

Statement of the Joint Science Academies For the G8 Summit Germany, 2007

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Joint science academies' statement on growth and responsibility: sustainability, energy efficiency and climate protection

Joint science academies' statement on growth and responsibility: the promotion and protection of innovation

The Science Academies of the G8 countries, including the Science Council of Japan, and some relevant countries, announced their joint statements for the G8 Summit, Germany, 2007, as they have done annually since 2005

By gathering scientific opinions and insight, scientists in each country share these statements to help solve the problems that humanity faces today and recommend them to the leaders of the G8 and other countries.



Science Council of Japan
~Since 1949~



Joint science academies' statement on growth and responsibility: sustainability, energy efficiency and climate protection

Introduction

It is important that the 2007 G8 Summit is addressing the linked issues of energy security and climate change. These are defining issues of our time, and bring together the themes of growth and responsibility in a way that highlights our duties to future generations.

In 2005, the Academies issued a statement emphasising that climate change was occurring and could be attributed mostly to human activities, and calling for efforts to tackle both the causes of climate change and the inevitable consequences of past and unavoidable future emissions. Since then the IPCC has published the Working Group 1 part of the Summary for Policymakers of its fourth assessment report, and further reports are expected later this year from IPCC. Recent research strongly reinforces our previous conclusions. It is unequivocal that the climate is changing, and it is very likely that this is predominantly caused by the increasing human interference with the atmosphere. These changes will transform the environmental conditions on Earth unless counter-measures are taken.

Our present energy course is not sustainable. World population is forecast to reach 9 billion by 2050, with the most rapid growth in the poorest countries. Escalating pressures on land will accelerate deforestation. Major increases in demand for energy are inevitable as economies around the world accelerate and peoples justifiably seek to improve their living standards. Responding to this demand while minimising further climate change will need all the determination and ingenuity we can muster.

The problem is not yet insoluble, but becomes more difficult with each passing day. A goal of confining global warming to an average of 2 centigrade degrees above pre-industrial levels would be very challenging, and even this amount of warming would be likely to have some severe impacts.

Energy, development and climate

Many of the world's poorest people, who lack the resources to respond to the impacts of climate change, are likely to suffer the most. The dilemma, however, is that climate protection goals appear to conflict with prosperity targets within the traditional development paradigm. Access to energy resources and affordability of energy services are key factors for the wealth of nations and the well being of their people.

Last year our academies addressed a further important aspect of the challenges related to energy: the implications for security. We noted then that a key strategic priority will be a diversification of energy sources, as a way to address the wide variety of circumstances and resources, and to decrease vulnerabilities to a wide range of possible disruptions in supply.

Major investments and successful technological and institutional innovation will be needed to achieve better energy efficiency, low- or zero-carbon energy sources and carbon-removing schemes. A clear area for increased investment is energy conservation and efficiency. This has immediate and long-term benefits for local and regional health and environment, security of energy services and climate change, while having potential for local economic development and build-up of local technological capabilities.

Against this background it will be necessary to develop

and deploy new sources and systems for energy supply, including clean use of coal, carbon capture and storage, unconventional fossil fuel resources, advanced nuclear systems, advanced renewable energy systems (including solar, wind, biomass and geothermal energy), smart grids and energy storage technologies. Research focused on the energy field must be enlarged significantly. The InterAcademy Council (IAC) is preparing a report on these challenges, which will be available later this year.

Promoting efficiency: a key element

It is urgent to increase efficiency in the global production and use of energy. Energy efficiency has been a major field for the G8 countries since the 2003 Evian Summit.

Concentrating on energy efficiency is an effective contribution towards meeting the global energy challenges.

The implementation of measures to increase energy efficiency will depend to a decisive extent on financing options and technology knowledge. A sound financial and technological framework and improved global investment conditions will therefore be vital.

The common strategic priorities should concentrate on the following points:

Sustainable buildings Around 27 % of final energy is consumed by private households, and much could be done with existing technologies to improve the energy performance of buildings. The energy demands of buildings can be covered to a significant extent by using renewable energies.

Efficient transport and alternative fuels There are around 600 million motor vehicles across the globe. This figure may double by 2020. Here in particular lies a large package of possible measures, like innovative engine concepts with energy efficiency standards, alternative fuels and integrated transport systems.

