February 2007

Executive Summary

CONFRONTING CLIMATE CHANGE:

AVOIDING THE UNMANAGEABLE AND MANAGING THE UNAVOIDABLE

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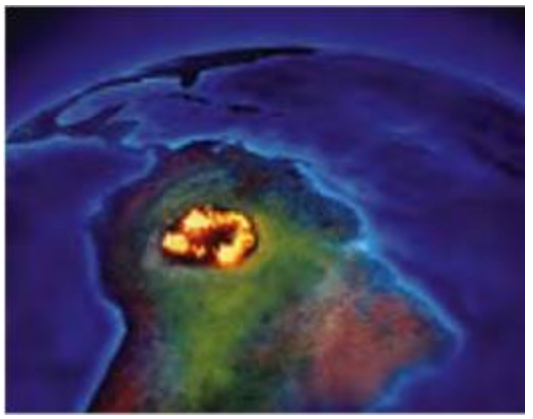
- Utilizing the most advanced building designs, which can provide emissions-free space conditioning (cooling and heating) in ways that greatly reduce energy and water demands and that promote improved health and worker performance.
- Implementing carbon capture and storage from fossil-fueled power plants, which reduce impacts on climate while making available concentrated CO_2 that can be used in enhanced natural gas and oil recovery and in agricultural applications.
- Replacing traditional uses of biomass fuels for cooking and heating (including agricultural residues and animal dung burned in inefficient cookstoves) with modern energy supplies that can reduce production of black soot and other aerosols, improve the health of women and children otherwise exposed to high indoor air pollution from traditional uses of biomass, and reduce deforestation and land degradation.
- Combining the sustainable use of biomass for energy (renewable sources of biomass to produce electricity, liquid fuels, and gaseous fuels) with carbon capture and sequestration, which can power development and remove CO_2 already emitted to the atmosphere.



In addition, reversing the unsustainable land-use practices that lead to deforestation and degradation of soil fertility will help limit the release of CO_2 and CH_4 into the atmosphere from the soil. Improving sanitation in rural areas can reduce emissions of CH_4 and provide a renewable fuel to help reduce dependence on coal, petroleum, and natural gas.

Projects and programs from around the world have demonstrated that much progress can be made on climate-change mitigation and adaptation in ways that save money rather than add to costs. Some of the measures that will ultimately be required are likely to have significant net costs – albeit much less, in all likelihood, than the climate-change damages averted – but a clear way forward for immediate application is to promote much wider adoption of "win-win" approaches, such as those described above, that reduce climate-change risks while saving money, or that produce immediate co-benefits outweighing the costs of the measures.

To move further, government leadership is required to establish policy frameworks that create incentives for energy-system change and establish public–private partnerships for energy-technology development, deployment, and diffusion. Leaders in the private sector also need to seize opportunities to develop, commercialize, and deploy low-emitting energy technologies that will also create jobs and enable economic development. Individuals, especially in affluent societies, must also show leadership by consuming responsibly.

The Elements of a Roadmap

Avoiding the unmanageable and managing the unavoidable will require an immediate and major acceleration of efforts to both mitigate and adapt to climate change. The following are our recommendations for immediate attention by the United Nations (UN) system and governments worldwide.

1. Accelerate implementation of win-win solutions that can moderate climate change while also moving the world toward a more sustainable future energy path and making progress on attaining the MDGs (see Box ES.1). Key steps must include measures to:

- Improve efficiency in the transportation sector through measures such as vehicle efficiency standards, fuel taxes, and registration fees/rebates that favor purchase of efficient and alternative fuel vehicles, government procurement standards, and expansion and strengthening of public transportation and regional planning.
- Improve the design and efficiency of commercial and residential buildings through building codes, standards for equipment and appliances, incentives for property developers and landlords to build and manage properties efficiently, and financing for energy-efficiency investments.
- Expand the use of biofuels, especially in the transportation sector, through energy portfolio standards and incentives to growers and consumers, with careful attention to environmental impacts, biodiversity concerns, and energy and water inputs.
- Promote reforestation, afforestation, and improved land-use practices in ways that enhance overall productivity and delivery of ecological services while simultaneously storing more carbon and reducing emissions of smoke and soot.
- Beginning immediately, design and deploy only coal-fired power plants that will be capable of cost-effective and environmentally sound retrofits for capture and sequestration of their carbon emissions.

Box ES.1. UN Millennium Development Goals

The eight Millennium Development Goals (MDGs) – which range from halving extreme poverty to halting the spread of HIV/AIDS and providing universal primary education, all by the target date of 2015 – form a blueprint agreed to by all the world's countries and all the world's leading development institutions. The MDGs were adopted by heads of state meeting at the United Nations headquarters in September 2000. The goals are to:

1. **Eradicate extreme poverty and hunger**
2. **Achieve universal primary education**
3. **Promote gender equality and empower women**
4. **Reduce child mortality**
5. **Improve maternal health**
6. **Combat HIV/AIDS, malaria and other diseases**
7. **Ensure environmental sustainability**
8. **Develop a global partnership for development**

See http://www.un.org/millenniumgoals/index.html.

2. Implement a new global policy framework for mitigation that results in significant emissions reductions, spurs development and deployment of clean energy technologies, and allocates burdens and benefits fairly. Such a framework needs to be in place before the end of the Kyoto Protocol's first commitment period in 2012. Elements of the framework should include:

- An agreed goal of preventing a global-average temperature increase of more than 2°C to 2.5°C above the 1750 value – accompanied by multi-decade emission-reduction targets compatible with this aim.
- Metrics of performance that enable monitoring of progress towards reductions in energy and emissions intensity at a national level.
- Flexibility in the types of policies, measures, and approaches adopted that reflect different national levels of development, needs, and capabilities.
- Mechanisms that establish a price for carbon, such as taxes or "cap and trade" systems. A carbon price will help provide incentives to increase energy efficiency, encourage use of low-carbon energy-supply options, and stimulate research into alternative technologies. Markets for trading emission allocations will increase economic efficiency.
- A mechanism to finance incremental costs of more efficient and lower-emitting energy technologies in low-income countries.

3. Develop strategies to adapt to ongoing and future changes in climate by integrating the implications of climate change into resource management and infrastructure development, and by committing to help the poorest nations and most vulnerable communities cope with increasing climate-change damages. Taking serious action to protect people, communities, and essential natural systems will involve commitments to:

- **Undertake detailed regional assessments to identify important vulnerabilities and establish priorities for increasing the adaptive capacity of communities, infrastructure, and economic activities. For example, governments should commit to incorporate adaptation into local Agenda 21 action plans and national sustainable-development strategies.**
- **Develop technologies and adaptive-management and disaster-mitigation strategies for water resources, coastal infrastructure, human health, agriculture, and ecosystems/ biodiversity, which are expected to be challenged in virtually every region of the globe, and define a new category of "environmental refugee" to better anticipate support requirements for those fleeing environmental disasters.**
- **Avoid new development on coastal land that is less than one meter above present high tide, as well as within high-risk areas such as floodplains.**
- **Ensure that the effects of climate change are considered in the design of protected areas and efforts to maintain biodiversity.**
- Enhance early-warning systems to provide improved prediction of weather extremes, especially to the most vulnerable countries and regions.