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Committee on Energy and Commerce

Hearing on
Climate Change – International Issues, Engaging Developing Countries
March 27, 2007

Thank you Mr. Chairman. I appreciate this opportunity to discuss my views and provide input to your deliberations related to international action on climate change.

I would like to make several points:

(1) The science is real – and it is seen as real in all countries, both developed and developing. This provides us, globally, with a common understanding of urgency and scale.

(2) We cannot afford to wait to start: every year of delay increases the magnitude and rate of future reductions required to avoid damages – and increases the overall costs.

(3) The scale of the problem is enormous; it requires that we reduce our long term emissions by 60 to 80% from our global energy system, industries, agriculture and land use.

(4) No single policy or action in any single sector will be adequate to solve the climate problem. It will require efforts in all sectors addressing all gases, with multiple policy instruments, and sustained over a long period.

(5) Not all countries are the same; they have different circumstances driving different emissions trajectories, different responsibilities and different capacities. Thus, we cannot and should not expect any future international arrangement to set the same requirements for every country.

(6) Some countries clearly matter more than others for climate mitigation: the largest 15 countries (including the EU as one) are responsible for about 80% of global emissions. We need all of these 'big' players to be at the table, working on a solution. We cannot coerce them to participate, any more than they can coerce us; we need to find solutions that speak to each country's self-interest and desire for long term sustainable growth.

(7) Fortunately, there are solutions:

- A price on greenhouse gas emissions can lead to changes in consumer choices, corporate behavior and new investment. We know how to create markets – and make them work.

- Capturing the co-benefits of climate solutions – for energy security, local air quality and community improvements – can buy us time during which new technologies can be developed and penetrate into the market.

- We have technologies today that can begin to reduce emissions, and we can and must develop new technologies that will continue the downward path in the future. The market for such technologies could be a US one – or, if we do not take advantage of this opportunity, it will be one our competitors seize.

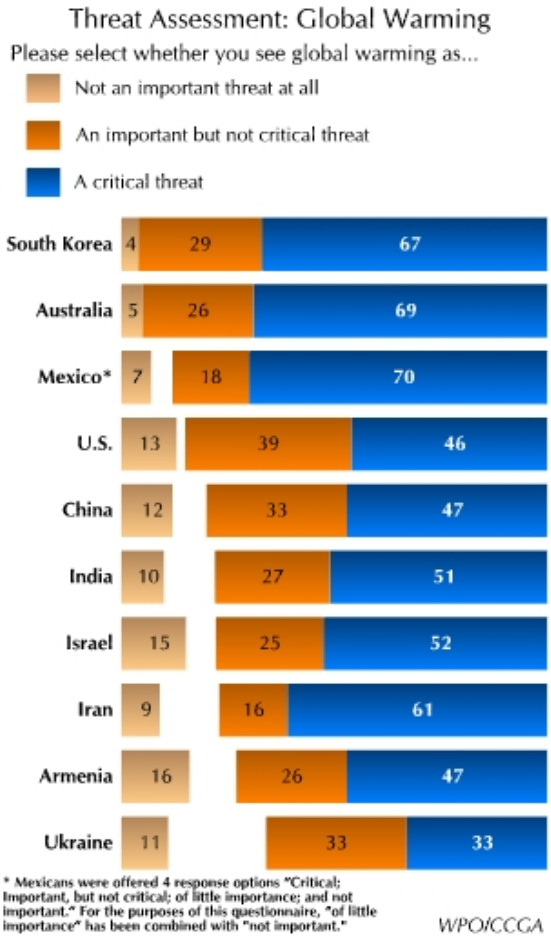
(8) We are unlikely to solve the problem before we are faced with significant, unwanted climate change. This means that part of the global effort will need to be devoted to adaptation. Unfortunately, it is the poorest and least able to cope who will be most significantly affected; we need solutions that address this reality.

(9) We will need to use all available fora for the international negotiation of these solutions. This will require the US to assume a more constructive role in the UN Climate Convention, to actively use existing (and create new) bilateral and multilateral arrangements, and to develop incentives to engage the private sector in global emission reduction opportunities.

1. The science is real

While it is unnecessary to belabor the point about the near universal consensus on the science of climate change, it is instructive to consider how the science is seen in other countries who must be our partners in the debate. The following figure is from a poll undertaken in ten countries around the world during the second half of 2006 by The Chicago Council on Global Affairs and WorldPublicOpinion.org, in cooperation with polling organizations around the world.

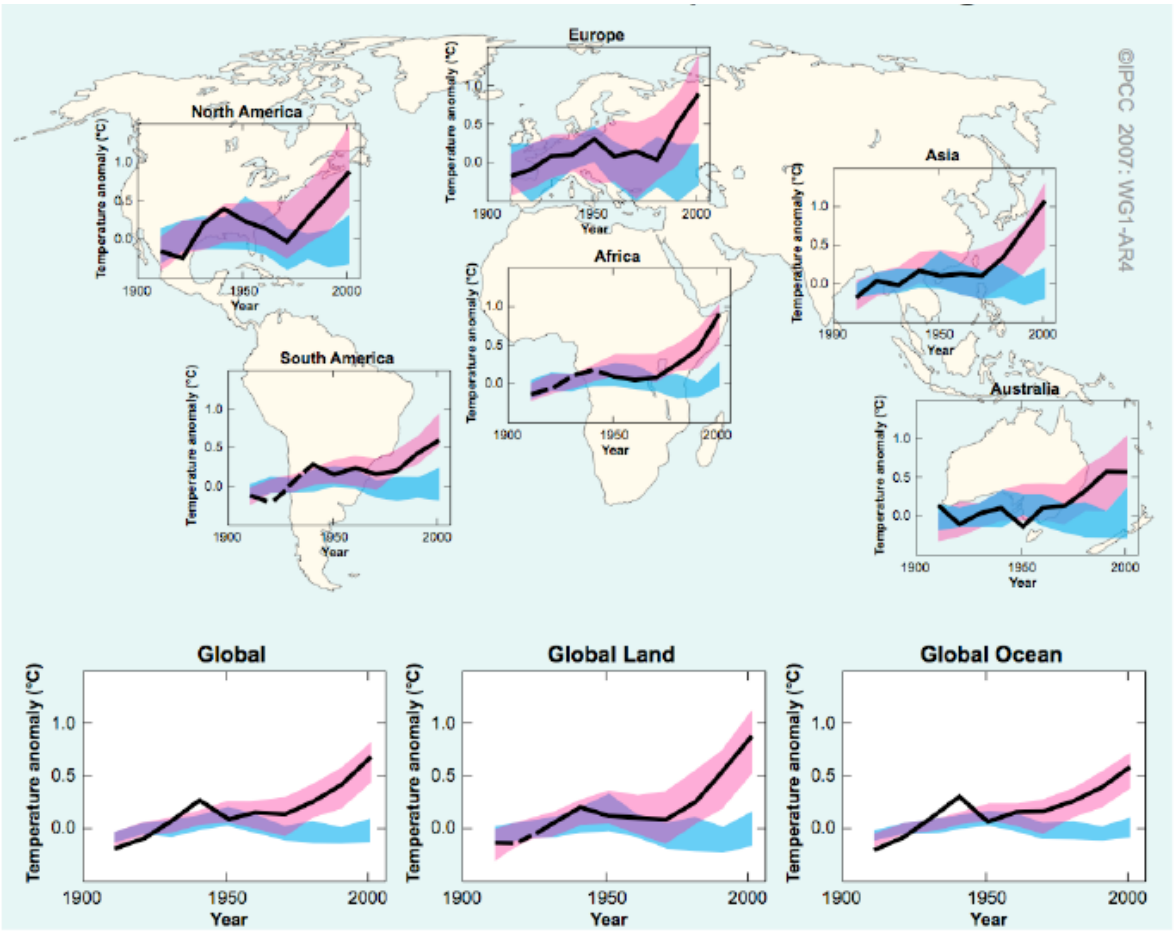
Figure 1. International Global Warming Poll



