



Federal Ministry
for Economic Cooperation
and Development

BMZ TOPICS 187

Development needs sustainable energy





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1. Sustainable energy for development



In the last few years, the world has seen a trend in the energy sector which would have been unimaginable even at the start of this millennium. Here are just a few of the major aspects of this trend:

- > Oil prices have quintupled since December 2001, while dwindling oil reserves are causing increasing concern among many industrialised and developing countries about future energy supplies.
- > Developing countries have discovered, often the hard way, that development without energy supplies is limited to nonexistent.
- > At the same time, the most rapidly growing countries, particularly China, are facing the question of how to satisfy their increasing demand for energy.
- > Energy generated from the combustion of oil and coal is increasingly falling into discredit as one of the main causes of climate change.
- > For these reasons, renewable energies are experiencing a boom, which is transforming them from a niche technology to a genuine source of hope for development and climate protection.

Renewables are taking over

High oil prices are hitting the poorest countries with no oil reserves of their own the hardest of all. At the start of 2008, oil prices broke the 100 dollar a barrel mark for the first time ever. In July 2008 the oil price peaked at over 145 US dollars a barrel, highlighting the growing urgency to find alternatives. Calls for the wide-scale use of renewables and for massive improvements in energy efficiency are increasingly falling on open ears around the globe.

The report by Sir Nicolas Stern, former chief economist at the World Bank, and the report from the Intergovernmental Panel on Climate Change (IPCC) make it unambiguously clear that climate change is taking place. Although we can no longer stop it, we can still slow it down significantly by taking decisive action to avoid the worst case scenario.

The main burden of responsibility for climate change rests undeniably on the shoulders of the industrialised countries, which are the main polluters. But all countries are now called on to act together, all the more so since the (welcome) process of economic development in some developing countries and transition states will further aggravate the problem, as growth is still being driven largely by fossil fuels. Thus, these countries too must be persuaded of the need to join forces; yet many of them will require external assistance.

Prospects for reducing poverty

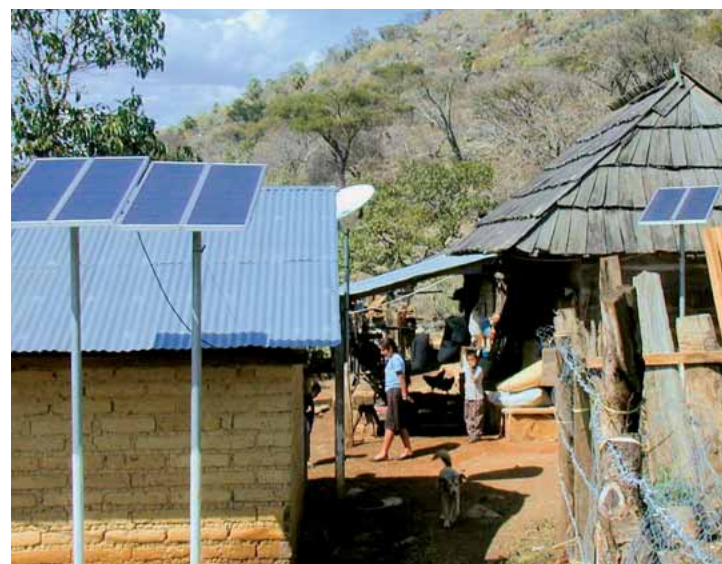
Access to energy services is an important precondition for meeting basic needs and for developing a modern economy. A smoothly functioning energy supply system is important for the stability of a country and its economy, and exerts a significant influence on the quality of the local and global environment. Energy is thus an indispensable element of efforts to

overcome poverty and to achieve the Millennium Development Goals (MDGs) adopted by the global community.

The Millennium Declaration

On 8 September 2000, the United Nations General Assembly adopted the Millennium Declaration, in which 189 governments committed themselves to a wide-ranging package of development goals. The central concerns are sustainable development and poverty reduction throughout the world. By 2015 the percentage of the world's population forced to live on less than one US dollar a day is to be halved.

Alongside primary education, primary health care, access to safe and affordable water and an elementary transport infrastructure, access to energy is one of the essential prerequisites for improving living and production conditions in developing countries.



Solar power can be a key to development for poor isolated villages.

Reducing dependence on imports

Renewable energies and enhanced energy efficiency can help a great many developing countries reduce their dependence on imported fossil fuels, and thus ease the financial burden caused by fluctuating prices on the world market. This will liberate funds that can then be used for urgently needed development measures.

Precondition for development

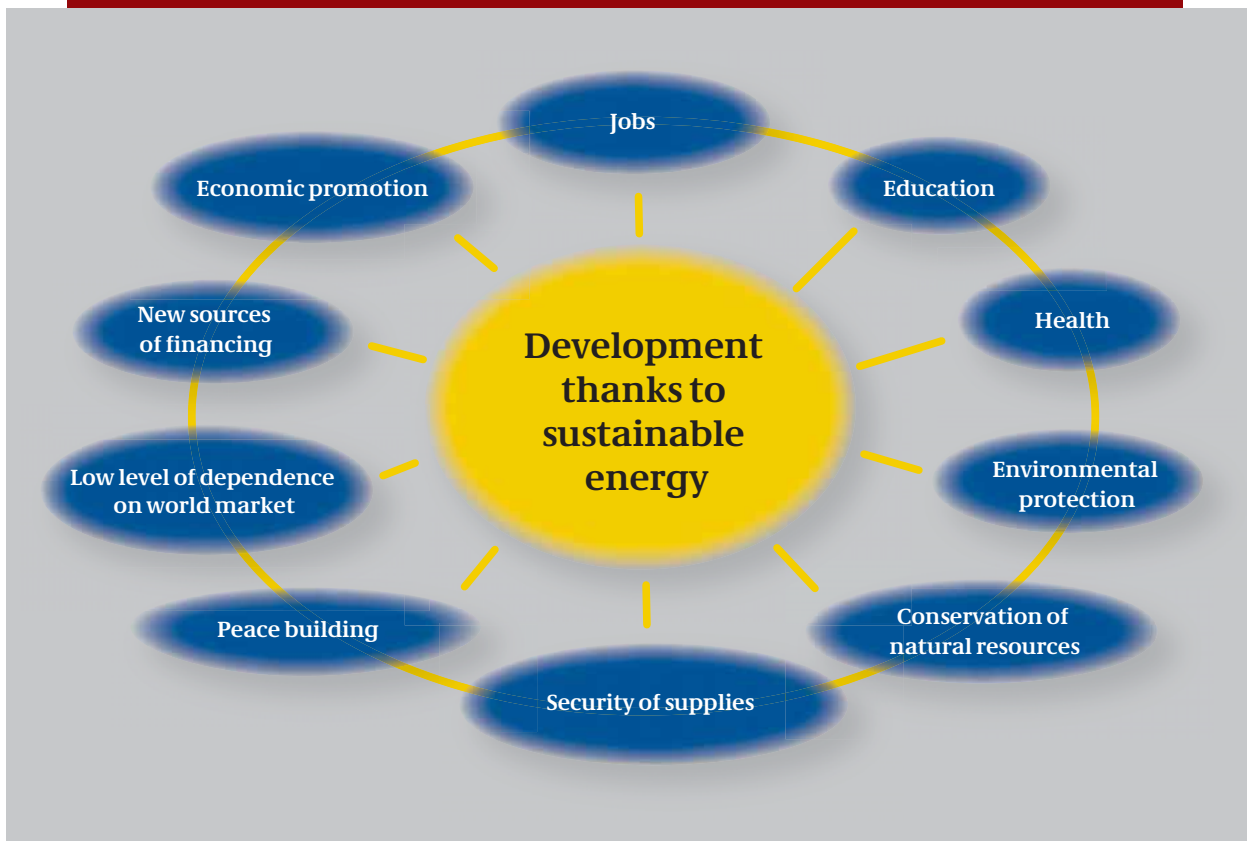
An adequate supply of energy is a central factor for economic and social development. To ensure that the economy can develop, generating jobs and income, we need energy. In almost every

aspect of everyday life energy is used – for cooking, for pumping water and for refrigerating essential drugs, to give but a few examples.

