CHATHAM HOUSE

briefing paper

# The International Climate Change Agenda

## Opportunities for the G8

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### Summary points


- The countries of the G8 have a key role in establishing a global deal to reduce greenhouse gas emissions, not only because they produce 40% of global emissions, but because they can help facilitate the diffusion of the technologies necessary to stabilize the climate.
- Energy efficiency holds the key to both energy and climate security. Currently available technologies and practices will enable short-term and long-term targets to be met. There is a need for international cooperation that leads to increased efficiency standards for products and structures, focused finances and greater human resources and knowledge.
- Sector initiatives that help drive emissions reductions in heavy energy-consuming sectors will play an important role.
- Reductions in energy consumption and greenhouse gas emissions can be significantly increased through greater technological innovation and diffusion. This can be enhanced through greater research cooperation, increased targeted finance and deployment agreements.

## Introduction

Climate change and energy security have been priorities of the recent G8 presidencies. The Japanese presidency of 2008 has also set climate change as one of its three priorities. This was reflected in the speech of Prime Minister Yasuo Fukuda in Davos in late January outlining the Japanese presidency's focus on three key elements of climate change:

- The need to address and to work towards the establishment of a post-2012 framework (after the end of the first commitment period of the UN's Framework Convention on Climate Change – UNFCCC) with the participation of all major emitters, as well as the setting of fair and equitable emissions targets.
- The introduction of measures to improve energy efficiency.
- Assistance to developing countries to achieve both emissions reductions and economic growth, and contributing to climate stability through technological cooperation.

Chatham House hosted a roundtable in March 2008 to discuss opportunities for climate change as a contribution to the G8 agenda. Participants included European and Japanese government officials, representatives from industry and the finance sector, non-governmental organizations as well as academics and independent experts. The workshop, held under the Chatham House rule, focused on these three main elements. The objective was to enable an open discussion on realistic expectations and opportunities for the G8 on climate change in the run-up to the 15th Conference of the Parties (COP) to the UNFCCC in Copenhagen at the end of 2009, and to help create common understanding and share ideas on how to address key issues.

This briefing paper focuses on two fruitful approaches in the G8's response to the challenges of climate change: improving energy efficiency and encouraging the transfer of clean technology. It is informed by the workshop discussions and draws upon information provided, but the views expressed are those of the author alone.

## The importance of the G8

The G8 countries are currently responsible for 45% of the world's energy consumption and 40% of its $CO_2$ emissions. For this reason they have an even greater responsibility to help deliver a global post-2012 climate deal. This will require them to demonstrate the possibilities of large-scale reductions in emissions, while making available technological and financial assistance to help others, in particular developing countries, in setting and meeting their own objectives.