What is instructive is that in all countries where polling was undertaken, a significant majority see climate as an important or critical threat. This includes China and India, both essential partners in the global solution.

To a certain extent, global concerns about climate are mirrored by the distribution of the observed effects – and even more, the projected impacts. Thus, for example, the IPCC, in its report released in February 2007, provided disaggregated information on the already observed temperature changes. Increases have been observed in all regions of the world (see figure 2).

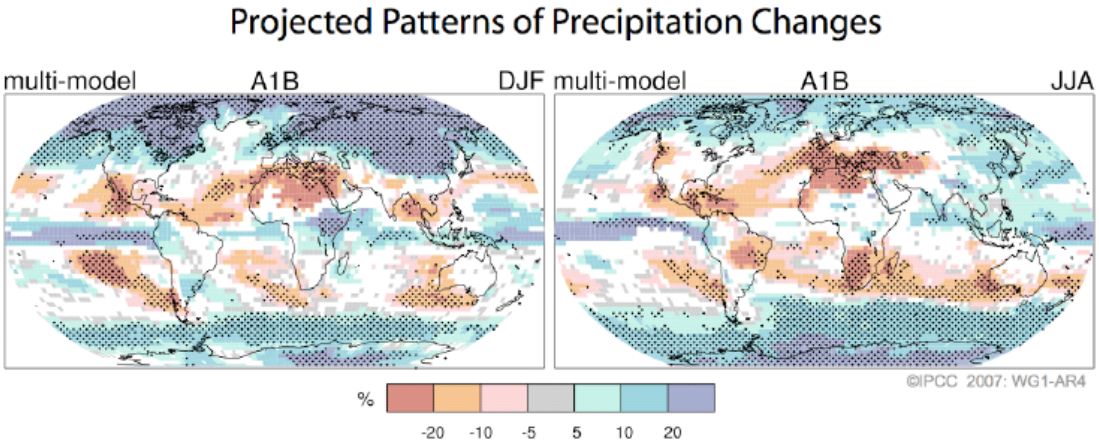
Figure 2. Comparison of observed continental- and global-scale changes in surface temperature with results simulated by climate models using natural and anthropogenic forcings. Decadal averages of observations are shown for the period 1906–2005 (black line) plotted against the centre of the decade and relative to the corresponding average for 1901–1950. Lines are dashed where spatial coverage is less than 50%. Blue shaded bands show the 5–95% range for 19 simulations from 5 climate models using only the natural forcings due to solar activity and volcanoes. Red shaded bands show the 5–95% range for 58 simulations from 14 climate models using both natural and anthropogenic forcings.



Perhaps even more significant is the set of projections released by the IPCC that consider reduced water availability (see figure 3).

The substantial majority of areas around the world that are anticipated to experience reduced water availability are in already stressed regions – sub-Saharan and southern Africa, southeast and western Asia, and during the summer months, most of southern Europe and Central America.

Figure 3. Relative changes in precipitation (in percent) for the period 2090–2099, relative to 1980–1999. Values are multi-model averages based on the SRES A1B scenario for December to February (left) and June to August (right). White areas are where less than 66% of the models agree in the sign of the change and stippled areas are where more than 90% of the models agree in the sign of the change.



The IPCC's report is developed drawing on scientists from around the world, including the Panel Chairman, Dr Rajendra Pachauri from India, and Dr. Dahe Qin, from China, the co-chair of the science working group. Its results thus have significant standing in all countries – a standing that will make its conclusions (essentially indicating the urgency of the problem and the need for prompt and significant action) even more compelling.

A further indication of the general acceptability of the science is in another, equally prestigious statement issued jointly by the Academies of Science of Brazil, Canada, China, France, Germany, India, Italy, Japan, Russia, UK and USA in 2005, which stated:

> *"The scientific understanding of climate change is now sufficiently clear to justify nations taking prompt action…. We urge all nations, in the line with the UNFCCC principles, to take prompt action to reduce the causes of climate change, adapt to its impacts and ensure that the issue is included in all relevant national and international strategies. As national science academies, we commit to working with governments to help develop and implement the national and international response to the challenge of climate change*[1]*."*

2. We must start action immediately

While the science of climate change is widely agreed, there is a much weaker consensus on how quickly we must act, or with what stringency. However, a report released by Sir Nicholas Stern (former chief economist at the World Bank and economics advisor to the UK government), commissioned by the UK Chancellor of the Exchequer, and reporting to both the UK Chancellor and to the Prime Minister, has brought considerable clarity to this discussion. As the report states:

[1] For full text of Academies Statements see http://www.royalsoc.ac.uk/displaypagedoc.asp?id=20742

> *"Stabilisation at 450ppm CO2e is already almost out of reach, given that we are likely to reach this level within ten years and that there are real difficulties of making the sharp reductions required with current and foreseeable technologies. Costs rise significantly as mitigation efforts become more ambitious or sudden. Efforts to reduce emissions rapidly are likely to be very costly. An important corollary is that there is a high price to delay. Delay in taking action on climate change would make it necessary to accept both more climate change and, eventually, higher mitigation costs. Weak action in the next 10-20 years would put stabilisation even at 550ppm CO2e beyond reach – and this level is already associated with significant risks.[2]"*

The IPCC, in the third volume of its 4th assessment report, will include some review of the Stern materials; however, the Stern view on this issue is basically consistent with the consensus among the research community[3].

3. Emissions must be cut by 60 to 80%, requiring multiple policies covering all sectors.

The IPCC's science assessment provides a comprehensive examination of the physics of the climate system. From that analysis, several points clearly emerge:

- We are putting considerably more greenhouse gases into the atmosphere than can be absorbed by the Earth's system.