The poor in particular can and must benefit from access to modern energy. Renewable energies and technologies for improved energy efficiency offer great advantages, especially in developing countries. Renewable energies can be used at decentralised level, meaning that even isolated regions can be given access to an energy supply, and thus also to development.

The dwindling reserves of fossil fuels give us reason to fear that access to affordable energy will increasingly be a root cause of conflicts in future. Since renewable energies are available

Key to many facets of development: sustainable energy



almost everywhere, their development can help avoid conflicts and can go a long way towards mitigating what could become violent competition for the world's oil reserves.

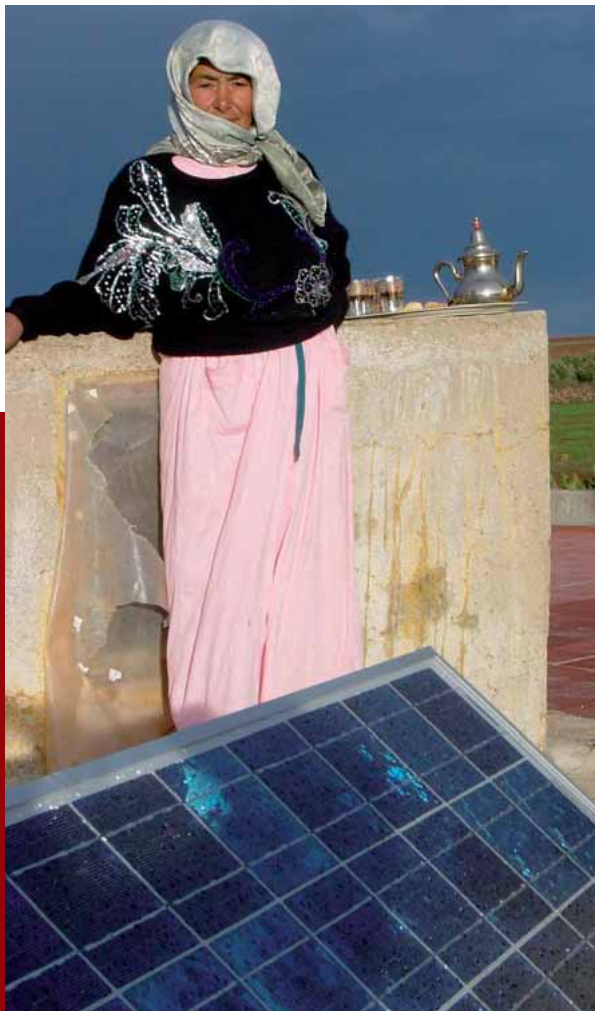
Rising demand

Energy policy around the globe is facing an enormous challenge. The human race continues to expand, as does its demand for food, goods and services. At the same time, a growing number of countries are managing to break out of the vicious circle of poverty and underdevelopment, with a concomitant rise in demand for energy. It is becoming more and more difficult to meet the demand for energy supplied mainly by fossil fuels. Experts expect oil prices to continue rising sharply. The price increases on the crude oil markets are already having dramatic impacts on oil-importing developing countries. The additional costs from these price increases

to the affected countries are higher than all of the official development assistance provided by the entire global community. For the poorest oil-importing countries, every US\$10 a barrel increase in oil price results in a 1.4 per cent loss in GDP (World Bank 2006). It is thus essential to find alternatives to oil.

Better supply and new sources of income

There is a close correlation between an inadequate supply of energy and poverty. More than two billion people have no direct access to modern energy for cooking and heating. Alongside fuelwood, these populations use batteries, candles and petroleum, which puts an enormous strain on their limited financial resources. Although the energy requirements of poor population groups are only about one kilowatt-hour per day, they frequently spend around one third of their income to buy this energy.



Renewable energies are in many instances a lower-cost alternative to conventional forms of energy. They offer people the chance to make better use of their limited income. At the same time, a connection to the national electricity grid opens up new production options and new sources of income for crafts and trades businesses and small enterprises.

The symptoms of the poor energy supply in many developing countries and emerging economies are many and varied. Large regions

are not connected up to the national electricity grid, which is a major obstacle to economic development in these areas. In many places the population is forced to meet its energy needs largely from naturally occurring biomass, especially wood. This has far-reaching consequences for their health and for the conservation of forests. Deforestation brings environmental problems on a massive scale with it, which in turn is an obstacle to development.



Access to modern sustainable energy prevents the negative impacts that gathering firewood can have on human health and the environment.

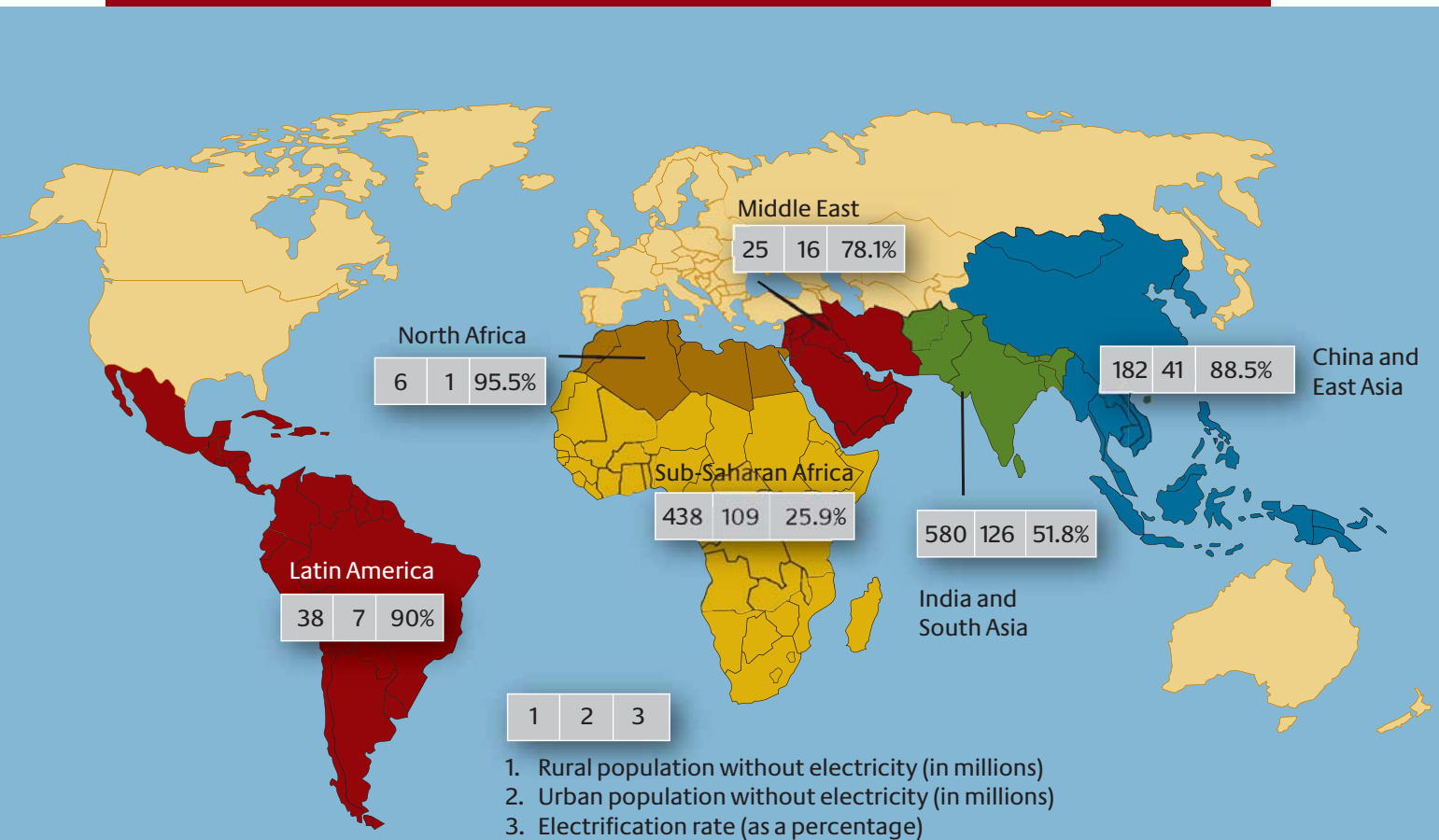
Oil – sometimes a blessing, sometimes a curse