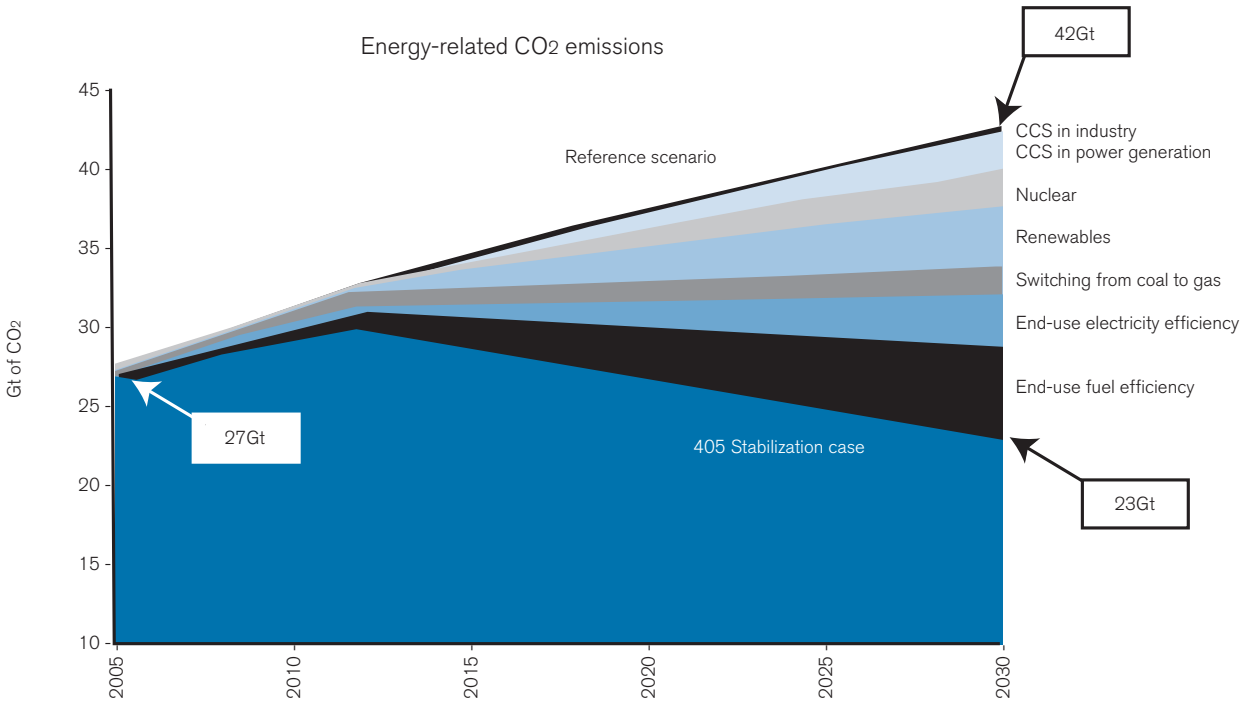
The G8 summit in Hokkaido in July, along with the meetings of the energy and environment ministers in the preceding months, could play an important role in the further development of ideas and commitments in line with the Bali action plan.[1] As early as the Heiligendamm Summit Declaration (June 2007), the G8 stated: '*We will consider seriously the decisions made by the European Union, Canada and Japan which include at least a halving of global emissions by 2050.*'[2] Furthermore, one of the key pillars of the Bali road map and any subsequent post-2012 global deal is seen to be G8 members' financing and facilitation of programmes to enable the introduction and scaling up of low-carbon energy technologies and measures in other parts of the world.

A month before the G8 summit the Japanese Prime Minister, Yasuo Fukuda, set out his energy security and climate change vision. In this he stated that Japan would set a long-term goal of reducing 60–80% of its current level of emissions to enable a halving of global

1 UNFCCC, Bali Action Plan, Decision CP-13, December 2007.

2 G8, Chair Summary of the Heiligendamm Summit, 2007; http://www.g-8.de/Content/EN/Artikel/__g8-summit/anlagen/chairs-summary,templateId=raw,property=publicationFile.pdf/chairs-summary.

Figure 1: IEA's forecast for the role of different technologies in achieving a stable climate




Source: 'Long-Term Oil Supply Outlook: Constraints on Increasing Production', Nobuo Tanaka, Executive Director, International Energy Agency, at the International Oil and Money 2007 Conference, London, 30 October 2007.

emissions by 2050. This will require the peaking of emissions within the next 10–20 years.

Prime Minister Fukuda further announced that in 2009 Japan would set a target of reducing emissions by 14% from 2005 levels by 2020. To achieve this target, energy-inefficient technologies such as incandescent light bulbs would be phased out, while new requirements would be set on building to meet higher energy efficiency standards, and 70% of new buildings would need to use solar energy. He also proposed that Japan would establish an emission trading scheme to create a market mechanism to facilitate the reduction of $CO_2$ emissions.

> 'It goes without saying that aiming at the most efficient use of energy is now an obligation upon humanity … the whole world must make efforts to maximize the improvement of energy efficiency'
>
> Prime Minister Fukuda[3]

## Energy efficiency

More than 1.6 billion people live without access to electricity and 2.4 billion people lack modern energy services for cooking and heating. Millions more are connected to the grid but experience poor service and frequent power outages. Access to basic, clean energy

3 Speech by Prime Minister Yasuo Fukuda to the World Economic Forum, January 2008.

services is essential for sustainable development and poverty eradication, and provides major benefits in the areas of health, literacy and fairer distribution of wealth.