- To reach equilibrium requires significant reductions, the rate and magnitude of which are a function of the level of concentrations that are tolerable. Stabilisation - at whatever level - requires that annual emissions be brought down to the level that balances the Earth's natural capacity to remove greenhouse gases from the atmosphere. The longer emissions remain above this level, the higher the final stabilisation concentration. In the long term, annual global emissions will need to be reduced to below 5 GtCO2e, the level that the earth can absorb without adding to the concentration of GHGs in the atmosphere. This is more than 80% below the absolute level of current annual emissions.

While deciding how quickly we wish to stabilize is a political question, it is amenable to technical analysis. According to Sir Nicholas Stern (and based on the IPCC science),

> *"…[S]tabilizing atmospheric concentrations at or below 550ppm CO2e would require global emissions to peak in the next 10 - 20 years, and then fall at a rate of at least 1 - 3% per year. By 2050, global emissions would need to be around 25% below current levels. These cuts will have to be made in the context of a world economy in 2050 that may be 3 - 4 times larger than today - so emissions per unit of GDP would need to be just one quarter of current levels by 2050. To stabilise at 450ppm CO2e, without overshooting, global emissions would need to*

[2] Ibid, p 15.

[3] It should be noted that the one area of controversy in the Stern report is related to the discount rate it uses. The decision, ultimately, is whether we adopt a discount rate that values future generations as highly as we value our own, or whether we believe that technology and opportunities will grow in the future, thus making current costs more important than future damages. On the issue of taking immediate action, however, there is very little disagreement.

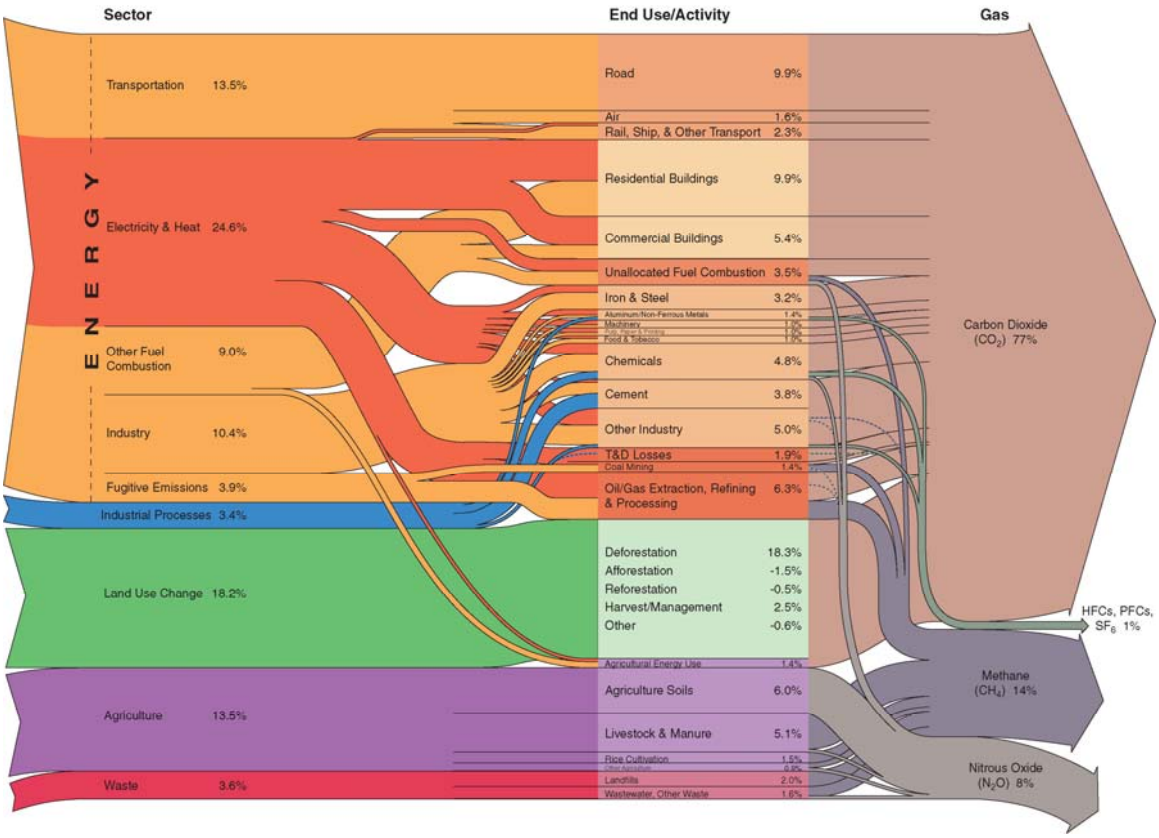
peak in the next 10 years and then fall at more than 5% per year, reaching 70% below current levels by 2050.

If we base our decision on historic information, we see that the world has no experience of sustained emissions reductions – or even of sustained economic growth – at rates of 5% or more per year over a 50 year period. This would, in turn, suggest the need to start quickly so as to avoid the need for a very rapid – and potentially impossible – reduction effort later.

4. Policies must address all sectors and all gases; this will require multiple instruments

Greenhouse gas emissions arise from all sectors of the economy. While we do not have comprehensive recent data on emissions from all countries (a gap that needs to be rectified), it is instructive to look at the most recent information available (from 2000) to assess how broad a range of policy choices and actions will be required. Figure 4 shows the share of gases, and how total emissions are divided between sectors and end-use activities.

Figure 4. Global GHG emissions by sector, end use activity and greenhouse gas



We can see that energy (with about 60% of global emissions) and CO2 (with about 3/4 of the total) are the primary areas of concern. However, other gases (in particular methane) and other sectors (in particular, land use and agriculture) must also be addressed if we are to be successful at solving the climate problem.

There are very few policies that could address all emissions and sectors across all countries. Of these, the simplest would be a GHG tax. However, while some countries have applied such a tax (e.g., Norway and Denmark with their carbon taxes), its application is not widespread, and there is no desire in the international community to adopt a common and harmonized GHG taxation system. Countries are not prepared to give up the sovereignty required for its implementation.

Other policy choices, most much more narrowly targeted, are thus likely to be used. One attractive solution, a cap-and-trade system, is likely to be applicable to the energy sector (either upstream, in which case it could include transport), or downstream (in which case it might be more focused on electricity), as well as to industry. However, it may not apply easily to land use or forestry, and even in the energy area, may be difficult to apply to residential buildings. Other policies, including incentives, regulations and standards, R&D programs, and voluntary initiatives may thus be needed.

5. Not all countries are the same; different policies will be needed for each

As can be seen in figures 6 and 7, there are significant differences between countries with a respect to their sources of emissions and the relative shares of gases in their emission totals. Thus, for a country like Brazil, for which (in 2000) nearly 60% of all emissions derived from deforestation, a significantly different policy will be required than for China, where an even more substantial share (68%) of emissions arose in the energy sector.

