

German British Forum (GBF)

**"ENERGY FOR THE FUTURE:
Governments, Cities and Technologies for the New Age"**

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***Government and industry cooperation on energy security, containing
climate change – The wider picture***

Opening remarks

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I

Energy policy more than other industrial policies has to operate within a long term perspective. The investments in the energy industry and in the consumption patterns are large, long-term and often of a systemic nature. The periods of return of investments are very long and investors need stable long-term framework conditions.

The price signals on the energy markets do not reflect the real social costs. A number of market failures give reasons for governments to intervene. These interventions have developed over time into a complicated system of taxes and tax incentives, of subsidies in various forms for individual energy sources and consumption measures (e.g. “energy savings”) and regulations on the local, national and European level. Such policies can be very expensive in terms of economic growth, jobs and the competitiveness of industry on the global markets.

Therefore, the intervention logic has to be clear and consistent. Governments together with all stakeholders have to develop a long-term vision with a horizon of 30-40 years about our energy future. The energy vision, we have agreed upon in the developed world, can be described by the term “*low carbon economy*”. This implies above all a considerable reduction in CO₂ emissions and a reduction of the energy intensity of the economy as a whole. This vision is based on broad scientific evidence about the reasons

for climate change and global warming. It is shared by mainstream scientists and by most of the governments in the world.

But, there are heavy disputes how we should reach a lower energy intensity of the economy and who should reduce his emission to what extent. In an interconnected global economy we need agreements at the global level on emission reduction targets. And these targets must be binding, if governments want to build intervention measures on them. The more ambitious these targets are the greater is the difference between the actual price signals and the real social costs of energy production and consumption. This is why an agreement on binding targets in Copenhagen or a follow-up conference is so important.

II

In Europe we have made good progress in setting ambitious targets agreed upon under the German EU-presidency in the first half of 2007. Two important pillars of the energy strategy are the increase in energy efficiency and the further expansion of renewable energies. Germany is a pioneer in both of these areas. This applies to solar energy and wind energy as well as to heat-saving technologies or modern heating technologies in the building sector. Allow me to highlight some of our achievements and prospects by quoting a few figures:

Approximately 20,000 wind energy plants with a capacity of approximately 24,000 MW have been installed in Germany since 1990. In 2008, wind energy met approximately 6.6% of Germany's gross demand for electricity. Of all the renewable energies, it now makes the largest contribution to generating electricity in Germany and has overtaken hydroelectric power with its share of 3.4% of energy production. The wind energy sector employs approximately 90,000 people in Germany. In 2007, the German wind energy industry produced plants and components worth 7.6 billion euros. The export share is 83%. We have experienced a rapid increase in the use of wind energy over the last two decades. The experience that we have gained during this period is now enabling us to tackle a further challenge: Preparations are being made to install wind parks off the German coast. Our aim is for wind electricity to cover 25% of our demand for electricity

by 2030. More than half of this electricity is to be generated at sea. This is a great challenge taking into account the indispensable corresponding improvements of the grid

The production of solar energy has also made impressive progress in Germany. Photovoltaics have become an important branch of industry. The number of people employed in the PV sector in Germany is estimated at around 40,000. In 2008, the PV sector invested approximately 190 million euros in research and development and 1.8 billion euros in the installation, expansion and modernization of its production plants. The mechanical engineering sector is playing a crucial role in photovoltaic production. Roughly half of the photovoltaic production equipment used worldwide is produced by German mechanical engineering and plant construction companies. The global production and use of photovoltaics are experiencing dynamic growth.

Another important field of activity is energy efficiency:

Germany is already world champion in energy efficiency. Its energy productivity, which means the quotient of energy consumption per year and Gross Domestic Product, is 3.7 in comparison with the USA 6.7 and China 17.1. But there is still a considerable potential for improvement. According to a McKinsey study on "*Energy as a Competition factor*" from 2009 Germany could save one fifth of its today's energy consumption by 2020 using available technologies. This represents around 53 bn € less in energy costs per year.

Right across the EU, buildings are the largest energy consumers with a 40% share, above all for heating, cooling and illumination. In Germany, almost 80 % of all residential buildings were built before 1978, before the first Heat Insulation Ordinance came into effect. Such buildings require three times the energy for heating than more contemporary ones. The energy saving quality of building modernization often remains far behind its opportunities. Conventional refurbishment usually exploits only a third of the actual savings potential. But pilot projects of the German Energy Agency show that highly innovative refurbishment can reduce the primary energy requirements of an old building up to 85 % - using market available technologies and up-to-date building services. These pilot projects convert older buildings into low energy houses requiring only three to five liters of heating oil per square meter each year.

It has been calculated that the energy consumption in buildings in Germany could be reduced by 19% by the year 2020 through energy-efficient refurbishment and new construction. This represents an annual CO₂ reduction of 70 million tons.

What has been reached so far? Since 2006 more than 720.000 apartments have been energy-efficiently modernized with financial support by the “*CO₂ Building Refurbishment Program*” which the Federal Government started together with the KfW bank group. There are many other subsidy programs on federal, state and local level.