Oil-rich developing countries can benefit from the higher oil prices. Often, however, oil is a curse rather than a blessing. In order to ensure that income from commodities is used responsibly to foster sustainable development, especially in resource-rich countries, the issues of transparency and sustainability in the raw materials sector have been the subject of much debate, also within the framework of the G8. The G8 work has focused on support for the international Extractive Industries Transparency Initiative (EITI), which aims to ensure transparency in the cash flows generated by the oil, gas and mining industries.

The aim of the EITI initiative is for resource-rich countries to use revenues from their natural resource wealth responsibly. In a regulated multi-stakeholder process involving the governments of resource-rich countries, the private sector and civil society, the payments made by the extractive industries are compared with the revenues declared by the governments.

Another instrument to promote transparency and sustainability in the raw materials sector is the support for the development of certification systems, which aim to make the origins of raw materials and trade in these materials more transparent.

Massive regional disparities in electricity supplies



2. Sustainable energy means climate protection



Since the start of industrialisation some 200 years ago, humankind has had a major impact on the natural heat balance of the Earth, thanks to the release of more and more carbon dioxide (CO₂) into the atmosphere as a result of the combustion of fossil fuels. Carbon dioxide is a greenhouse gas which, along with other gases such as methane, raises temperatures near ground level. According to figures released by the IPCC in 2007 the Earth is today 0.74°C warmer on average than it was 100 years ago. In recent years the number of extreme weather events, such as storms, floods and droughts, has risen significantly. The IPCC

forecasts that by 2100, worldwide temperatures will rise by up to 5.8° Celsius, which would have disastrous consequences for life on Earth. If we are to keep temperature rises down to a probably still manageable rise of 2.0° to 2.4° Celsius, annual emissions of greenhouse gases will have to be cut by at least half by 2050.

If current trends continue, the demand for energy will rise by almost half by 2030. According to the World Energy Outlook 2008 from the International Energy Agency (IEA), developing countries will be responsible for almost 90 per cent of the increase, with China and India accounting

for just over half of that increase. This would mean that by 2010, developing countries would already be producing more CO₂ than the industrialised countries. A radical change of course is vital. It is, however, possible to change course without jeopardising the rights of developing countries to appropriate development.

An enormous challenge

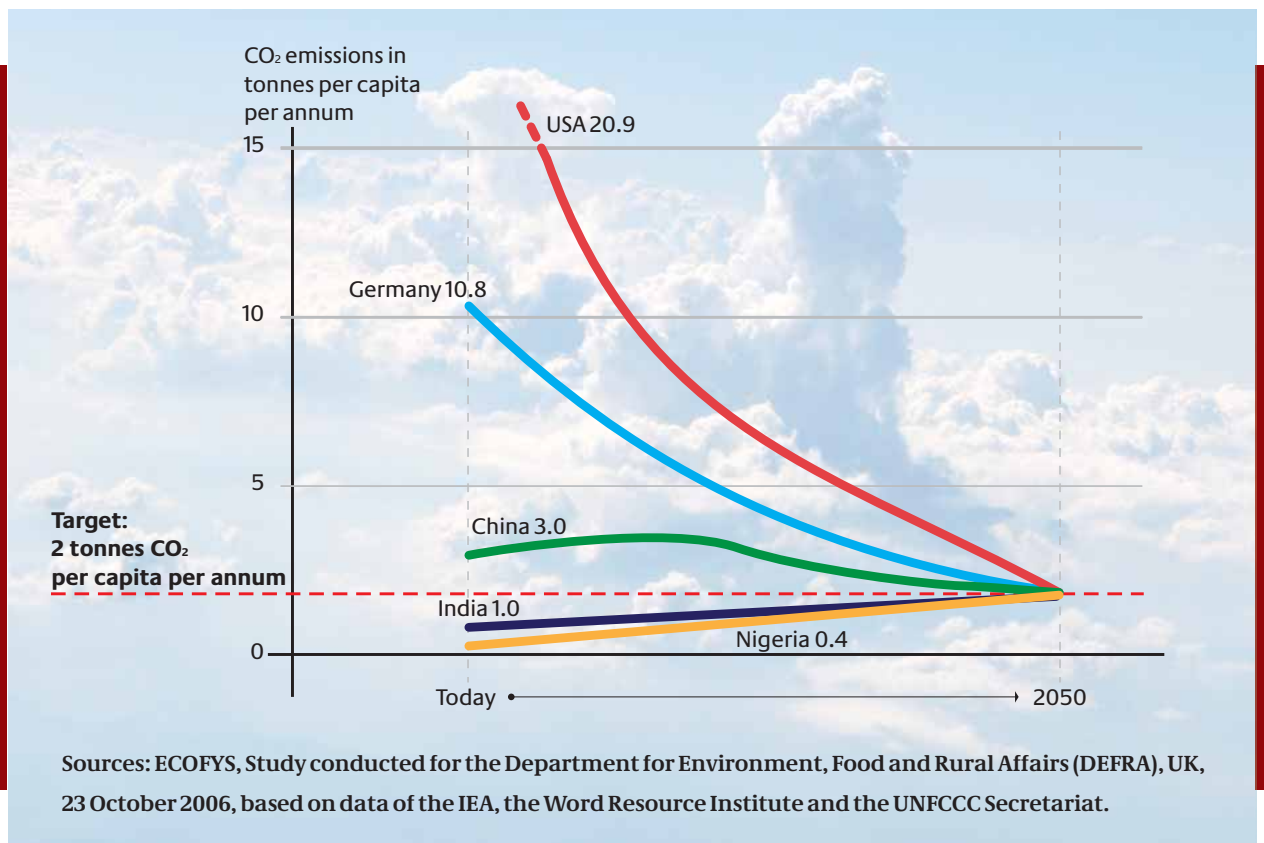
Climate change is one of the greatest challenges facing humankind in the 21st century. If the IPCC's model calculations are correct, entire climatic zones are set to shift over the decades to come. Areas that are today still fertile agricultural regions could become desert, rainforests could dry out, and storms become more frequent, causing enormous damage. Entire island states and flat coastal areas of the continents could be

lost to the oceans. The natural resource base for millions and millions of people would be destroyed. Feedback effects could make this situation completely uncontrollable. If the Earth continues to warm, the oceans and biospheres will absorb less carbon dioxide in future, and areas of permafrost will melt, releasing huge quantities of greenhouse gases, which will in turn have an additional negative impact on the climate.