Similarly, if the differences in GHG shares are considered, a CO2 only policy might be relatively effective for the US (with 82% CO2 in the mix) but much less effective for India (with 55% CO2 only).

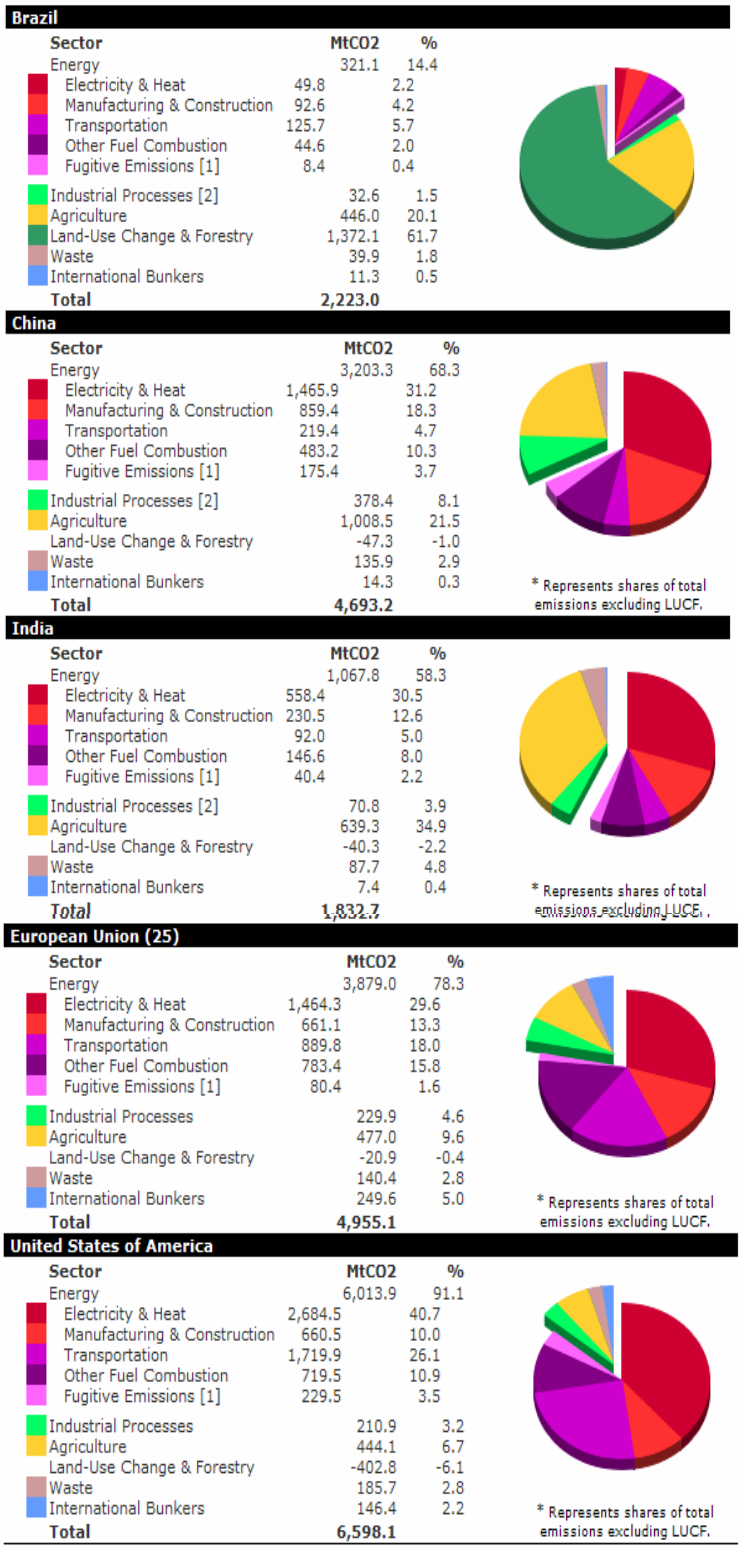
The Kyoto Protocol dealt with this issue by allowing all countries to choose their own policy mix, according to their own national circumstances and priorities. Including all six major greenhouse gases, and allowing maximum policy flexibility continues to seem a good choice or a global policy regime.

A different issue emerges when considering a specific policy choice: can all countries implement a specific policy uniformly? Is this a pre-requisite for a successful global regime? The answer seems to be that for some policies, common application is necessary for success, while for others, it is less critical. Thus, for example, emissions trading will not be successful across countries (and countries cannot even link their national systems) unless equally stringent compliance regimes, and full and robust monitoring and reporting programs are in place in both. Given the current detail and robustness available in national GHG inventories for Russia (which has yet to complete or submit a national GHG inventory), or China (which has only submitted a single inventory – in 2004, containing 1994 data), or Brazil, which has submitted an inventory containing 1990 and 1994 data), it seems none of these countries would currently be ready to participate in a full global trading system.

Conversely, a policy that would set agreed standards, or allow multiple countries to exchange information on best practice need not be constrained by such national differences. Thus, for example, a group of countries could all pass automobile efficiency

standards (even with varying stringency) and exchange information on their effectiveness and jointly commit to make them more stringent over time.

Figure 6. GHG Emissions by Sector in 2000. Data for CO2, CH4, N2O, PFCs, HFCs, SF6 from all sources including land use change & international bunkers



Brazil

Sector	MtCO2	%
Energy	321.1	14.4
Electricity & Heat	49.8	2.2
Manufacturing & Construction	92.6	4.2
Transportation	125.7	5.7
Other Fuel Combustion	44.6	2.0
Fugitive Emissions [1]	8.4	0.4
Industrial Processes [2]	32.6	1.5
Agriculture	446.0	20.1
Land-Use Change & Forestry	1,372.1	61.7
Waste	39.9	1.8
International Bunkers	11.3	0.5
Total	**2,223.0**	

China

Sector	MtCO2	%
Energy	3,203.3	68.3
Electricity & Heat	1,465.9	31.2
Manufacturing & Construction	859.4	18.3
Transportation	219.4	4.7
Other Fuel Combustion	483.2	10.3
Fugitive Emissions [1]	175.4	3.7
Industrial Processes [2]	378.4	8.1
Agriculture	1,008.5	21.5
Land-Use Change & Forestry	-47.3	-1.0
Waste	135.9	2.9
International Bunkers	14.3	0.3
Total	**4,693.2**	

* Represents shares of total emissions excluding LUCF.

