in the towel on the current agreement that binds them to Kyoto?

Bate: I have one thing to say other than yes, and you know much more about this than I do. European politicians are dealing with this and if a method can be discovered by which paying off penalties can be delayed, then I can see the existing architecture continuing through another round. With that caveat, I think you are right. Perhaps there will be more debt forgiveness!

Lewis: I will answer your question by posing another one. Back in 1998, the Energy Information Administration produced an analysis of the Kyoto Protocol. It was quite different from the analysis of the Clinton Administration. You remember Janet Yellen, who was the Chair of the Council of Economic Advisors in those days, said Kyoto would cost the United States only one-tenth of one percent of GDP. It would basically be a free lunch. Then EIA came out and said, "Oh, no. There could be significant impacts on the economy, anywhere from roughly \$100 billion to \$400 billion in 2010, depending the availability of emission credits from abroad." The interesting thing to me is that under the toughest implementation scenario that the EIA analyzed, in other words where there is no emissions trading and the US meets its Kyoto target, 7 percent below 1990 levels, solely through domestic policies and measures, guess how high gasoline prices are projected to go? Two dollars a gallon! I bet some of us will kill for \$2.00 a gallon gasoline today. But the thing is, we now have gas that's

near \$3.00 a gallon in some places. Are we anywhere near meeting our Kyoto target? So the question that I would ask you is, how high do gas prices have to go in this country before the United States meets its Kyoto target, and would the American people put up with that for one instant?

Question: Europe pays \$5.00 a gallon and they are still not compliant, so the answer begins at \$5.00 and goes up.

Lane: I guess I would say – this is a Clintonesque answer – it all depends on what the meaning of Kyoto is. You don't have to pay a penalty unless you actually sign on to the next agreement and nobody is going to sign on, given those penalty clauses. So obviously we are going to re-negotiate. If there is an effort to create a new round of an international cap-and-trade program, we are going to negotiate away the penalties. But I read a lot of diplomatic history and my impression is that it is within the creativity of good diplomats to construct an agreement that looks as though it is accomplishing something while in fact avoiding most of the costs. I doubt very much that it is impossible to construct such an agreement. I don't know whether they will or not. I think they might well have the sense to get themselves out of this. But I don't think that the kind of analysis that says, "Well, if you follow through the logic of what they said up to now, they are bound to continue on that course and the cost would be prohibitive," I don't believe that. I think it is possible for them, if they decide to, to construct something that is symbolic and that gets them out of the worst consequences of logic of what they've done.

Question: I agree that so long as everyone accepts that if you deal with the Europeans on this, you can believe anything you want out of what you agree, except what you agree upon. Who is going to agree to that? There is a tremendous lobby seeking to sell things, such as hot air not produced. That is Russia's sole motivation for doing this. Will they try the diplomatic, clever route first? Yes, Roger, you are absolutely right, if you look at the UNFCCC web page, they wave the clever diplomatic wand in prohibition on emissions trading, and "may not transfer or acquire" means transfer. So if you don't have any credits to sell, you are not allowed to sell them. But you can now acquire them, even though there is a prohibition on acquiring them. That is what they are trying to do in a non-binding administrative fashion. We will see a lot more of that in Montreal. The question is, who will engage in an agreement with people like this, for whom words mean whatever they want them to mean, the most convenient meaning in any situation for them? The bottom line is, you can call it Kyoto, but it can't be Kyoto 2 unless Europe has to somehow build in forgiveness and

find parties who are willing to engage them for the purpose of some presumably binding agreement upon which we would be presumed to have to comply with Kyoto. They presumably thought that Kyoto was for us to comply with too, and not necessarily them. So they can negotiate among themselves, I have no doubt, and be clever, but I think that the number of nations that are willing to engage in a serious discussion with people who view agreements this way is probably limited.

Lane: It seems to me that we are tracing through the logic that leads to the conclusion that we can get to about four different ways: that a Kyoto-like system can't solve the problem of climate change. It won't work. It won't work for about five different reasons and this is another one. That, I think, is the conclusion. It doesn't necessarily mean just because it won't have any substantive impact on the world, that they might not make another agreement.

Kueter: Thank you all for coming. I want to say I think it is true that the era of symbolic politics will be reemerging on this issue as we go forward. Thank you all for your time and please thank the panelists.

RECENT WASHINGTON ROUNDTABLES ON SCIENCE AND PUBLIC POLICY

Lowell Wood – *Ballistic Missile Defense in an Ideal World* (July 2005)

George Taylor – *Ice, Hockey Sticks, and Fish* (June 2005)

Stephen McIntyre, Ross McKittrick – *The Hockey Stick Debate: Lessons in Disclosure and Due Diligence* (May 2005)

David Montgomery – *Creating Technologies to Reduce Greenhouse Gas Intensity: Policy Options and Opportunities* (March 2005)

Sen. James M. Inhofe, Harlan L. Watson, William O'Keefe, Myron Ebell, Christopher C. Horner and Jeff Kueter – *The Kyoto Protocol and Beyond – A Roundtable Discussion on the Future of International and U. S. Climate Policy* (February 2005)

Richard Lindzen – *Climate Alarmism: The Misuse of “Science”* (December 2004)

David Henderson – *+10°F – Are the UN’s Global Warming Forecasts based on Faulty Economics?* (November 2004)

Lt. Gen. Henry “Trey” Obering, III – *Current Status and Future Developments for U.S. Missile Defense* (October 2004)

Admiral Conrad Lautenbacher, Jr. – *The Global Earth Observation System* (October 2004)

Gregory Canavan – *Performance and Cost Issues for Boost Phase Missile Defense* (September 2004)

The Marshall Institute – Science for Better Public Policy

GEORGE C.
Marshall
I N S T I T U T E

Board of Directors

Robert Jastrow, Chairman
Mount Wilson Institute (ret.)

Frederick Seitz, Chairman Emeritus
Rockefeller University

William O'Keefe, President
Solutions Consulting

Bruce N. Ames
*University of California
at Berkeley*

Sallie Baliunas
*Marshall Institute
Senior Scientist*

Gregory Canavan
*Los Alamos
National Laboratory*

Thomas L. Clancy, Jr.
Author

Will Happer
Princeton University

Bernadine Healy
U.S. News & World Report

John H. Moore
*President Emeritus
Grove City College*

Robert L. Sproull
University of Rochester (ret.)

Chauncey Starr
*Electric Power
Research Institute*