The anticipated access to modern energy services in the coming decades for a greater proportion of the world's population will result in higher energy demand in developing countries: forecasts suggest that until 2030 demand growth is set to increase by around 2.8% per year, with China expected to experience 3.2% per annum growth, India 3.6% and Africa 1.8%. Furthermore, despite their current high per capita energy consumption and relatively stable populations, countries in the OECD are also expected to experience an increase in energy demand of around 0.8% per year until 2030. Overall, global energy demand is expected to increase by over 50% by 2030, requiring an additional 6,000 million tonnes of oil equivalent (mtoe). The vast majority (84%) of this energy is expected to be provided by fossil fuels, resulting in emissions totalling nearly 42,000 Mt of $CO_2$ per year in 2030, an additional 15,000 Mt compared with 2005. This is in dramatic contrast to the requirements of the Intergovernmental Panel on Climate Change (IPCC) that global greenhouse gas (GHG) emissions need to peak in the next 10 to 15 years and to fall swiftly after that.

> 'These measures are not just a "free lunch", but one you are paid to eat'

The International Energy Agency (IEA) has identified a pathway to reduced emissions in line with the IPCC's recommendation (the 450 stabilization scenario).[4] Figure 1 indicates the different roles that currently-known technologies could play. Importantly, this suggests that nearly 50% of the necessary reductions in $CO_2$ emissions will come as a result of improvements in energy efficiency.

Furthermore, energy efficiency comes at little, no or sometimes even negative cost. Demand-side energy efficiency measures have rapid payback times and are quick to introduce. For example, improving the efficiency of residential lighting can be achieved almost instantaneously and has a negative carbon abatement cost of €90 per tonne of $CO_2$ – since the user's energy bill is so significantly reduced – while insulation can have a negative $CO_2$ cost of over €150 per tonne.[5] These measures are not just a 'free lunch', but one you are paid to eat.

Members of the G8 have introduced wide-ranging objectives to increase their energy efficiency. For example, member states in the EU have each agreed to an action plan on energy efficiency that would result in an increase in efficiency of 20% by 2020 – an achievement that could save €100 billion a year. However, much greater economic savings are likely as this estimate was made in 2006 when the price of oil and gas was less than half that of today.

Furthermore, it is not just countries in the G8 that have recognized the importance of energy efficiency. Globally, China has introduced one of the most ambitious targets: between 2005 and 2010 it is striving to decrease its energy intensity by 20%, with a further reduction of 20% planned by 2020.

## Barriers to energy efficiency

Despite recognition that energy efficiency must play the major role in the next decades in meeting security of supply objectives, that it is quick to introduce and is the cheapest carbon abatement strategy, and that currently available technology provides the majority of the required savings, there is little confidence that the energy-saving targets will be achieved or even that energy consumption will fall. This is because, historically, insufficient priority has been given to energy efficiency for a number of reasons: because it was deemed too complicated to deliver on (as it requires action across the whole of society and not just in the

4 The 450 scenario is based on an objective to stop the mean temperatures rising 2 degrees above pre-industrial levels and therefore the atmospheric concentration of $CO_2$ should not exceed 450 ppm.

5 'An International Framework Agreement on Energy Efficiency: Towards Global Market Transformation', presentation by Randall Bowie at Chatham House, citing Vattenfall, March 2008.

energy sector); because of a belief that the market will deliver the necessary savings; or because of scepticism that lower energy consumption in one area – and therefore falling energy bills – will only result in greater energy consumption in other areas.

> 'Overall there has been a failure to regulate, and insufficient priority has been placed on policy measures and implementation'

Specific problems that have been identified as hindering capture of the efficiency potential include:

- Split incentives as the capital acquisitions are separated from the economic benefits (for example in rented accommodation where the landlord pays for retrofitting while the tenant pays the energy bills);
- Lack of global energy efficiency standards and unrestricted import of low-efficiency goods;
- Inadequate financing schemes for the specific requirements of energy efficiency projects (e.g. greater experience is needed with regard to the establishment of Energy Service Companies (ESCOs); micro financing schemes; international schemes);
- Insufficient information and expertise.

Overall there has been a failure to regulate, and insufficient priority has been placed on policy measures and implementation.