India

Sector	MtCO2	%
Energy	1,067.8	58.3
Electricity & Heat	558.4	30.5
Manufacturing & Construction	230.5	12.6
Transportation	92.0	5.0
Other Fuel Combustion	146.6	8.0
Fugitive Emissions [1]	40.4	2.2
Industrial Processes [2]	70.8	3.9
Agriculture	639.3	34.9
Land-Use Change & Forestry	-40.3	-2.2
Waste	87.7	4.8
International Bunkers	7.4	0.4
Total	**1,832.7**	

* Represents shares of total emissions excluding LUCF.

European Union (25)

Sector	MtCO2	%
Energy	3,879.0	78.3
Electricity & Heat	1,464.3	29.6
Manufacturing & Construction	661.1	13.3
Transportation	889.8	18.0
Other Fuel Combustion	783.4	15.8
Fugitive Emissions [1]	80.4	1.6
Industrial Processes	229.9	4.6
Agriculture	477.0	9.6
Land-Use Change & Forestry	-20.9	-0.4
Waste	140.4	2.8
International Bunkers	249.6	5.0
Total	**4,955.1**	

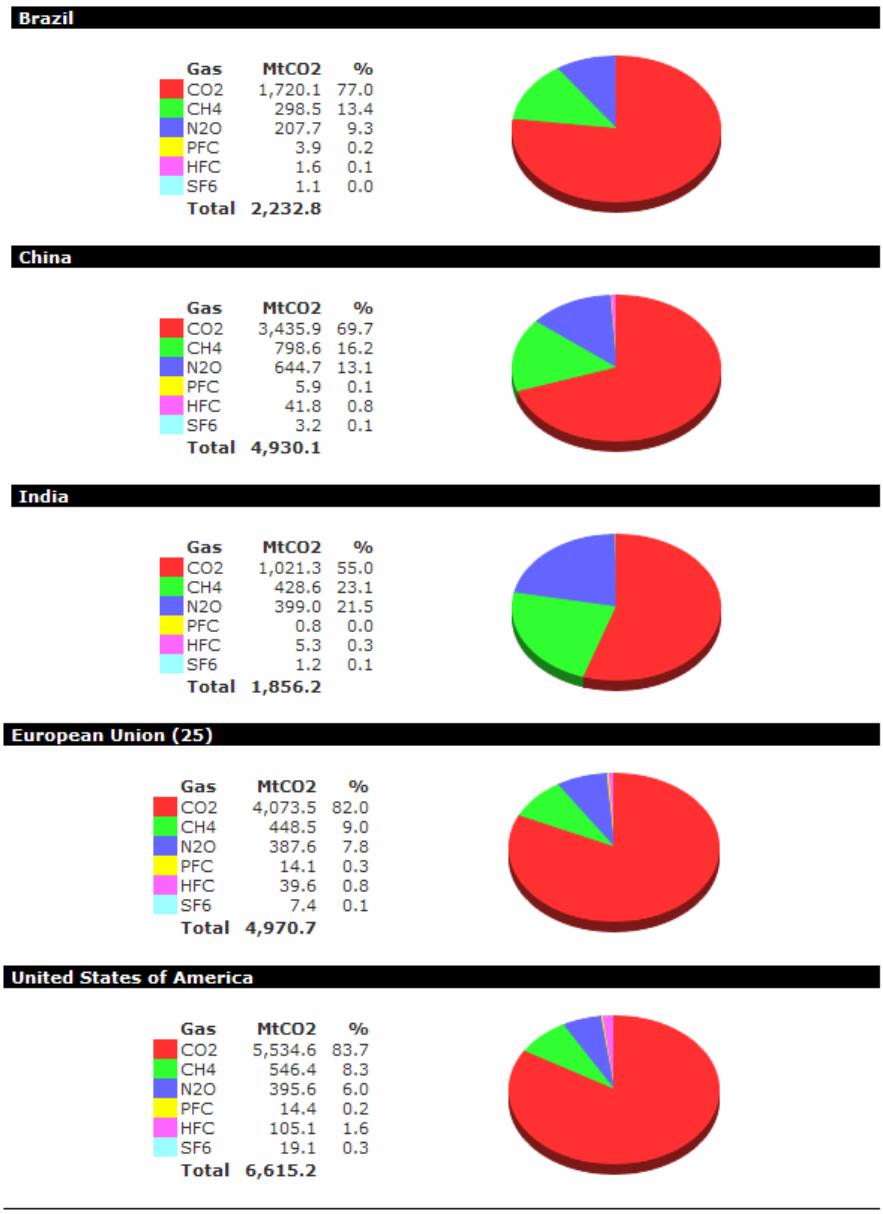
* Represents shares of total emissions excluding LUCF.

United States of America

Sector	MtCO2	%
Energy	6,013.9	91.1
Electricity & Heat	2,684.5	40.7
Manufacturing & Construction	660.5	10.0
Transportation	1,719.9	26.1
Other Fuel Combustion	719.5	10.9
Fugitive Emissions [1]	229.5	3.5
Industrial Processes	210.9	3.2
Agriculture	444.1	6.7
Land-Use Change & Forestry	-402.8	-6.1
Waste	185.7	2.8
International Bunkers	146.4	2.2
Total	**6,598.1**	

* Represents shares of total emissions excluding LUCF.

Figure 7. Total GHG emissions by gas in 2000 (includes land use change and international bunkers)



Finally, it should be noted that national emissions are only one representation of national circumstances. Other factors, such as national capacity, measured by national or per capita GDP, or ability to innovate and implement new technology may be relevant. Table 1 shows the national and per capita GDP of five of the largest emitting countries (with the European Union listed as a single entity). It is clear that even though total national Chinese and Indian emissions are high, on a per capita basis, they are quite low, and their ability to undertake major new investments is circumscribed by the overall poverty as well as institutional constraints in each country.

