**1. Sustainable Development and Climate Change
How can sustainable development be achieved for all while addressing global climate change?**

The December 2009 Climate Change Conference in Copenhagen has focused analysis on the practical details of how to manage cap and trade, pay for adaptation, stimulate technology transfer to reduce emissions, estimate when peak GHG emissions will be reached, and set goals to address climate change. Some argue that the goal should be no more than 450 ppm of atmospheric CO2, or no more than a 2°C rise from pre-industrial temperatures, but today the CO2 concentration is already at 390 ppm and glaciers are melting, polar caps are thinning, and one study found that climate change is costing the world $125 billion and 300,000 deaths per year. Average annual atmospheric CO2 increases rose from 1.5 ppm 1970–2000 to 2.1 ppm since 2000. A top NASA climatologist now suggest a 350 ppm target is needed. CO2 emissions are increasing faster—and the world is warming faster—than IPCC estimates, and the most recent estimates may understate reality again since they do not take into account the "permafrost" melting.

Each day, the oceans absorb 30 million tons of CO2, increasing their acidity. The number of dead zones—areas with too little oxygen to support life—has doubled every decade since the 1960s. Over 36 million hectares of primary forest are lost every year. Arctic summer ice and major Himalayan and Andean glaciers could be gone by 2030, leading some to warn that climate change has reached the point of no return, yet 800–1,000 coal plants without carbon capture are planned. Human consumption is 30% larger than nature’s capacity to regenerate. Global ecosystem services are valued at $16–64 trillion, which far exceeds the cost of protecting them.

It is time for a U.S.–China Apollo-like 10-year goal and global R&D strategy to address climate change that might support electric cars, saltwater agriculture, carbon capture and reuse, solar power satellites (a Japanese national goal), animal protein without animals, maglev trains, urban systems ecology, and a global climate change collective intelligence to support better decisions and keep track of it all. These would be in addition to the usual suggestions for a carbon tax, cap and trade, reduced deforestation, industrial efficiencies, co-generation, conservation, recycling, and switching government subsidies from fossil fuels to renewable energy. The EU has shown that it is possible to continue economic growth while reducing GHG emissions. Scientists are studying how to create sunshades in space, add iron powder to the oceans to absorb CO2, towers to suck CO2 from the air, and reuse carbon at power plants (e.g., algae production, liquid fuels, plastics, and cement or aggregate). The nuclear industry is gaining momentum, although the risk of accidents, waste management, and terrorist usage are not sufficiently addressed.

Without a global strategy to address climate change, the environmental movement may turn on the fossil fuel industries. The legal foundations are being laid to sue for damages caused by greenhouse gases. Large reinsurance companies estimate the annual economic loss due to climate change could reach $300 billion per year within a decade. Coastal urbanization is increasing the numbers of people vulnerable to coastal flooding. Envir