Development needs climate protection

In order to underline the fact that climate change is of vital concern for German development policy, the Federal Ministry for Economic Cooperation and Development (BMZ) presented the Climate and Development action programme in April 2007. The key statements of

Spreading the burden of climate protection fairly



this programme include the following:

- > Emphasis on the special responsibility of industrialised countries, which are largely responsible for climate change
- > Need to stabilise CO₂ emissions at the level of two tonnes per capita in every country
- > Particular attention to protection of the poor from the consequences of climate change, such as floods and drought
- > Expansion and consolidation of BMZ's climate protection measures: in 2008, funding provided from Germany's national budget will increase to some 700 million euros, most of which will be used for energy projects. In 2009, it is planned to increase budgetary funding for climate-related activities to one billion euros. Combined with

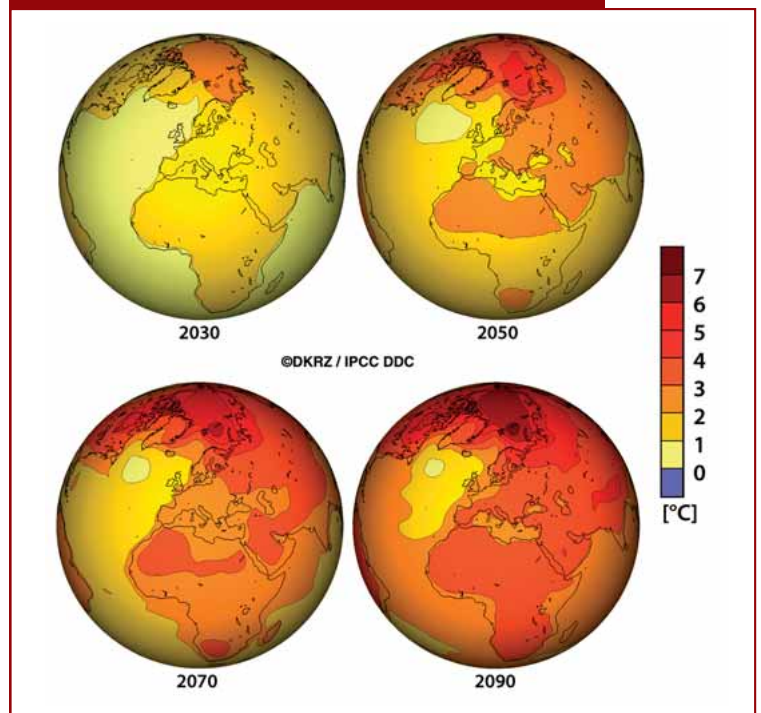
low-interest loans, the ODA funding provided through German development cooperation is therefore likely to amount to 1.8 billion euros

- > Use of BMZ's influence to help put in place effective regulations as of 2012 when the Kyoto Protocol expires.

The Stern Review on the economics of climate change

The "Stern Review" published in autumn 2006 is the most detailed study yet on the macroeconomic consequences of climate change. The author, Sir Nicolas Stern, comes to the conclusion that the costs of averting disastrous developments caused by climate change would be one per cent of the annual global gross domestic product. If, however, the international community fails to take action, we can expect global GDP to be between 5 and 20 per cent lower per annum than it would otherwise have been. In this context, Sir Nicolas speaks of the "greatest market failure the world has seen" and calls on governments to take action.

Mean temperature scenario for 2030 to 2090



The various regions of the world will be confronted with different changes in average temperature. Based on calculations made in 2007, the IPCC and the German Climate Computing Centre predict mean temperature increases of between two and seven degrees Celsius.

Source: Based on an averaged scenario from the IPCC in its Fourth Assessment Report (AR4). Scenario A1B; German Climate Computing Centre (DKRZ) 2007.

Developing countries particularly badly hit

Although they have done least to cause climate change, developing countries are particularly affected by the consequences. Firstly, many of these states are largely dependent on agricultural production and at the same time have few water resources. Extreme weather events and changed climatic conditions can mean lost harvests and a serious loss of income for people in these countries. This exacerbates poverty and hunger. Secondly, poor people rarely have the financial and technical capacities they would need to allow them to adjust to climate change, for instance by building dykes to protect their coasts. Climate change is a genuine threat to the very survival of people in the developing countries affected, especially for the poorer segments of the population.

We must all pull together

The world must shift as rapidly as possible towards renewable energies and low-CO₂-emission energy forms. Industrialised countries bear the brunt of the responsibility.

The efforts of industrialised countries alone, however, will not have the desired results if, at the same time, emissions continue to rise in other parts of the world, say in emerging economies like China and India. It is also becoming increasingly important to support population groups in the poorest countries who are most heavily affected in their efforts to adapt to climate change. Sustainable, global solutions can only be implemented within the framework of international cooperation. Under the provisions of the Kyoto Protocol, the international community took an important first step towards reducing emissions of greenhouse gases. The negotiations within the United Nations on a follow-up agreement to the Kyoto Protocol also aim to persuade developing countries to opt for

sustainable energy development by reducing their emissions and building a climate-friendly energy infrastructure.

Climate protection agreements to date

In view of the impending climate disaster, an additional protocol to the United Nations Framework Convention on Climate Change was adopted in 1997 in the Japanese city of Kyoto. Under the terms of the Kyoto Protocol, a number of industrialised states agreed to reduce their annual emissions of greenhouse gases by 5.2 per cent of the 1990 level by 2012. The protocol also gave states the opportunity to cut emissions of carbon dioxide outside their own borders. So-called flexible mechanisms allowed the private sector in particular to invest in climate protection projects in other countries. The underlying rationale was that the industrialised states should be enabled to meet their reduction commitments wherever it is most cost-effective. The flexible mechanisms involve three instruments:

1. Emissions trading: If a country or a company emits less greenhouse gases than agreed, it can “sell” this saving to another country or company, which generates more emissions than agreed.
2. Joint Implementation (JI): If an industrialised country or a company from an industrialised country implements climate protection projects in other industrialised countries, it can count the savings achieved towards its own emission reduction commitments.
3. Clean Development Mechanism (CDM): If an industrialised country or a company from an industrialised country finances emission reduction projects in developing countries, these can be used to help meet their own national emission reduction commitments.

A CDM project: Solar reflectors replace diesel for cooking

In schools, hospitals and temples in India, meals are generally prepared with the help of diesel burners. In a CDM project at eleven locations in India this fossil fuel is now being replaced by solar reflectors. The reflectors focus the heat of the sun on a pipe in which water is heated and then fed into the kitchens. A sophisticated steam accumulator system ensures that the kitchens can operate even after dark.