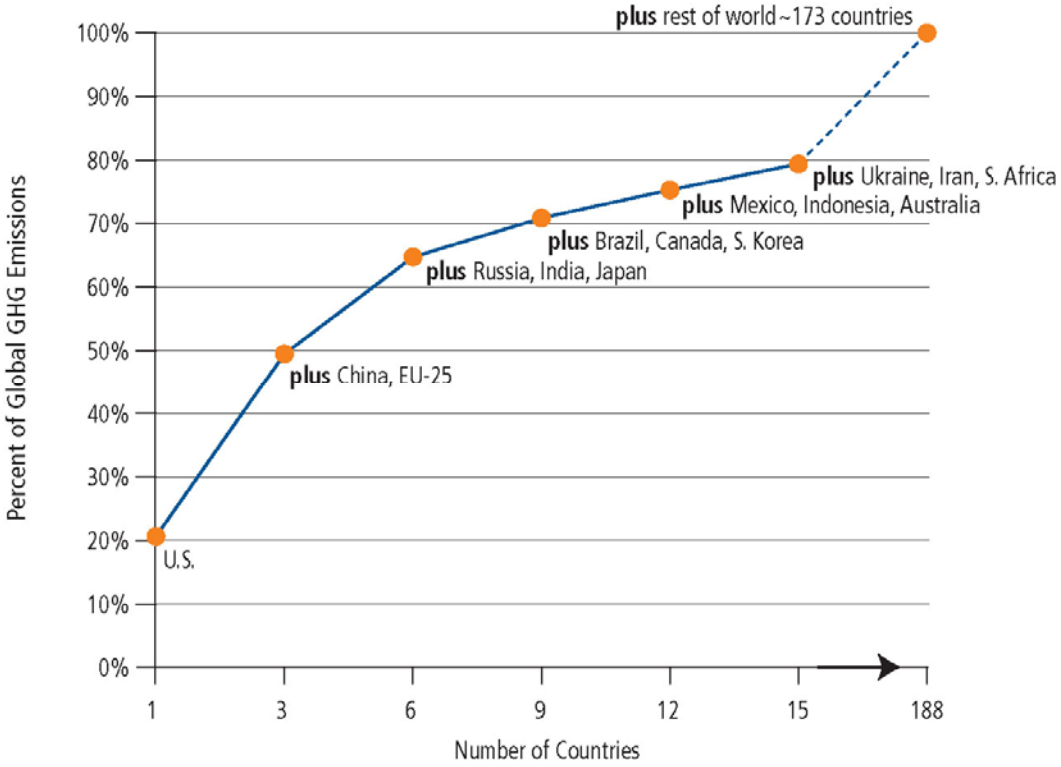
Table 1. GHG Emissions (2000) and GDP (2003): National and Per capita

Country	MtCO2	Rank	% of World Total	Tons CO2 Per Person	Rank	Intl $ Per Person	Rank	Total, Mill. Intl $	Rank	% of World
United States of America	6,468.80	1	15.65%	22.9	14	35,373	2	10,286,830	2	21.10%
China	4,915.80	2	11.89%	3.9	122	4,966	88	6,398,317	3	6.00%
European Union (25)	4,721.10	3	11.42%	10.4	53	23,770	21	10,845,226	1	22.30%
Brazil	2,221.50	5	5.37%	12.8	38	7,306	59	1,325,290	10	13.10%
India	1,848.80	7	4.47%	1.8	163	2,731	108	2,907,332	5	2.70%

6. The largest 15 countries (including the EU as one) must be at the table.

Emissions from all countries, as seen in the table above, are not equal. However, if we are to be successful in combating the threat of climate change, we must get the largest emitters to take action. Figure 8 shows the largest emitters; collectively, the top 15 countries account for 80% of global emissions. This does not mean that other countries might not be critical: the largest source of CO2 from deforestation is from Indonesia, and the second largest steel company in the world is based in Luxembourg – and neither rank in the top tier for total emissions. However, while for some policy solutions, other nations may be appropriately involved, for a large scale, satisfactory solution, at least the major emitters must all be engaged.

Figure 8: the Largest Emitters (6 gases, 2000 data)



It is clear that none of these major countries will act from coercion or under duress. We clearly see this when Russia, in the face of global objection, takes over private interests in its gas and oil sectors, and when Iran is prepared to defy global opinion to establish its nuclear arsenal. Policies to mitigate climate change are not likely to be different. They require a country to shift its national priorities and change fundamental development paths; this is only likely if a country is convinced it is in its own interest. External support and negotiation of common goals to reduce competitiveness barriers and constraints will help smooth this path, but the basic decisions must be taken at the national level.

7. There are solutions

In developing solutions to climate issue, and taking account of the differing national circumstances and priorities described above, it is clear that no single policy will apply in all cases. A portfolio will ultimately be necessary. I suggest three options here: (1) emissions trading, (2) Sustainable Development Policies and Measures (SDPAMS), and (3) sectoral and technology based agreements.

Emissions trading

For developed nations – in this case, particularly including members of the OECD, an emissions trading system is likely to reduce collective emissions at least cost. A single negotiation need not be undertaken for national systems to link. Already, the European Union has developed a regime that allows 25 member states, with different targets and national circumstances to join forces in a common effort. US States (e.g., the NE State's Regional GHG Initiative, RGGI) are proposing to accept EU allowances for compliance with their regime.

To join such a system, the US must negotiate its own national trading program. We could then choose to accept the allowances of others, linking our systems formally, or we can allow the market, through various arbitrage mechanisms, to link them informally.

However, linking to other countries may be less straightforward. Absent a strong and robust system for assuring compliance, and for monitoring and reporting, it is not realistic to accept emissions allowances from another country. For such countries, the option of accepting credits (through an emissions offset program) is possible. This would assure US companies of lower cost emissions reductions opportunities, while avoiding the problems of inadequate legal regimes.

It has frequently been argued that if the US were to establish its own emissions trading program, while other competitors (such as China or India) did not, we would be at a competitive and commercial disadvantage. In one sense, this is true: goods and services that were subject to the implicit GHG price in the US would cost more than those same goods produced in countries without such costs. However, a number of proposals have been made as to how to "level the playing field". One option is to rebate some of the proceeds from the trading system to offset the competitive disadvantage for exporters. Another is to allocate allowances in such a way as to reduce the liability. A third possibility is to work with specific affected sectors to undertake sectoral negotiations so that all companies in a given sector are meeting new and more climate friendly standards, avoiding the problem entirely. Finally, it is possible that the problem is significantly overblown: according to most economic analyses, the total cost of major US emissions reductions will be at most a few percent of GDP over the next 50 years or more. In effect, this means that US GDP would still more than double by 2050 – but in March of 2050 instead of in January 2050.

Sustainable Development Policies and Measures (SDPAMS)

For many developing countries, climate change is much lower on the list of priorities than are other major domestic problems: health, access to electricity, clean air and water, and a growing economy are all higher. The SDPAMs approach starts from the premise that while climate mitigation may never rise to the importance of these other policies, many of them can be implemented in a way that simultaneously reduces GHG emissions.

Several examples can help illustrate the point:

(1) Energy security and climate: meeting energy needs is a growing concern not only for the US, but also for China India and others. China is expected to import 75% of the oil it consumes by 2030. Any policy that reduces its demand may have enormous benefits. Thus, fuel efficiency standards, or efforts to switch from oil/diesel electric generation to renewable energy or nuclear power would be valuable. Each of these would also lead to a reduction in associated GHG emissions. China, acting on the basis of an energy security constraint, could also mitigate its climate footprint. Of course, not all security measures would necessarily be beneficial: if China increases its coal liquefaction program (particularly without concomitant CO2 sequestration), its emissions would rise precipitously, even though its energy security problems might be diminished.

(2) Clean air and climate: Another serious problem facing many cities in the developing world s increasing air pollution. As vehicle traffic increases and dirty industry and power generation grow, air quality declines, with related consequences for human health and welfare. Solutions to promote clean air – switching from coal to gas, increased automobile efficiency, improved mass transit, and process standards for industry can all improve the local pollution problem while simultaneously reducing the GHG footprint.