Modern power technology Fossil fuels will continue to dominate electricity production over the next two decades. The best coal-fired power stations now achieve efficiencies substantially better than the average. Modernisation of old power plants could help to save energy and to reduce carbone missions.

Electrical appliances are proliferating rapidly. New appliances on the market should be brought in line with the state of the art.

Energy consumption is strongly influenced by human behaviour. It is important to create the conditions and opportunities for energy consumers to use energy more efficiently.

Research and innovation

Increasing energy efficiency is a first crucial step towards solving the climate-energy problem. An entire portfolio of approaches will be needed, especially the substitution of fossil fuels by renewable energy sources, clean coal technologies, carbon capture and storage and advanced exploitation of nuclear fission and, in the longer term, fusion. This portfolio can be developed only through aggressive investment in research, development and innovation, with the efforts ranging from basic science over strategic analyses to practical applications.

Key research and innovation issues include: overcoming the intermittency problem for renewables, converting biomass (eg lignocellulose) to transport fuels, and coming to grips with the challenges of safety, waste, and on-proliferation in the nuclear energy domain. A whole-systems approach to energy security needs to be pursued.

Fundamental research is also needed on the climate system, climate impacts, and vulnerability at all scales in order to enhance the adaptive capacities of societies. It is equally vital to promote research on behavioural and other social issues that are central to implementing technological and institutional solutions

The G8+5 countries should develop national road maps for innovation along with well-defined research agendas. There should be an intense international dialogue about these road maps, agendas and best practices.

Conclusions

We call on all countries of the world to cooperate in identifying common strategic objectives for sustainable, efficient and climate friendly energy systems, and in implementing actions toward them.

G8 countries bear a special responsibility for the current high level of energy consumption and the associated climate change. Newly industrialized countries will share

this responsibility in the future.

We call on world leaders, especially those meeting at the G8 Summit in June 2007, to:

- Set standards and promote economic instruments for efficiency, and commit to promoting energy efficiency for buildings, devices, motors, transportation systems and in the energy sector itself.
- Promote understanding of climate and energy issues and encourage necessary behavioural changes within our societies.
- Define and implement measures to reduce global deforestation.
- Strengthen economic and technological exchange with developing countries, in order to leapfrog to cleaner and more efficient modern technologies.
- Invest strongly in science and technology related to energy efficiency, zero-carbon energy resources and carbon-removing technologies.

<http://www.scj.go.jp/ja/info/kohyo/pdf/kohyo-20-s4.pdf>



Joint science academies' statement on growth and responsibility: the promotion and protection of innovation

Promotion

Innovation is the engine that drives economies. Countries support innovation to ensure dynamic economic advancement and prosperity, to gain competitive advantage internationally, and to improve the quality of life of their citizens and those of other nations. The latter is fostered through international collaboration, especially in research and development.

At the very least, global collaboration requires greater promotion and funding, in priority areas such as sustainable energy, climate change adaptation and mitigation, natural hazards, biodiversity, water, and infectious diseases. It is important for governments to invest strongly in a spectrum of basic research, since the greatest benefits often arise from investigations in areas that are not the subject of international focus at a given time.

Innovation faces a fundamental dilemma: the innovator bears the cost, but is not guaranteed the full returns of his or her efforts. Innovators facing immediate imitation are less likely to engage in costly efforts. In addition to their vital responsibilities for education and training, governments have therefore pursued a number of approaches to foster innovation, including the establishment of intellectual property rights such as patents and copyrights, the financial support of R&D and innovation through public funding or subsidies, and the productive use of public procurement. It is critical to establish an appropriate balance between strong government investment and removal of barriers to research and licensing.

The development of long-term international research agendas in priority areas can markedly increase the rate and number of discoveries and inventions, and thus stimulate innovation and commercialization. Such development must include stakeholders from industry, academia and government.

Nations need to activate a culture of entrepreneurship and innovation, and ensure that policies exist to support the translation of such entrepreneurship and innovation into tangible outcomes for societal benefit.