Building refurbishment offers great business prospects for skilled trades, industry and service companies. A study by the Fraunhofer Institute for Systems and Innovation Research expects up to 100.000 new jobs in Germany by 2012 if measures for climate protection and energy saving are quickly and forcefully implemented. Even more than 350.000 new jobs by 2020 are considered as possible.

III

Apart from expanding the use of renewable energies, the Federal Government has consistently taken advantage of the potential for the rational and economic use of energy and for improving energy efficiency. Germany's success to date in increasing the share of renewable energy in meeting its energy requirements and utilizing energy-saving potential is based on stable political framework conditions, involving a mixture of financial incentives and long-term remuneration arrangements for electricity from renewable sources. In addition, Germany has introduced regulations governing energy efficiency (e.g. for both existing and new buildings).

In August 2007, the Federal Government adopted the *Integrated Energy and Climate Programme*. This provides a comprehensive and effective framework for modernizing and securing energy supplies. Let me cite just a few examples:

- The revised Renewable Energy Act (EEG 2009) with its remuneration regulations is promoting the increased use of renewable sources of energy – hydropower, wind, sun, geothermics and biomass – in electricity production.
- The Combined Heat and Power Generation Act is supporting the expansion of the combined production of electricity and heat as well as heat networks.

- The revised Energy Industry Act is supporting the connection of offshore wind parks to the national grid.
- The Energy Savings Ordinance is ensuring that new and refurbished buildings will only have very low energy requirements.
- The Renewable Heat Act means that increasing use will be made of renewable energies in new buildings in future.
- The Market Incentive Programme for Renewable Energies is encouraging the use of renewable energies for heat generation.
- Special regulations in the Gas Grid Ordinance are facilitating the feeding of biogas into the German natural gas grid.

These instruments are supported by numerous activities at *Länder* and local level as well as by various institutions, private individuals and companies.

Other European countries are seeing Germany as a role model and have already introduced or plan to introduce similar regulations. For example, the *2008 Energy Act* in the UK has established the statutory basis for introducing a feed-in regulation. The promotion of renewable energy plants and combined heat and power plants is to run parallel to the existing quota system. The feed-in provision is to be introduced by 2010.

IV

Of course, we need the corresponding technologies if such measures are to be effective. This is where research plays a decisive role.

The Federal Government has therefore strengthened its activities in the field of energy research and launched new initiatives. These measures include *inter alia* supporting strategic partnerships between publicly and privately funded research. On the one hand, this will unleash existing short to medium-term potential for optimization; and on the other hand, it will help to develop completely new energy solutions and technologies which will not be available, however, until after 2020.

The Federal Ministry of Education and Research (BMBF) is providing a significant contribution towards achieving this goal with its funding initiatives. We have introduced measures in the fields of climate research, energy research and social-ecological research under the Federal Government's *High-Tech Strategy*. These include topics such as:

- The use of biomass as a combined source of energy and materials;
- The development of low-cost, thin layer solar cells and solar cells made of organic semiconductors;
- Broad-based materials research aimed at increasing energy efficiency in various key technological fields such as energy production and storage, industrial production technology, electronic and optical systems and traffic technologies;
- CO₂ capture and storage (CCS) in combustion power plants and – as an interesting alternative – the possible use of CO₂ as a raw material;
- The option of solar hydrogen production through photocatalytic water splitting on the basis of photosynthesis – this option lies in the distant future;
- The – also long-term – option of the fusion power plant;
- The study of non-technical questions; for example, new energy-saving economic models, sustainable consumer behaviour, the acceptance of, strategies for marketing and acceptance of new energy-saving technologies, the conflicting objectives of energy and environmental policy.

Cooperation between science and industry must be expanded, particularly in fields of technological research. The Federal Government's *High-Tech Strategy* is intended to build bridges between these two sectors. Collaborations and joint projects are receiving targeted funding. The BMBF has launched innovation alliances between companies and research institutions in key fields of technology which are being funded by both industry and the Federal Government. This ensures that the technologies developed do actually take the needs of the market into account.

V

We can only solve the issues of securing our future energy supplies and containing climate change on a global scale if research and development are able to supply new options for action as well as improved more effective technologies. We are facing up to

this challenge by providing research funding in the fields of both basic and applied research.

We in Europe must show that saving energy, the use of renewable energy sources and sustainable resource management do work. But the contribution of these technologies to solving global climate and energy problems would only be very limited if they were not also introduced in the emerging and developing countries. Our aim must therefore be to set a good example with innovations in our own country and to allow the international community to share our experience on an equal footing.

Only thus will we be able to tackle the global challenges. If we don't share a common vision on a global scale and manage to take joint actions, we run a risk which economists call the *tragedy of the commons*. Elinor Ostrom, this year's Nobel laureate in economics, has given us valuable insights in the management of common pool resources. Her work may also help to find solutions for a fair distribution of the burden to cut CO₂ emissions. Binding targets are the key for the development of huge and growing markets for green technologies.

Thank you for your attention.