## New opportunities for energy efficiency

Energy security and climate change policies have now created additional incentives for energy efficiency at the national and international level, reflected in new proposals for initiatives and targets.

The Japanese government launched its 'Cool Earth 50' initiative in 2007, with the objective of reducing GHG emissions to 50% below current levels by 2050. The initiative is based on three principles:

1. All major emitters must participate.
2. The framework must be flexible and diverse (common but differentiated responsibilities and respective capabilities).
3. The framework must achieve compatibility between environmental protection and economic growth.

The initiative has a focus on the sectoral approach that would encourage cooperation in energy-intensive industries, in particular on improving their efficiency levels. This approach is gaining attention from a number of countries and regions, including the US, EU and China and within the framework of international debates at the UNFCCC and Major Economies Meeting (MEM). These discussions could enable a number of steps to be undertaken including:

- Identifying sector-specific best technologies and practices;
- Contributing to emission intensity ($CO_2$/GDP) improvements;
- Transferring these technologies and providing support from developed to developing countries;
- Promoting cooperation among developed countries and then improving national emissions intensity.

In other forums energy efficiency is rising up the political agenda. At the 2007 Ministerial meeting of the Asia-Pacific Economic Cooperation (APEC) a voluntary regional target was set which aims to improve energy efficiency by at least 25% by 2030, compared with 2005 levels. However, in his speech at Davos, the Japanese Prime Minister said he might propose a new global target of a 30% improvement in energy efficiency by 2020. Whether a global binding target for efficiency will be adopted in 2008 has still to be determined. At the meeting of Energy Ministers from the G8 plus China, India and the Republic of Korea in Aomori in June 2008, a declaration was made on an International Partnership for Energy Efficiency Cooperation (IPEEC). This recognized that encouraging energy saving and

improving energy efficiency is one of the quickest, greenest and most cost-effective ways to address energy security, climate change and efforts to ensure economic growth. As such the scope of the IPEEC is to support ongoing work to promote energy efficiency, to exchange information about sectorial and cross-sectional measures that could significantly improve energy efficiency, including the development of public-private partnerships, to enable joint R&D and to facilitate the dissemination of energy-related products and services. It is envisaged that the meetings of the partnership will be of a 'high-level' nature, in principle at least once a year and with an annual public report of activities. The joint statement from the Ministerial meeting also called on interested governments to join the IPEEC. The Ministers pledged to 'ensure stronger international cooperation, including through financial mechanisms, to promote development, commercialization, and deployment of lower carbon and energy-efficient technologies in developing countries so as to reduce the cost differential between current and lower carbon and more efficient technologies'. Such a partnership agreement could become a key forum for dialogue on energy efficiency and a vehicle for the introduction of greater international collaboration. These could lead to the introduction of an International Framework Agreement on Energy Efficiency with specific energy efficiency standards.

## Role for new energy supply technology

The coming decades are expected to see unprecedented investment in new energy infrastructure, with a requirement for up to $20 trillion by 2030. Roughly half of this will be in developing countries, where it will be required to meet the anticipated increase in demand, while in the OECD countries, particularly in North America and Western Europe, much of the investment is needed in the power sector to replaced antiquated generating facilities. This global need for new investment potentially offers important synergies and challenges for the energy sector as it strives to meet climate change objectives. Although a rigorous energy efficiency programme will reduce and change the shape of investment patterns, increased costs currently associated with some low-carbon energy generation may balance the overall investment costs.

The fundamental role that the introduction of new technology will play in meeting future emissions and energy demand reductions is recognized in the Bali Action Plan, which calls for:

- Effective mechanisms for the removal of barriers for the provision of finance and other incentives for scaling up the development and transfer of technologies to developing countries;
- Ways to accelerate the deployment, diffusion and transfer of environmentally friendly technologies;
- Cooperation on research and development (R&D) of current and innovative technologies;
- Effective mechanisms for technological cooperation in specific sectors.

