



Photo: by Wang Yuanling

If the world stays on its present trajectory, the global average temperature by the end of the century could exceed 6 degree Celsius with devastating levels of sea level rise and all of the adverse consequences for water, agriculture, storms, droughts and other disasters.

Climate Change: The Clock Keeps Ticking

The emission powers have climate goals, but the question is whether any country can implement measures to achieve them

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Three reports between Sept. and Nov. 2011 documented a rapidly accelerating deterioration in the global climate system caused by the release of heat trapping gases from the intensive use of fossil fuels, land use change and industrial gas emissions. Fortunately, a fourth report suggests a means for mitigating these emissions in a manner that is aligned with a growing part of the Chinese economy.

In Nov. 2011, the Intergovernmental Panel on Climate Change released a special report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation.

This report concluded that extreme events like floods and prolonged droughts are already occurring as a result of human alteration of the climate system.

These changes are occurring because of additions of heat trapping gases to the atmosphere and to land use changes.

The observed damage from these altered climate events is often worsened by decisions to build or place communities in vulnerable locations.

Among the findings of current impacts were the following:

- “It is very likely that there has been an overall decrease in the number of cold days and nights and an overall increase in the number of warm days and nights on a global scale.” (95 percent confidence level)

- “There have been statistically significant trends in the number of heavy precipitation events in some regions. It is likely that more of these regions have experienced increases than decreases...” (66-100 percent confidence)

- “Economic losses from weather and climate-related disasters have increased, but with large spatial and inter-annual variability.”

- “It is likely that there has been an increase in extreme coastal high water related to increases in mean sea level.” (66-100 percent confidence)

- “Fatality rates and economic losses ... are greater in developing countries.”

- “Extreme events will have greater impact on sectors with closer links to climate such as water, agriculture and food

security, forestry, health and tourism.” Water is highly likely to be affected. (95-100 percent confidence)

In summary, the relatively small increase of global average temperatures of slightly less than 1 degree Celsius is already responsible for major increases in adverse weather-induced events.

In Sept. 2011, the Dutch Environmental Assessment Agency released a report entitled “Long Term Trends in CO₂ Emissions.” The report stated that carbon dioxide (CO₂) is responsible for about 60 percent of the increase in temperature from human activities.

After growing slowly but steadily since the end of the oil shocks (1980), emissions began to grow rapidly around 2002.

As the global economy slowed in the recession of 2008, emissions slowed and actually dropped in 2009 only to grow by over 5 percent in 2010.

This is the largest annual increase in history.

The good news from the report is that the group of industrial countries that are committed to lowering their emissions by the end of 2012 by a combined total of 5.2 percent under the Kyoto Protocol will meet that goal (even including the United States that has opted not to be bound by this agreement).

In 1990, the base year for measuring national emissions, 68 percent of emissions came from the developed countries and just 29 percent from developing countries (the remaining 3 percent was from international transport).

In 2010, 54 percent of emissions came from developing countries and 43 per-

cent came from developed countries. Total global emissions increased from 22.7 billion tons in 1990 to 33 billion tons in 2010, an increase of 45 percent. In other words, developing countries today emit more than developed countries did in 1990.

IEA Assessment Paints a Stark Picture

The top six total emitters today, China, United States, the European Union, India, Russian Federation and Japan accounted for 60 percent of global CO₂ emissions in 2010.

Without mitigation from this group of nations, the problem will become much worse as shown below.

China passed the United States as the top total emitter in 2008, but still lags in cumulative historical CO₂ emissions, and in CO₂ per capita.

However, China’s 2010 CO₂ emissions of 6.8 tons per capita is rapidly approaching that of the European Union at 8.1 tons per capita, and is now nearly half that of the United States. The International Energy Agency projects that China could exceed U.S. per capita emissions by as early as 2017.

Due to heavy reliance on coal, China’s emissions have doubled since 2003 and India’s have increased by 60 percent. The economy is growing rapidly, and while its energy and carbon intensity are falling, the CO₂ emissions per unit of GDP is still more than 2.5 times that of the United States and three times that of the European Union.

In May 2011, the International Energy Agency released an assessment that concluded that it would soon be impossible to restrain global temperatures below the 2 degree Celsius limit that was agreed to by governments in Cancun.

It concluded that if the world stays on its present trajectory, the global average temperature by the end of the century could exceed 6 degree Celsius with devastating levels of sea level rise and all of the adverse consequences for water, agriculture, storms, droughts and other disasters.