The project is to supply environmentally friendly energy for cooking at various locations in India, and should prevent emissions of about 3,000 tonnes of CO₂ by 2012. The positive impacts of the project, however, go well beyond emissions reduction. Additional jobs are being created to operate and maintain the equipment. And the air in the kitchens will no longer be polluted by diesel soot, which is a health hazard for cooks.

German support for the Clean Development Mechanism (CDM)

The CDM is becoming an increasingly important source of financing for developing countries. German development policy is helping partner countries to make use of the CDM for sustainable development, and also to attract environmentally friendly technologies into the country.

- > The Clean Development Mechanism is one of the main fields of activity of the Climate Protection Programme of the GTZ (Deutsche Gesellschaft für technische Zusammenarbeit). The programme helps partner countries to elaborate emission-reduction strategies and to establish designated national authorities for approving CDM projects.
- > The KfW Entwicklungsbank has established a climate protection fund on behalf of the German government. This is used to encourage climate protection projects, transfer modern technology to partner countries and to support sustainable development in developing countries. The KfW Entwicklungsbank also assists European businesses in acquiring emission reduction certificates from CDM projects.
- > The German government made great efforts to have the CDM linked to the EU emissions trading system as rapidly as possible. A relevant EU guideline for this has been in force since November 2004. As of 2008 it will be possible to trade emission reduction certificates from CDM projects within the EU emissions trading system.



Capacity building and technology transfer are essential for development and climate protection.

European Union (EU) sets itself ambitious goals

The EU plays a leading role in climate protection on a global level. The EU endeavours to have industrialised countries cut their emissions radically in both the medium and long term. The EU heads of state and government gave a clear signal in favour of climate protection under the German EU Presidency in early 2007 with the adoption of an ambitious climate protection and energy policy. Under the terms of this policy, the EU is willing to reduce its emissions by 30 per cent of the 1990 levels by 2020 within the framework of a global climate protection agreement – if other industrialised states also commit to making similar efforts and the developing countries make an appropriate contribution.

Irrespective of any future agreement, the EU plans to reduce its own emissions by a minimum of 20 per cent by 2020. In addition to this, renewables are to account for 20 per cent of the EU's primary energy consumption by 2020, and energy efficiency is to be enhanced by 20 per cent. The German government has gone even further. It has set itself the goal of reducing its emissions of greenhouse gases by 40 per cent of 1990 levels by 2020.

Climate protection – What will happen after 2012?

The international community agreed in December 2007 on the Indonesian island of Bali to a joint action plan for a new climate protection regime as of 2012. The Bali Roadmap for negotiations comprises four thematic blocks:

- > Reducing carbon dioxide emissions
- > Adapting to the consequences of climate change
- > Technology transfer
- > Financing issues.

The promotion of energy efficiency and renewable energies is absolutely central. Germany is thus working to facilitate access to modern technologies for developing countries and to help them make use of these technologies.

Germany is also particularly active in protecting tropical forests, as their ongoing destruction is responsible for about 20 per cent of global greenhouse gas emissions. In particular financial incentives are to be created for developing countries, to help them prevent forest destruction; these incentives are to be tied to a future post-2012 regime.

3. Partnerships and networks for a new era in global energy



In its development policy, Germany is working closely together with its partner countries in the energy sector. Especially the so-called anchor countries like China, India or Mexico, which have a vitally important political and economic status within their regions, are essential partners to meet regional and global energy challenges.

In 2003 and 2007, the BMZ committed new funding totalling some two billion euros for renewable energies and energy efficiency. Annual commitments of fresh funding are being further increased. In 2008, commitments for energy projects have already reached 755

million euros. In 2009, the annual commitment of fresh funding for renewable energies and energy efficiency will exceed one billion euros (cf. figure page 18). Energy projects are currently being supported in about 50 partner countries (cf. map). More than half of these projects are aimed at promoting renewable energies. The BMZ bases its promotion of sustainable energy systems in developing countries on the sector strategy "Sustainable Energy for Development" (BMZ Strategies 154). Energy projects and programmes are agreed between the German government and the governments of the partner countries. The spectrum of projects is extremely wide, going from general energy

policy advisory services to financing interventions for disseminating renewable energy both to the national grid and for energy generation in areas without a connection to the national grid. It also embraces projects to save energy and boost energy efficiency in power stations, industry, transport and private households.

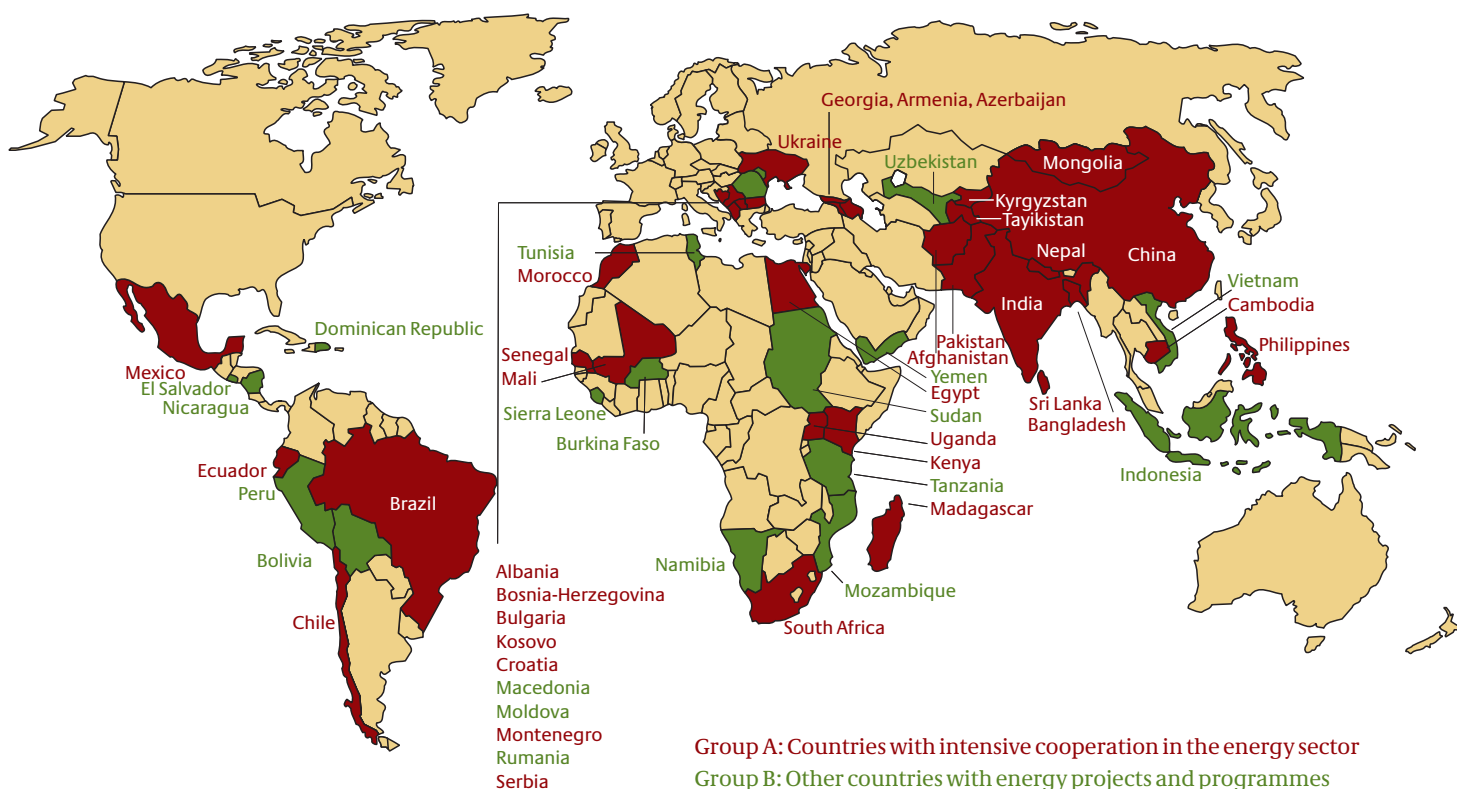
Various international processes and the tireless commitment of multilateral development organisations offer impressive evidence of the increasing importance which humans around the world attach to sustainable energy supplies. As a pioneer in the use of innovative renewable energy technologies, the German government is playing an important part in establishing international objectives and realising concrete measures. Cooperative approaches are being pursued at the level of the EU and with the G8, the World Bank and regional development banks. German development policy also invests strongly in global networks and public-private partnerships and emphasises their current effectiveness and future potential.