The emphasis on technologies is particularly important in the context of a truly all-engaging global deal, as technology transfer and cooperation are especially important for some developing countries. This will require establishing an enabling environment at all levels – globally, regionally, nationally and locally – and for all phases of technological advancement: development, deployment, commercialization and diffusion (including technology transfer). Figure 2 illustrates the different stages of advancement for different technologies and highlights the individual approaches needed for each technology.

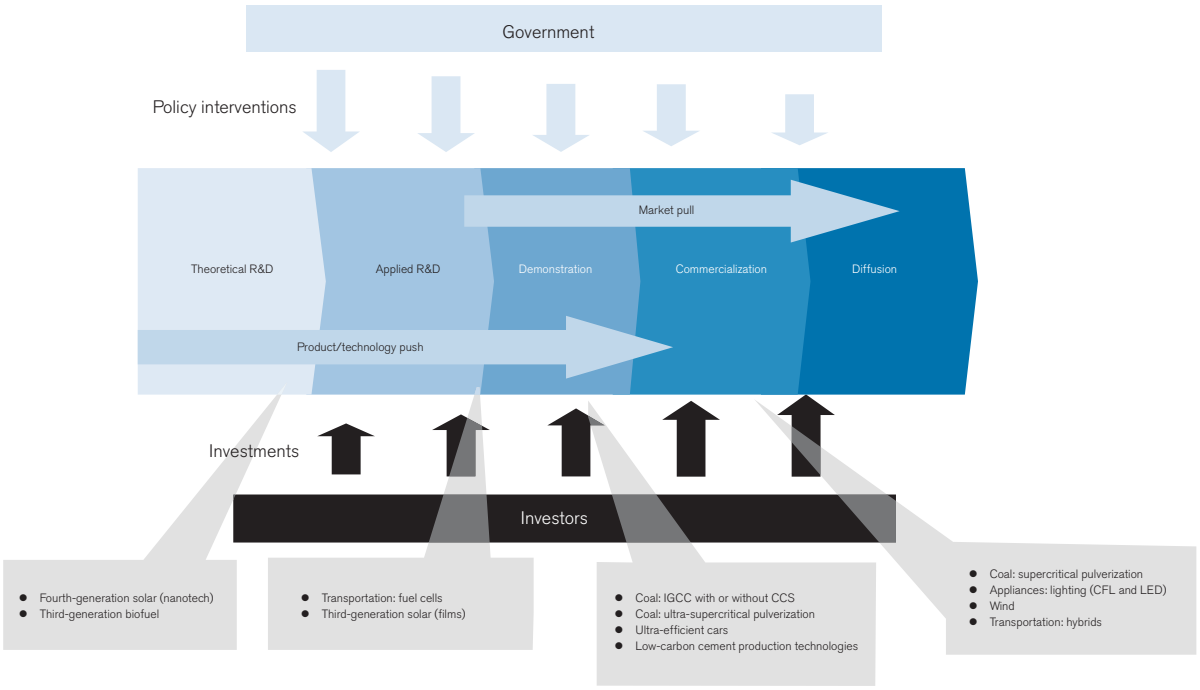
## Barriers to scaling up new technologies

The barriers vary at each stage of the development pathway, for each technology and in different locations. The examples below demonstrate the difficulties and opportunities associated with bringing new technologies to market.