Increasingly, the developing world is focusing on

innovation as a route to growth and sustainability. International agencies and the wider donor community should support and encourage nations in the developing world to build their own systems of innovation, including instruments to fund research and development nationally. In particular, investments, including infrastructure, should encourage bringing promising innovations to market (including encouraging venture capital and microfinance, building local manufacturing ability and providing services). Relevant traditional knowledge has a role to play in nurturing discovery and innovation in developing countries.

The developed world should facilitate, where appropriate, the transfer of knowledge and innovative technologies to the developing world, working in partnership so that such technologies can be applied and adapted to local requirements. Such transfers will enable the developing world to leapfrog the conventional route to development. At the same time, the developing world needs to ensure that local infrastructure encourages such transfer of technology, with appropriate tariff, investment and protection regimes.

It is crucial for developing and emerging economies to have people who are skilled at solving complex problems, thus enabling their nations to create and exploit research, development and innovation. The education and training of science, engineering, technology and medical graduates, free of the bias of gender, are essential for success.

Protection

Innovation needs protection, but care should be taken that protective measures do not become impediments to innovation (at all levels, from corporate to individual). Access to knowledge is critical. Infringing intellectual property rights undermines the long-term progress of innovation. G8 countries should aim to ensure that national and international regimes to protect intellectual property also facilitate and promote access to knowledge.

In order to ensure that the patent system provides the necessary incentives for continued scientific and technological progress, patents need to reveal clearly the

key criteria for patentability: utility, novelty, and non-obviousness. G8 countries should provide for harmonised standards to facilitate early dissemination of knowledge by an adequate "grace period". Such provision protects the inventor from adverse effects of his or her own publications before the filing date.

In order to encourage scientific research, patent laws should also include a properly specified research exemption and permit the use of patented technology for non-commercial research purposes, including improving and further developing the patented subject matter.

A great deal of time and resources are still expended on preparing and filing patents in multiple jurisdictions. Global efforts have been made to harmonise some requirements and share information through the Substantive Patent Law Treaty (SPLT), which is encountering problems. Since the main differences and sharing requirements arise between the jurisdictions of G8 nations, these most industrialised countries of the world could forge an interim agreement among themselves. Such a system should involve best practices and high quality levels in prior art search and examination. Moreover, in the case of patents, quality of the rights issued and thus legal certainty is in urgent need of substantial improvement.

If the application of a newly patented technology from the industrialized nations is needed mainly in the South, an adequate return on investment by the industry in the North is often unlikely under normal conditions. The G8 governments should consider subsidizing development of such patented technology, and then its commercialization in the South. This could be achieved by subsidizing the technology development through a programme tied to the front end of the patent process (e.g. through subsidies, procurement, length of patent term, or by G8 nations paying a fair price for the licence for a developed product on behalf of a country in the South). In return, governments of countries of the South would undertake to enforce the patents, police local manufacturing under licence, etc. This strategy

could be beneficial for the commercialization of products needed in the South that might not otherwise be available.

Conclusions

Innovation promotion

We recommend that the leaders of G8 governments

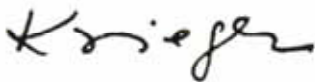
- Encourage the development of long-term international research agendas to promote innovation in priority areas.
- Facilitate the transfer of knowledge and innovation to the commercial realm, especially between universities and industry, and establish tools to activate entrepreneurship.
- Work with developing countries to build systems of science, technology and innovation for economic and social development, and to promote the education and training of their future leaders particularly in science, engineering, technology, and medicine.
- Promote global knowledge policies that deal with generation, transmission, use and protection, rather than focusing on just the latter.

Innovation protection

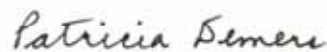
We recommend that the leaders of G8 governments

- Encourage global efforts to simplify and enforce intellectual property while making sure that a proper balance is maintained between thoroughly examined formal intellectual property rights and free access to knowledge and information.
- Develop and implement policies to remove barriers to innovation, in addition to the provision of a fertile infrastructure to foster it.
- Establish bold initiatives by global financial institutions to facilitate and protect innovation in the developing world.
- Urge and assist the developing world to have local infrastructure, laws and regulations to catalyse and protect local innovation, thus providing a stimulating environment for the transfer of technology.

<http://www.scj.go.jp/ja/info/kohyo/pdf/kohyo-20-s5.pdf>



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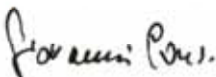
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