(3) Deforestation and climate. One of the major causes of deforestation is land clearing for agricultural purposes. However, land cleared from forests in much of the equatorial regions is relatively poor, and is often left fallow after only a few years of farming. Policies that improved existing agricultural land could both reduce the need for forest clearing as well as improve productivity for food and fiber supplies.

A successful SDPAMS approach will need to be country specific, and issue specific. It will need to build on the domestic priorities, and find synergies between development agendas and climate. This will require technical inputs on the US government side from agencies like DOE, EPA, DOC and AID, and on the private sector side from both multinationals and from SMEs. Congress will need to create systems to encourage such engagement – and push the State Department, DOC and USTR to open opportunities for trade relationships so that markets in such new technologies and systems can be easily developed and exported.

Developing countries too will support such an approach – but it must meet both their local development needs and business interests. China and India are already beginning down this path. For example, China has fuel economy standards that require all new cars and light trucks to achieve 21 to 43 mpg by 2008 (depending on class). This policy is projected to save 960 million barrels of oil and avoid 130 million tons of carbon emissions through 2030. India has a goal of using renewable energy for 10 percent of new power generation by 2010, and another goal to

electrify18,000 rural villages by 2012 from non-conventional sources such as biomass, solar, wind, and small hydropower[4].

The US role in promoting SDPAMS is central. It will mean working to create fair trade agreements in new technologies, and will likely lead to increased competition for the manufacturers of such low cost technological solutions. Historically, US companies have done well in such markets; we need to develop the skills to do well in this new world of environmental technology too. However, this market will develop whether or not we participate. The issue for the US is whether we will play "catch-up" as we have done for many of the telecoms and automotive applications that were invented in the US but built elsewhere, or whether we will be market leaders, with the concomitant economic wealth creation that such leadership brings.

Sectoral and technology agreements

A final option for developing an international regime is around key sectors and technologies that are widely traded and where a relatively small group of companies are key manufacturers. An example in one sector (transport) and one technology (carbon capture and storage; CCS) help illustrate the value of this approach.

- Transport. According to the OICA, as of 2005, five multinational manufacturers produced more than half of all the world's vehicles. The EU capitalized on the small number of manufacturers to push through an agreement setting a target of 140 g/km (representing a 25% reduction over 1995 levels and corresponds to a fuel consumption figure of 6 liters per 100 km) to be met by any European, Japanese or Korean manufacturer selling cars into the EU market. Inasmuch as manufacturers have not been meeting the voluntary goals, the EU is now considering making them binding.

- CCS: Unlike most other technology approaches, CCS has no ancillary benefits. It is likely to reduce the efficiency of the electric generating unit to which it is applied, and increase operating costs. However, inasmuch as coal is the fuel of choice for many countries (representing about 70% of China's total energy supply, and nearly 60% or India), it is clearly critical that we find a technology solution to reduce the impact of its use. Agreements, such as the Carbon Sequestration Leadership Forum, are exploring opportunities to exchange information on the technologies for CCS. However, they will inevitably also require new funding sources and incentives – without which it is unlikely that these technologies will make it to market.

The Administration has been experimenting with sector and technology partnerships, albeit in a very modest way. The US Methane to Markets Program, the Carbon Sequestration Leadership Forum, and the International Partnership for a Hydrogen Economy, are all examples. To date, US efforts have been sadly under-funded. The International Energy Agency projects that global energy investment will total more than $20 trillion over the next 25 years. To date, the US investment in these new technology initiatives, designed to shift global energy infrastructure and investment, is much too small to make a difference. To be effective, it must be significantly ramped up – by a factor of ten or more. The $100 million announced by DOE to be spent over 4 years on hydrogen fuel cells, as well as the modest demonstration projects that are the extent of the CSLF effort to date will not ever allow this approach to reach its potential.

[4] WRI maintains a database of policies and measures being taken in key developing countries; see http://cait.wri.org/sdpams/search.php

It is clear such sectoral and technology approaches can work. They already engage the key countries that must be at the table, and create pubic private partnerships that could be instrumental in making successful commercial markets in new technologies. Congress could increase their chances of success by authorizing additional resources to them, and by creating incentives for companies that work in these agreements to develop and disseminate the technologies they produce. Furthermore, Congress can provide a framework for technology investment so that the large scale private capital and investment community is more actively engaged. Financing for technology development on a scale needed will ultimately need to come from such resources; the role for the government is in creating the market framework to promote such new investment decisions.

8. We will need to adapt

Unfortunately, our best projections suggest we are not likely to be on a path that will keep our climate unchanged. This will require adapting to the changes we cannot avoid.

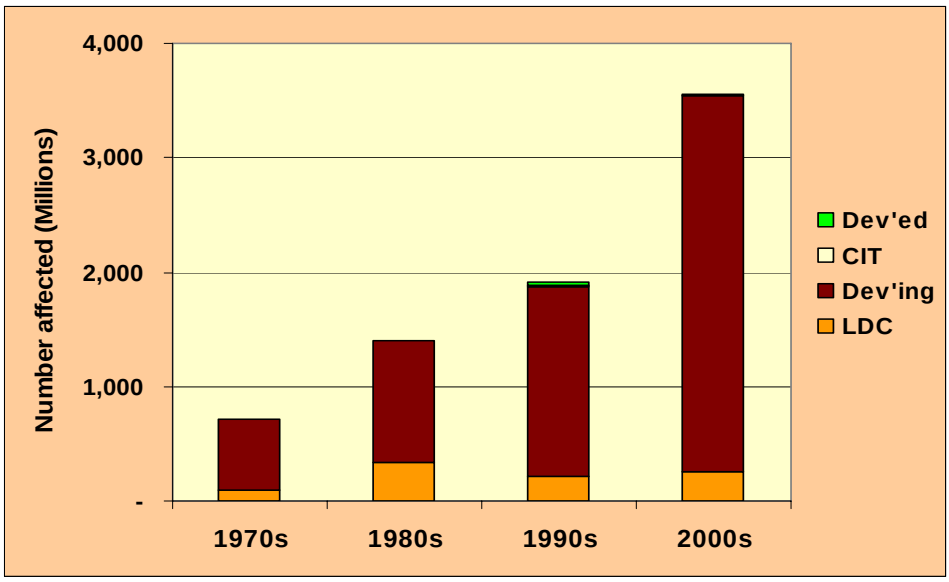
To a certain extent, the critical question for developing adaptation policy is one that the science can help answer: whether (in any given circumstance) climate change will be slow and incremental or fast and large scale. If the former, we can and must develop a resilience to change that will enable us, collectively, to cope. Thus, we can work so that we can manage a drought that occurs every 10 years instead of every 12, or a change in rainfall that leads to 10% less water, or an increase in the disease vectors for malaria, or the need to create corridors in addition to parks to protect diversity. In these cases, we need to do a bit more of what we are now doing: more careful husbandry of scarce resources, more medicines, and better planning.