### Research and Development

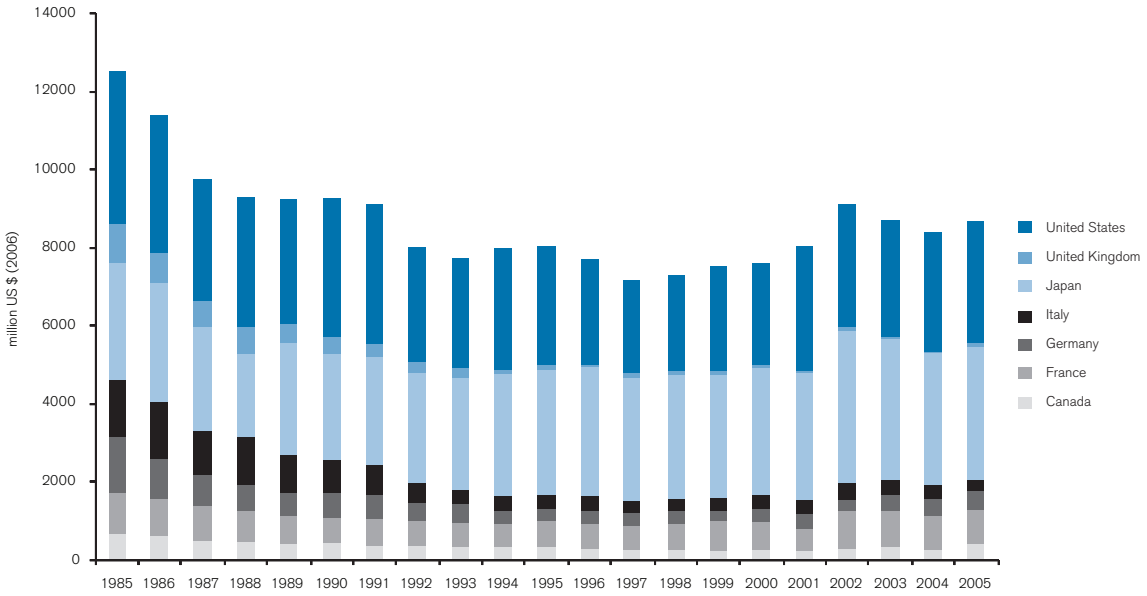
State R&D has significantly decreased in G7 countries for most energy technologies since the mid-1980s, as Figure 3 shows. Furthermore, there is a strong bias towards certain technologies. In particular, nuclear power (both fission and fusion) has received over half of all state R&D budgets from the G7 countries over the

## Figure 2: Technology development pathway




Source: Chatham House/E3G, *Changing Climates: Interdependencies on Energy and Climate Security for China and Europe* (Chatham House, 2007) Figure 3.1, based on Stern Review.

## Figure 3: G7 Energy R&D budgets




Source: IEA 2008: International Energy Agency database of research and development, accessed May 2008, http://www.iea.org/Textbase/stats/rd.asp.

last two decades, more than five times the combined energy efficiency budgets.

### Demonstration

There has often been a lack of funding for the additional costs associated with demonstration facilities. For example, in China the failure to introduce Integrated Gasification Combined Cycle (IGCC) coal plants on a widespread basis was due to the high costs associated with the first units, attributed to the economic consequences of the monopolization of the technology by foreign firms.[6] Likewise there have been increasing calls for a clear financial assistance framework to enable the commercial and economic viability of carbon capture and storage facilities in Europe to be tested.

In some regions and for some technologies, financial packages have been made available. The US Energy Policy Act of 2005 provided financial assistance for the construction of the first six to eight nuclear reactors in three main ways: through a production tax credit, provision of federal loan guarantees and risk insurance against regulatory delays. It has yet to be seen whether this package is sufficient either to encourage the actual construction of new reactors or to stimulate the market sufficiently for a new construction programme to begin.

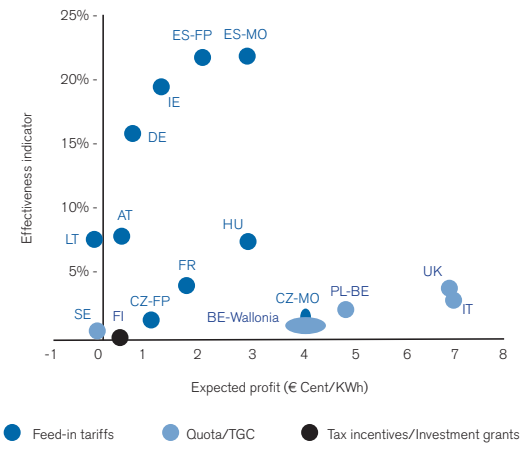
### Commercialization

To compete with established technologies, infant technologies often initially need ongoing regulatory or financial support. Appropriate schemes have been implemented in recent years to enable the rapid introduction of renewable energy, in particular in Germany and other European countries, while in neighbouring countries different support schemes have been introduced that have failed to stimulate the market sufficiently, such as in Italy and the UK. The trends for the onshore wind sector in the EU can be seen in figure 4.