The announcement of the report by the IEA states the following:

“The IEA has estimated that 80 percent of projected emissions from the

It would soon be impossible to restrain temperatures below 2°C limit

power sector in 2020 are already locked in, as they will come from power plants that are currently in place or under construction today.”

“The IEA’s 2010 World Energy Outlook set out the 450 Scenario (2 degree Celsius), an energy pathway consistent with achieving this goal, based on the emissions targets countries have agreed to reach by 2020. For this pathway to be achieved, global energy-related emissions in 2020 must not be greater than 32 Gt. This means that over the next 10 years, emissions must rise less in total than they did between 2009 and 2010.”

“Our latest estimates are another wake-up call. ... The world has edged incredibly close to the level of emissions that should not be reached until 2020 if the 2 degree Celsius target is to be attained. Given the shrinking room to maneuver in 2020, unless bold and decisive decisions are made very soon, it will be extremely challenging to succeed in achieving this global goal agreed in Cancun.”

Renewables Will Light the Path Forward

This bleak assessment for addressing climate change does leave open an option to address the problem.

The Intergovernmental Panel on Climate Change published a Special Report on Renewable Energy Technologies and Climate Change Mitigation in May 2011.

The report examines the technical and economic potential for renewable energy.

It finds that no significant technical barriers to the adoption of sufficient renewable technologies by 2050 to slow the buildup of heat trapping gases in the atmosphere.

The Dutch report documents that renewable energy is growing extremely rapidly, but is still too small to offset the emissions from the much larger amounts of new coal and gas technology that is being introduced for electric power production and by the rapid growth in petroleum driven vehicles.

China has become the acknowledged leader in the production of renewable energy.

China has long held the overwhelming lead in installed solar hot water systems

No significant technical barriers to the adoption of renewable technologies

for buildings, and now produces 60 percent of solar PV panels.

In 2010, it doubled its installed wind capacity for the sixth year in a row, and leads the world in wind production and capacity.

The amazing acceleration in renewable technologies by China occurred because of a shift in policy with the introduction of the Renewable Energy Law that only came into effect in 2006 along with many complementary policies, especially China’s aggressive wind concessions.

China is also the largest manufacturer of refrigerators and air conditioners. It is building more power plants and more buildings than any other country each year, and has developed a high-speed rail industry.

China is the only economy in the world that has demonstrated a capacity for this type of accelerated industrial growth.

With its extensive manufacturing capacity, China could continue to forge alliances with private companies in the United States, Europe and Japan to transform not only its own economy, but help to build the carbon protective, low carbon energy systems for the world.

This would be a more comprehensive version of what the Chinese economy has done when it set out to supply refrigerators to its own citizens and ended up manufacturing them for the global economy. Climate change provides the opportunity for China to take a major international leadership role that matches its economic development goals with a truly sustainable future.

Of course, markets for cleaner energy technologies depend strongly on govern-

ment policies in multiple countries.

China’s ability to manufacture and sell solar PV at such large scale was enabled by the establishment of feed-in tariffs in Germany and Spain, and state-level renewable portfolio standards in the United States.

The various policies created favorable market conditions for renewable energy industry.

The Chinese government has already established policies to support a thriving wind power business domestically, and has recently enacted policies to support solar PV as well. Since China relies so heavily on coal, any significant shift in fuel supply to alternative energy will greatly reduce China’s own carbon dioxide emissions.

Therefore, every effort should be made for China to achieve the ambitious targets in its 12th Five-Year Plan. Although China has decided to experiment with some regional cap-and-trade regimes, it might also want to experiment with carbon taxation, and other policies that would create strong market signals to encourage development and use of low-carbon energy sources.

The time is late, and the planetary stakes are high. The Chinese government has already moved beyond arguments about who is responsible for climate change and who has obligations to address it, and has begun to confront climate change domestically by including a carbon intensity target in its 12th Five-Year Plan.

The target is a laudable first step, but is insufficient to avoid significantly more emissions and damaging climate change. China has already demonstrated significant leadership in support of these new alternative energy industries, and in committing itself to further reductions in carbon intensity.

The United States is beginning to suffer by comparison. Both countries now have climate goals.

However, the question now is whether either country can implement measures to achieve those goals, and act before climate change overwhelms all nations, ruins their economies and relegates billions of people to an unsustainable and miserable life. ♦