Programmes worth billions

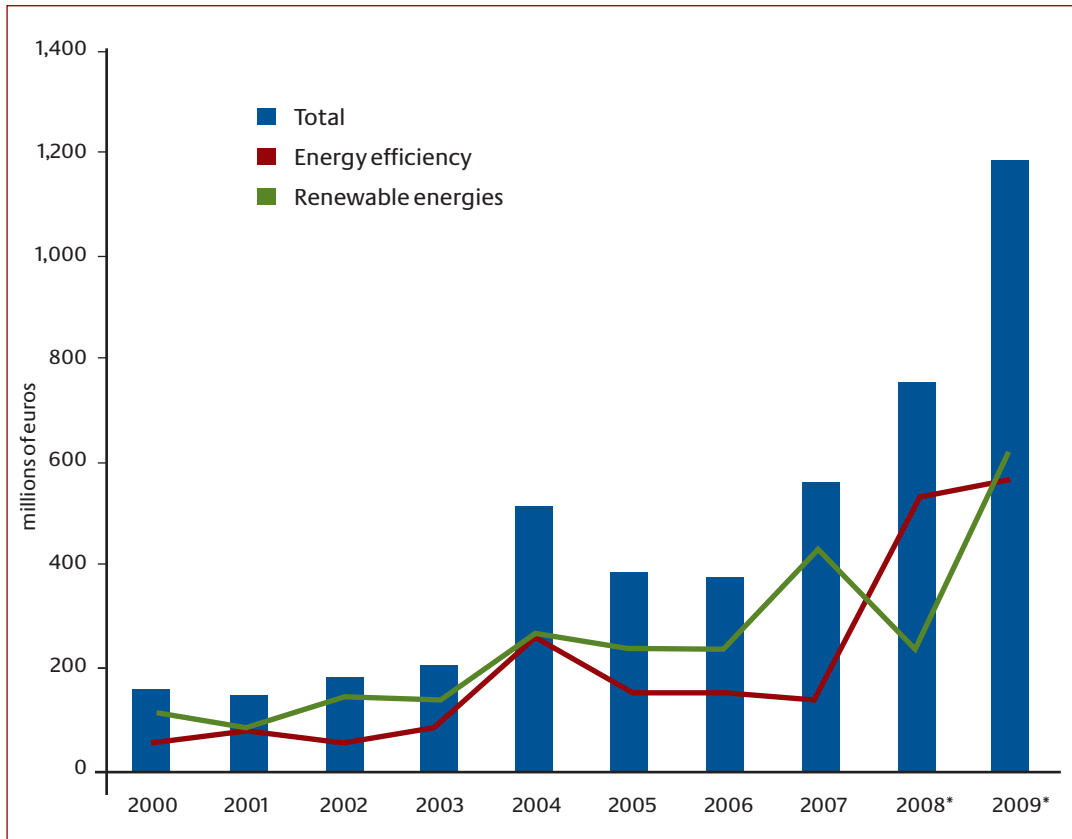
At the World Summit on Sustainable Development in 2002 in Johannesburg, the German government sent an important signal with the launch of the Sustainable Energy for Development Programme, with total funding of one billion euros for the period up to 2007. The funds were to be used to expand the use of renewable energies and boost energy efficiency. The objectives set have now been exceeded by far, and the programme has been extended for an unlimited period.

At the International Conference for Renewable Energies “renewables 2004” in Bonn an additional Special Facility for Investment in Renewable Energies and Energy Efficiency was established, with 500 million euros funding. After only three years these funds too had been used for various energy interventions. Because of the huge demand, the term of the special facility was extended until 2011 and the original funding topped up to around 1.5 billion euros.

Partner countries of German development cooperation in the energy sector



Annual commitments of funding for climate-friendly energy under German development cooperation 2000-2009



* planned figures

Commitment at EU level

The EU is the largest donor worldwide in the field of development assistance: together the European Commission and the EU member states provide more than half of global official development assistance.

Energy was one of the key topics during the German EU Presidency in the first six months of 2007 and aspects of development-policy also played a vital part in policy efforts. A comprehensive energy partnership between Africa and Europe was launched during the German EU Presidency, and is now an integral part of the new EU-Africa strategy which was adopted at the EU-Africa summit held in Lisbon at the end of 2007.

G8 puts its money on energy for development

The group of the eight leading industrial nations (G8) too has made energy and climate one of its main concerns for some years now. The G8 summit that took place in July 2008 in Toyako in Japan brought together the topics of the last few years; climate change, energy and sustainable development from the Gleneagles summit in 2005, secure energy supplies from the St. Petersburg summit in 2006, and climate and energy efficiency from the Heiligendamm summit in 2007.

At the G8 summit in Gleneagles in 2005, a process of dialogue on “climate change, clean energy and sustainable development” was agreed on with Brazil, China, India, Mexico, South Africa and other nations. Within the scope of this exchange of experience and views among the

Energy partnership between Europe and Africa underpins development

The energy partnership between the African Union and the European Union, launched at the end of 2007 embraces objectives that both sides agree to work towards in joint efforts:

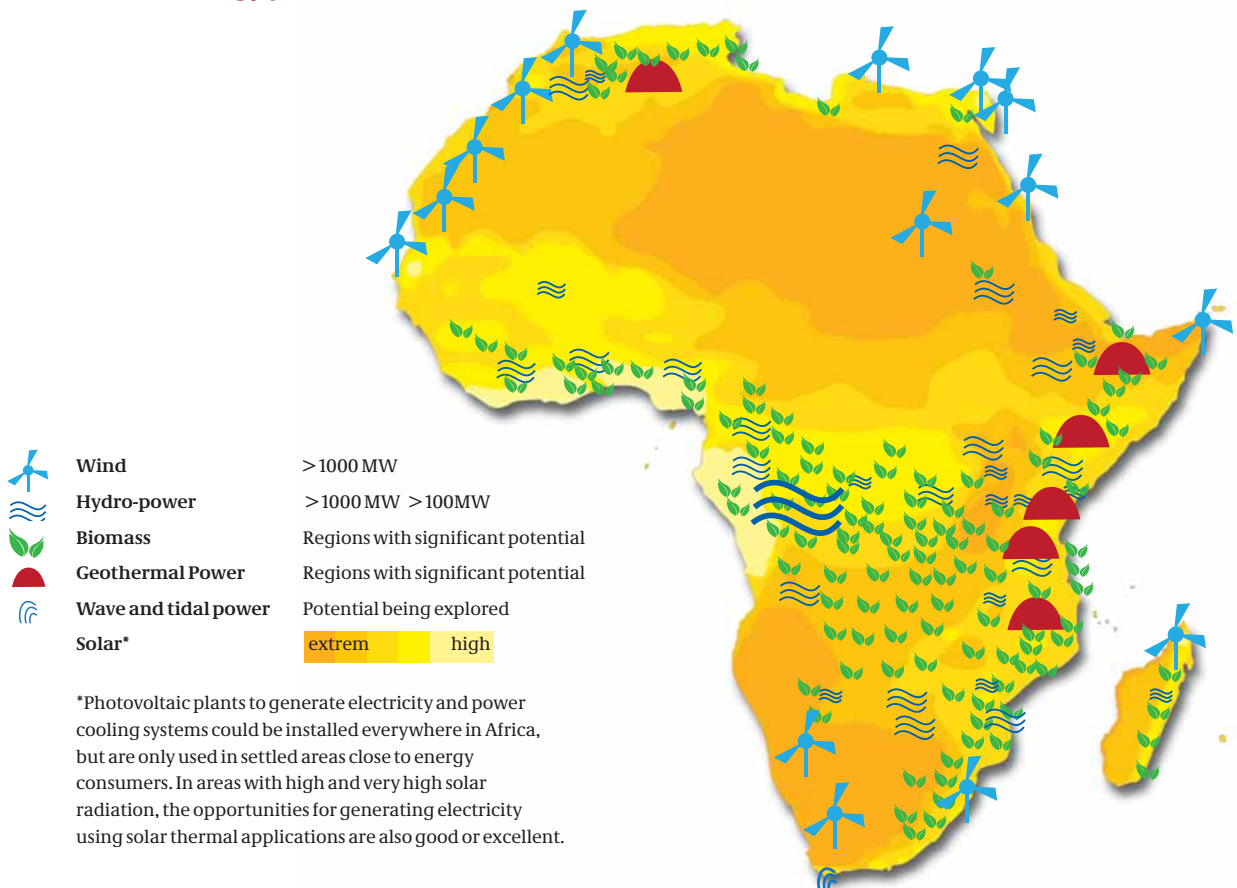
- > Facilitating access to energy and ensuring a secure supply of energy
- > Promoting technical and personnel capacities as well as favourable conditions for investment in the energy sector
- > Stepping up investment, especially in renewable energies and energy efficiency
- > Utilising the revenues generated by oil and gas exports for development
- > Enhancing transparency and effective manage-

ment in the energy sector

- > Taking into account climate change and necessary adaptation measures.

Within the EU, the energy partnership builds on the EU Energy Initiative (EUEI), launched in 2002. The EUEI aims to give many of the world's two billion or more "energy-poor" individuals access to secure, environmentally sound energy services. To this end, the EUEI promotes close cooperation with developing countries, the private sector, financial institutions and civil society. Important EUEI instruments include an energy facility for Africa, with current funding of 220 million euros and the Partnership Dialogue Facility.

Renewable energy po



responsible ministers, the aim is to focus on the strategic challenges of providing sustainable energy supplies and of adapting to climate change. The talks are geared towards achieving progress on international climate-protection instruments such as the United Nations Framework Convention on Climate Change and the Kyoto Protocol.

The dialogue with emerging economies is being continued within the framework of the so-called "Heiligendamm Process". This is a two-year dialogue between the G8 nations and the key outreach states called the "Plus Five" countries (Brazil, China, India, Mexico and South Africa). Energy issues are one of four topics covered in these talks, and a special emphasis is put on energy efficiency and technology transfer. At the G8 summit in Italy in 2009 participants will take stock of what has been achieved.

This year in Toyako, the G8 countries – including, for the first time, the USA – agreed to cut CO₂ emissions by at least 50 per cent by 2050. The G8 countries want to join together to press for this long-term target to be made the binding basis for a post-2012 climate regime involving all the parties to the UNFCCC.

World Bank invests in clean energy

At the International Conference for Renewable Energies ("renewables 2004") held in Bonn in 2004, the World Bank resolved to increase the funds it pledges for the use of "new" renewable energies (i.e. excluding large-scale hydro-power projects) and energy efficiency by a minimum of 20 per cent a year for the period 2005 – 2009. It has met this commitment in full. Currently, pledges for "new" renewable energies are running at more than 400 million US dollars a year. At the Gleneagles summit in 2005, the G8 states called on the World Bank to make proposals for the increased use of clean energy in developing countries and emerging economies. The World Bank addressed this issue in its Clean Energy for Development Investment Framework (CEIF). This institution manages the earmarked climate-protection funds provided by other donors, but also increasingly uses its own funds for activities in the fields of renewable energies and energy efficiency. Along with other EU states, the BMZ believes the time has come for the World Bank to set itself a more ambitious goal – to achieve new pledges of one billion US dollars every year for "new" renewable energies.



The World Bank is currently developing a comprehensive Strategic Framework on Climate Change, in which the CEIF is to be integrated. It proposes that the growing commitment of the G8 nations should be channelled into a Climate Investment Fund (CIF), in which an important component should be targeted support for adaptation to climate change in the poorest developing countries.

In July 2008, the G8 decided to establish Climate Investment Funds (CIFs) under the umbrella of the World Bank. The German government will contribute at least 500 million US dollars to these funds. In total, the donor countries will provide some six billion US dollars. In this way, considerable additional funding will be mobilised for immediate use in climate change mitigation and adaptation. The Climate Investment Funds are to be used to fund major investments in climate change mitigation and adaptation programmes that are also expressly to benefit the poorest developing countries. The funds also serve to close the current climate funding gap until a comprehensive new financing architecture is decided on at international climate negotiations. For this reason, the funds will operate in close cooperation with the United Nations and remain in operation initially until 2013, when a new international climate agreement is due to come into force.

Regional development banks

In cooperation with the World Bank, the BMZ is also involved in an in-depth dialogue with regional development banks, in order to make the case for increasing renewable energies and climate protection measures. Since “renewables 2004” and Germany's Presidencies of the EU and G8 in 2007, climate change, renewable energies and energy efficiency have become more firmly established within the development bank's activities.

Cooperation with the Asian Development Bank (ADB)

Within the framework of cooperation with the ADB, the German government is encouraging the bank to increase its commitment to renewable energies and energy efficiency. The BMZ is also aiming to step up cooperation with the ADB in these fields. Although the ADB is extremely active in the energy sector, concrete project lending activities have hitherto focused on fossil fuels. In the fields of renewable energies and energy efficiency, the bank has so far concentrated on putting in place the necessary political, legal, institutional and regulatory frameworks in borrower countries. With the establishment of its Renewable Energy and Climate Change Program (REACH), however, the ADB has shown that renewable energies and energy efficiency will play a greater part in its energy policy in future. The ADB's CDM facility is a successful instrument used to identify projects eligible for global emissions trading. Currently, the BMZ is working to step up the role of the bank in financing measures for adaptation to climate change. There are plans to climate-proof all ADB projects in future.