### Diffusion

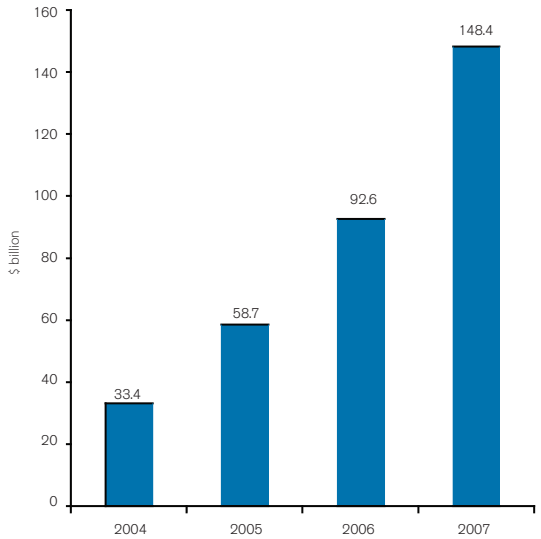
There are a number of barriers that will halt or delay the wider dispersal of new energy technologies and in particular those that relate to technology transfer. These include:

Figure 4: Effectiveness of national support policies for wind power in Europe




Source: IEA 2008: International Energy Agency database of research and development, accessed May 2008, http://www.iea.org/Textbase/stats/rd.asp.

Figure 5: Growth of global clean energy market




Source: GWEC, Wind Energy Market Development, Presentation by Steve Sawyer, General Secretary of the Global Wind Energy Association, Chatham House, March 2008.

6 'Obstacles and Way Out of Technology Transfer, Cases in Energy Area', Presentation by Professor Qiang Yao, Tsinghua University, at the Forum on Climate Change and Science and Technological Innovation, Beijing, 24 April 2008.

- *Transfer vs Licensing*: Technology developers have a tendency to favour the transfer of their most recent designs rather than allow manufacture under licence, as this both maximizes financial returns and increases construction quality assurances. However, the licensing of new technologies will increase the rate of diffusion as it tends to decrease prices and increase the number of units being produced.
- *Intellectual property rights*: Firms may be reluctant to license their technology for fear of losing control over them, owing to lack of enforcement of the intellectual property (IP) regime. This can be overcome with confidence-building measures in the IP regime, greater use of joint-development regimes, or even compulsory licensing mechanisms.
- *Financial mechanisms*: The scale of the new investment requirements will need contributions from both the public and the private sector. Greater private-sector involvement requires confidence that the policy framework for low-carbon technology is 'long, loud and legal'.[7]
- *Military applications*: The dual use of a number of technologies and materials restricts their international sale (for example some gas turbines or nuclear fuel).

## New opportunities

Previously insurmountable political barriers may be overcome once awareness spreads of the importance of the global use of best available technology. However, relying on political will alone will not deliver the scale of changes necessary. The private sector is already rapidly scaling up its investment in clean energy solutions. Figure 5 shows the growth in investment in clean energy infrastructure over the last few years. As a result, around 20% of all energy investments are now in this sector.

As the market for low-carbon and sustainable energy options grows, so it is likely to lead to a greater number of market actors and systems. The growing carbon market will give further stability to these technologies and investors; it has already demonstrated its ability to play an important role in the development of specific technologies, for example wind power in China.

The Japanese presidency has also recognized the important role that technology will play and has pledged $10 billion in order to assist measures to be taken in developing countries. Multilateral action is also clearly required and attempts are being made to address this through the establishment of a multilateral fund. Japan has already pledged $1.2 billion, with other countries, such as the UK and US, also offering financial support. The Japanese government intends to make use of the G8 summit process to call for a greater number of countries to contribute. In April 2008 the World Bank published a proposal for a Clean Technology Fund, the aims of which will be to:

a) provide positive incentives for scaled-up action and transformational change and for solutions to the climate change challenge in developing countries;
b) promote international cooperation on climate change supportive of progress towards a post-2012 climate change agreement;
c) provide experience and lessons in responding to the challenge of climate change through learning-by-doing;
d) utilize the skills and capabilities of the international financial institutions;
e) complement other multilateral financial mechanisms, as well as bilateral financing, and seek co-financing with them as much as possible; and
f) provide for transparency and openness in its governance.

