

# Joint Science Academies' Statement: Climate Change

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## Adaptation and the Transition to a Low-Carbon Society

Since 2005, the Academies of Science for the G8+5 countries have called on world leaders to limit the threat of climate change. We have advised prompt action to deal with the causes of climate change and cautioned that some climate impacts are inevitable.

However, progress in reducing global greenhouse gas emission has been slow.

In 2007, the Intergovernmental Panel on Climate Change (IPCC) reaffirmed that climate change is happening and that anthropogenic warming is influencing many physical and biological systems.

Average global temperatures increased by 0.74°C between 1906-2005 and a further increase of 0.2°C to 0.4°C in the next 20 years is expected. Further consequences are therefore inevitable, for example, from losses of polar ice and sea-level rise.

Key vulnerabilities include water resources, food supply, health, coastal settlements and some ecosystems (particularly arctic, tundra, alpine, and coral reef). The most sensitive regions are likely to include the Arctic, Africa, small islands and the densely populated Asian mega-deltas.

As the concentration of greenhouse gases increases, these impacts become more severe and spread both geographically and sectorally. To stabilise climate, emissions should eventually be limited to the net absorption capacity of the earth, which is less than half of current emissions. Immediate large-scale mitigation action is required. At the 2007 Heiligendamm Summit, G8 leaders agreed to seriously consider halving global emissions by 2050. We urge G8+5 leaders to make maximum efforts to carry this forward and commit to these emission reductions.

Mitigation policies are essential, but not sufficient. Adaptation is necessary if the worst impacts of climate change, now and in the future, are to be alleviated. Mitigation and adaptation can complement each other and if pursued together can significantly reduce the risks of climate-change impacts.

## Adaptation

Climate change is a pressing issue for today. Action on adaptation is needed now and failure to respond poses a significant risk. According to the IPCC:

- A global mean temperature change of only 2.0°C above 1990 levels will exacerbate existing impacts and trigger others, such as reduced water and food security.
- Increases of 2.0-4.0°C will result in widespread biodiversity loss, decreas-

ing global agricultural productivity and long-term commitment to several metres of sea-level rise due to ice-sheet loss.

- Increases above 4.0°C will lead to major increases in vulnerability, exceeding the capacity of many physical and human systems to adapt.

In April 2007, the UN Security Council addressed the threat that the aggregate impacts of climate change might cause, in particular the serious environmental, social and economic consequences and the implications for peace and security. All regions will be affected in the long term, but developing countries are likely to be affected most and their vulnerability will be exacerbated by pre-existing stresses.

Humans have been adapting to their environment throughout history. But the rate and scale of climate change means there is no time for complacency. A step-change in our response is needed, with action at global, national and local level. Local actors must be engaged in impact assessment and in identifying solutions. But global and national leadership is also required to manage the macro-scale effects that will accompany widespread efforts to adapt to climate change.

A strategic approach to adaptation must be based on the principle of sustainable development. As an immediate first step, governments can take measures to improve resilience to existing environmental stresses. Such measures will, in turn, reduce exposure to the threat posed by climate change. This involves governments recognising the role that ecosystems and the natural resource base play in meeting basic needs (water, food and shelter).





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This strategic approach can be strengthened with more targeted measures once detailed assessments of the impacts and key vulnerabilities have been carried out.

Basic research, technology development and transfer will play a major role in improving the ability of nations to adapt. Understanding the underlying economic, social and environmental causes of vulnerability will enable the development of appropriate policy solutions, and strengthen the ability of the market to respond to the impacts.

Governments and businesses can then develop adaptation solutions and avoid investment in technologies or infrastructure which fail to take climate change into account. This will also contribute to the achievement of other international priorities, including the Millennium Development Goals (MDGs).

### Low-Carbon Society

The development of a low-carbon society means not merely the replacement of energy sources with less carbon intensive ones, but energy conservation as well. Sustainable consumption requires fundamental changes in all sectors and levels of society, including energy-saving housing, low-carbon transportation and more efficient industrial processes.

A movement to a low-carbon society will provide the opportunity to mitigate and adapt. Mitigation cannot provide all the answers, but many impacts can be reduced, delayed or avoided by cutting emissions.

There is also an opportunity to promote research on approaches which may contribute towards maintaining a stable climate (including so-called geo-engineering technologies and reforestation), which

would complement our greenhouse gas-reduction strategies.

The G8+5 academies intend to organise a conference to discuss these technologies. The transition to a low-carbon society requires: setting standards; designing economic instruments and promoting energy efficiency across all sectors; encouraging changes in individual behaviour; strengthening technology transfer to enable leapfrogging to cleaner and more efficient technologies; and investing strongly in carbon-removing technologies and low-carbon energy resources: nuclear power, solar energy, hydroelectricity and other renewable energy sources. These points are also stressed in the InterAcademy Council report<sup>1</sup>.

Technologies should be developed and deployed for carbon capture, storage and sequestration (CCS), particularly for emissions from coal which will continue to be a primary energy source for the next 50 years for power and other industrial processes. G8+5 economies can take the lead globally to further develop CCS technologies. This will involve governments and industry working collaboratively to develop the financial and regulatory conditions needed to move CCS forward and international coordination in the development of demonstration plants.

Given the time-lags inherent in the global energy system, actions need to be taken now to reach the desired target by 2050. While the developed world should take the lead and encourage technology transfer and collaboration with developing world partners, it is also an issue where the developing and emerging economies can and must make a significant contribution.

Transition to a low-carbon society will also require reducing emissions caused by deforestation and degradation of ecosys-

tems, requiring improved agricultural efficiency and sustainable forestry.

### Conclusions

Responding to climate change requires both mitigation and adaptation to achieve a transition to a low-carbon society and our global sustainability objectives. We urge all nations, but particularly those participating in the 2008 G8 Summit in Hokkaido, Japan, to take the following actions:

- Call on G8+5 governments to agree, by 2009, a timetable, funding, and a coordinated plan for the construction of a significant number of CCS demonstration plants.
- Prepare for the challenges and risks posed by climate change by improving predictive and adaptive capacities at global, national and local level and supporting the developing world in carrying out vulnerability analyses and addressing their findings.
- Take appropriate economic and policy measures to accelerate transition to a low-carbon society and to encourage and effect changes in individual and national behaviour.
- Promote science and technology cooperation, innovation and leapfrogging, e.g., by transfer of some basic critical low carbon and adaptation technologies.
- Urge governments to support research on greenhouse gas-reduction technologies and climate-change impacts.

As national science academies, we commit to working with our governments to help implement these actions.

<sup>1</sup> "Lighting the Way - Toward a sustainable energy future", InterAcademy Council, October 2007