On the other hand, if climate really leads to a step change, an incremental adaptive strategy may be counterproductive. A potentially catastrophic example of this may be the city of Lima, Peru: if, as predicted, the glacier that waters the city is melted in 25 years, the city does not have an incremental option – small savings in water will be inadequate. Instead, they need to accept a major change: leave town, begin massive desalination operations, or commence large scale shipping of water into the city. Clearly, to cope, there will also be a need for massively increased efficiency, and perhaps in the near term, some shifting away from water intensive activities. But over the longer term, these changes will not suffice. The Lima scenario paints a picture less of resiliency than of paradigm change.

Decisions on how to spend adaptation money thus require a clear answer to the question: “What are we trying to adapt to?” Wasting money on incremental change that could be spent on relocating populations must be avoided; conversely, if incremental shifts are adequate, huge society-wide programs would be equally foolish.

According to the World Bank, nearly 2 billion people in developing countries were affected by climate related disasters in the 1990s, and the rate may double this decade (see figure 9). People in developing countries are more than 20 times as likely to be affected by such disaster as those in the developed world.

Figure 9. Vulnerability to Climate Change



Source: World Bank, Ian Noble

One key part of any future international regime will therefore need to consider who will pay for the adaptation required. The sums involved are very large: estimates of climate related impacts range from $10 billion to more than $100 billion per year, and these are only likely to increase. Meeting these costs poses both a moral and a political dilemma. Most developing countries consider historical responsibility in determining who should pay for damages. Under this model (using WRI data) the OECD countries along with the FSU are responsible for about 73% of the contribution to the rise in atmospheric GHG concentrations between 1850 and 2000. This same group of countries also has the capacity to pay: in 2003, OECD & FSU countries produced about 60% of the world total GDP.

However, the politics of such payments are much more difficult. Virtually all OECD countries have seen development assistance decline as a percentage of their GDP. Even including private charitable donations (usually forthcoming in times of massive disaster), we have demonstrated a limited willingness to pay for sustained, long term development priorities.

On the more positive side, there will be business opportunities in disaster preparedness and relief, in the development of technologies that reduce the consequences of climate change such as new drugs, new water savings technologies, and new crops. All of these will reduce the burden that governments must meet. However, Congress has a responsibility too: it should consider increasing support for USAID and the various development banks that many of the poorest nations will turn to when disaster strikes. And it should support global agreements, including agreements that include insurance coverage and liability, and financial assistance to alleviate the worst of the suffering that will likely be borne by the world's most vulnerable communities.

9. Negotiating a solution requires a portfolio approach

For many problems facing the international community, bilateral or simple multilateral agreements suffice to frame and implement solutions. Climate change, which affects the entire

global population, and virtually every facet of human activity, may require a much more complex regime.

There are several possible fora for negotiating international agreements. Of these, the most widely used is the regular meeting held under the auspices of the UN Framework Convention on Climate Change. With representatives of about 190 parties (including the US), it provides an opportunity for countries to discuss options for actions on climate mitigation and adaptation.

That agreement, and its subsidiary Kyoto Protocol, have established some of the basic building blocks for a long term architecture. The UNFCCC itself established rules for reporting on GHG emissions (although many countries do not fully comply). The Kyoto protocol set up rules for a global cap-and-trade market. If the USA chooses to create its own independent market, it may still seek to use the Kyoto rules for accepted project based offsets.

In parallel, the US and others have set up a series of small, plurilateral systems for discussing (and possibly negotiating agreements). The US established groups to address methane, carbon capture and storage, and hydrogen, while Europe (through the Renewable Energy and Energy Efficiency Program, REEEP) has established a partnership to address these issues. At the same time, the G8 countries, led by the UK, has regularly included climate change on its agenda; Germany (currently the G8 president) and Japan (which holds the presidency in 2008) have committed to include the major developing countries in discussions under this agenda item.

Simultaneously, industry has been active: the International Aluminum Institute, a consortium of the major aluminum producers (including about 80% of global production) set – and is meeting – a target to reduce by 80% the perfluorocarbons in aluminum manufacture, and a 10% decrease in the energy used in smelting.

Work in each of these fora needs to be continued and strengthened. It is highly unlikely that any one regime will fully meet the demands of the complex and fragmented structure that a climate solution is likely to require. This will require US support in multiple arenas –from the formal negotiations under UN auspices to informal bilateral arrangements and business support networks.

Today, we are clearly missing strong US engagement. Historically, many of the most innovative solutions to international issues have come from US – including the very structure of the climate agreements themselves, as well as systems to promote technology innovation and global trade. If the world is to reach a successful conclusion to the climate change problem, it will only be if the US is actively involved, and shouldering its share of the burden.

There is money to be made from the solutions. Done right, climate policy can foster innovation and new markets for clean technologies. The United States, with its high levels of innovation, deep capital markets and world-class technology companies, is extremely well-placed to make the most of these markets. The ever-growing chorus of American companies calling for clear climate regulation (of which the USCAP is among the most recent) is clear evidence that they see a carbon-constrained world as one in which they can thrive. In the absence of such policies, new clean technology markets, from renewable energy to hybrid vehicles, will be led by our competitors.

If Congress can effect such a shift, it will indeed be a major contribution.

SUMMARY

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World Resources Institute

Testimony submitted to the
US House of Representatives Subcommittee on Energy and Air Quality
Committee on Energy and Commerce
March 27, 2007

Thank you Mr. Chairman. I appreciate this opportunity to discuss my views and provide input to your deliberations related to international action on climate change. In my testimony, I make several points:

(1) The science is real – and it is seen as real in all countries.

(2) We cannot afford to wait to act.

(3) The scale of the problem is enormous; it requires that we reduce our long term, global emissions by 60 to 80%.

(4) No single policy or action in any single sector will be adequate to solve the climate problem. It will require efforts in all sectors, all gases, with multiple policy instruments.

(5) Not all countries are the same. We cannot and should not expect any future international arrangement to set the same requirements for every country.

(6) Some countries clearly matter more than others for climate mitigation: the largest 15 countries, responsible for about 80% of global emissions must be at the table. But we cannot coerce them to participate; we need solutions that speak to each country's self-interest and desire for long term sustainable growth.

(7) Fortunately, there are solutions:

- A price on greenhouse gas emissions
- Capturing the co-benefits of climate solutions – for energy security, local air quality and community.
- Develop and adopt new technologies – which could be a new US market opportunity

(8) Part of the global effort will need to be devoted to adaptation – and it will be the poorest and least able to cope who will be most significantly affected.

(9) We will need to use all available fora for international negotiations, including the UN Climate Convention, existing and new bilateral and multilateral arrangements, and private sector engagement.