## Recommendations for the G8

Already the majority of G8 members have made commitments to significantly reduce their GHG emissions. The Heiligendamm declaration stated that they would 'consider seriously the decisions made by the

7 'Financial Sector: Statement on Renewable Energy', submitted by Kirsty Hamilton and Virginia Sonntag O'Brien, members of the International Advisory Group to the Bonn International Conference on Renewable Energies, June 2004.

European Union, Canada and Japan which include at least a halving of global emissions by 2050'. Since then the UNFCCC has adopted the Bali Action Plan to establish the framework for the post-2012 global deal. It is therefore important that the momentum created in Bali is carried forward, while recognizing the impact of the forthcoming presidential election in the United States.

However, concrete action is still possible in a number of key areas, in particular the establishment of specific national and international action on energy efficiency and on technological development and transfer.

Increasing global energy prices highlight both the advantages and the opportunities for energy efficiency. However, the market alone will not capture all the efficiency gains that are possible and necessary; additional measures must therefore be taken. The establishment of an International Partnership for Cooperation on Energy Efficiency could play an important role in the establishment of a shared vision, increasing the availability of vital capacity and creating new mechanisms to support energy efficiency. However, experience shows that clear policy signals, greater enforcement and global standards can also assist in meeting energy efficiency objectives. A common objective set by G8 countries would assist in the implementation of all of these measures. The suggested target of improving energy efficiency by 30% by 2020 is an achievable and valuable proposal.

The use of low-carbon and sustainable energy technologies in developed and developing countries must be given a priority. To speed up their introduction a multinational fund should be established, particularly targeting the diffusion of technologies and practices in developing countries. This fund must enable both supply- and demand-side lower-carbon activities to be introduced in all areas of energy use, including electricity, heating and cooling, and transport. While it is clear that new technologies need to be developed and deployed, significant emissions savings can be made by both improving the operation of existing equipment and upgrading and retrofitting existing facilities In the short term these operational improvements will play a fundamentally important role in enabling emissions reductions targets to be met.

## Energy, Environment and Development Programme

The Energy, Environment and Development Programme (EEDP) is the largest of the research programmes within Chatham House, one of the world's leading independent institutes for the analysis of international issues.

EEDP seeks to advance the international debate on energy, environment and development policy and to influence and enable decision-makers – governments, NGOs and business – to make well-informed decisions that contribute to achieving sustainable development. Independent of any actor or ideology, it does this by carrying out innovative research on major policy challenges, bringing together diverse perspectives and constituencies, and injecting new ideas into the international arena.

In order to meet the strategic challenges of the 21st century, EEDP's work will continue to offer cutting-edge analytical research and forums for discussion, focusing on three strategic priorities:

(1) Promoting climate security: This stream focuses on providing innovative analysis on policy designs and other key building blocks that will help facilitate the transition to a low-carbon future. Creative dialogues will be convened to engage major actors (including Japan, the US, the EU, China and India), strengthen bilateral engagement (such as between the EU and China and between the US and China) and to build strategic alliances.

(2) Enabling energy security: The work of EEDP in this area has traditionally focused on the perspective of producers of energy products including oil, gas and electricity, highlighting the drivers and interests of exporters as well as associated governance and developmental challenges. The programme has established an international reputation for its analysis on the changing pattern of global energy trade and investment and for facilitating much-needed producer-consumer dialogue. Emphasis will be placed on the global dimensions of energy-related issues, drawing on national lessons and analysis.

(3) Strengthening sustainable development solutions: Building on EEDP's reputation for analysing new developments, designing global solutions (from technical assistance to trade measures) and convening global stakeholder forums on timber and fisheries, this work stream will outline key trends and global governance issues for major renewable and non-renewable resources.

In addition, EEDP regularly hosts workshops and meetings which provide a neutral and non-confrontational forum where experts from different perspectives are able to network and meet to freely exchange views and experiences. Meetings are often held under the Chatham House Rule of confidentiality to encourage a more open exchange of views. The impact of the EEDP's work is recognized internationally and its research output is widely read throughout the policy community.

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