Cooperation with the African Development Bank (AfDB)

In its capacity as a shareholder of the AfDB, the German government is lobbying for the more widespread use of renewable energies in Africa and is calling for climate-relevant factors to be systematically taken into account. The bank's Clean Energy Investment Framework (CEIF) takes special account of renewable energies. The main focus is on hydro-power. The bank also sees promising potential in the fields of geothermal energy, and solar and wind power. The AfDB intends to promote investment projects and improve the framework for private investors. The CEIF includes a proposal for a

multi-donor trustee fund for access to clean energy and climate change for Africa. Parallel to the CEIF, the strategy for managing the risks resulting from climate change will be presented until 2009, and an overarching action plan for clean energy and climate change will be developed.

Strategic partnership with the Inter-American Development Bank (IDB)

At “renewables 2004”, the BMZ and the Inter-American Development Bank (IDB) signed a strategic agreement on renewable energy. Latin America is the region of the world that is most dependent on oil. While the high oil prices help oil producers such as Mexico, Venezuela and Ecuador, they are a heavy burden for the majority of oil-importing countries in the region and alternatives to oil are becoming increasingly important. Latin America has an enormous potential for alternative energy sources such as hydro-power, biofuels, wind and solar power, and geothermal power. The

partnership pursues two goals. First, Latin American countries are to align their energy policies more closely to support renewable energies and energy efficiency. Secondly, this sector is to be strengthened within the portfolio of the IDB. The BMZ is currently contributing 16.6 million euros to this energy partnership. The development of the IDB's Sustainable Energy and Climate Change Initiative (SECCI) in February 2007 marked a milestone for the partnership. This initiative elevates the status of sustainable energy, which now ranks as a strategically important topic of the bank. SECCI consists of renewable energies and energy efficiency components, along with biofuels, emissions trading and adaptation to climate change. At the 2007 annual meeting of the Inter-American Development Bank, Germany organised a highly acclaimed side event on renewable energy.

The Global Environment Facility (GEF)

The GEF is an international financing mechanism which promotes projects in developing countries and in the states of Central and Eastern Europe which contribute to global environmental protection. The GEF finances only the incremental or additional costs arising when a project takes into account the interests of global environmental protection, such as climate protection. Since it was founded in 1991, some 1.17 billion US dollars have been allocated by the GEF to projects to promote renewable and low-emission energy generation. Germany is the third largest donor and provides about eleven per cent of GEF funds.

**“renewables 2004” in Bonn:
Ushering in a new era in energy**

In June 2004 several thousand participants at the first International Conference for Renewable Energies – “renewables 2004” – in Bonn impressively expressed their commitment to extending the use of renewable energies and ushering in a new era in energy. Worldwide interest shifted to renewable energies as a way of overcoming poverty and ensuring an environmentally sound and secure energy supply, independent of oil.

Alongside a political declaration and policy recommendations, the key outcome of the conference was the International Action Programme, which embraces about 200 concrete

activities and voluntary commitments on the part of governments, international organisations, civil-society institutions and the private sector. It is expected that the realisation of the International Action Programme will save 1.2 billion tonnes of carbon dioxide a year by 2015. This is equivalent to around five per cent of global carbon dioxide emissions and is more than Germany's total carbon dioxide emissions in 1990.

**The process continues: Beijing 2005,
Washington D.C. 2008, India 2010**

In November 2005 the Chinese government hosted an international follow-up conference to “renewables 2004”, the Beijing International



The first international conference on renewable energies: “renewables 2004” in Bonn.

Renewable Energy Conference 2005 (BIREC). During the conference, the importance of renewable energies for developing countries in particular was underlined. The process was continued in March 2008 with the Washington International Renewable Energy Conference (WIREC), held in Washington D.C. This conference impressively demonstrated the common will of all countries and stakeholders involved to forge ahead and support the use of renewable energies worldwide. To this end an ambitious action programme was also adopted in Washington D.C. In order to keep the global partnership for renewable energies moving, the Indian government has announced its intention to host the third follow-up conference in 2010.

Global networks for renewable energies: REN21 and GNESD

At “renewables 2004”, a global Renewable Energy Policy Network for the 21st Century (REN21) was established. It provides an open forum, where governments, international institutions, non-governmental organisations and representatives of the private sector can share ideas and information. REN21 is not an organisation, but a network whose various stakeholders work together in the interests of promoting renewable energies. The network’s goal is to facilitate the rapid expansion of the use of renewable energies in developing and industrialised nations by providing support for political developments and decision-making processes at the national, regional and international level. In its annual Global Status Report,



Wind park in Costa Rica

REN21 publishes a comprehensive overview of worldwide trends in renewable energies. Another task of REN21 is to document and evaluate progress made on implementing the International Action Programme of “renewables 2004”.

A second notable network is the Global Network on Energy for Sustainable Development (GNESD), which brings together competence centres working in the fields of energy, the environment and development in developing and industrialised countries. These activities support the improved capacity of national institutions to devise sustainable development strategies. The group’s main focus is on ensuring environmentally sound, needs-driven energy supplies in each country. GNESD is funded by the United Nations Environment Programme (UNEP), the BMZ and other donors.

Germany counts on a new International Renewable Energy Agency (IRENA)

Since there is currently no international organisation dealing specifically with renewable energies, the German government is also working to establish an International Renewable Energy Agency (IRENA). IRENA’s goal would be to encourage the further development of renewable energies worldwide. The organisation should:

- > Provide support and advisory services for governments
- > Encourage the use and development of renewable energies
- > Provide scientific back-up and provide facilities for sharing information on renewables
- > Undertake capacity development and institution building

At the beginning of 2009, the German government will be inviting all interested countries to Bonn for the IRENA Founding Conference. IRENA will then immediately begin work on promoting the worldwide dissemination of renewable energies. IRENA will help member countries to adapt their political environment, develop capacities and improve financing and technology transfer for renewable energies.

Joining forces with other donor countries – the Netherlands-German Partnership

Germany is attaching increasing importance to joining forces with other donor countries for sustainable development projects. One example of this in the energy sector is the Energising Development Partnership between Germany and the Netherlands. The partnership has supported 23 projects in 22 countries so far. The partnership has a particular focus on Africa, with 14 projects focusing on that continent, but is also supporting projects in Asia and Latin America. Rural electrification and boosting the energy efficiency of cooking technology at household level are the main fields of support. Assistance has also been provided to help ensure secure energy supplies for schools and hospitals and to encourage the productive utilisation of energy by small and medium-sized enterprises. In order to underpin the sustainability of the projects, only projects that are incorporated in the respective national development strategies of partner countries are eligible for assistance. This cooperation arrangement was initiated at the end of 2004. By mid-2008 access to sustainable, modern energy services had been provided to almost 5 million people. In September 2008 Germany and the Netherlands agreed upon a second phase of the partnership until 2011.

The private sector as a partner

Successful poverty reduction cannot do without the input and commitment of industry. It is the private sector in developing countries that can make the largest impacts and that is called on to act, and it is this sector which must be strengthened. The private sector of industrialised countries is equally important: private investment from industrialised states in developing nations is equivalent to about five times the total state transfers worldwide. Private investment offers developing countries one of the best means for establishing a modern and sustainable energy supply system. Public-private partnerships (PPPs) within the framework of German development cooperation can tap additional private-sector contributions for the development of cooperation countries. The private sector in Germany also benefits from this sort of development cooperation if projects and programmes in developing countries use German products and services. In the energy sector, for instance, this applies to wind turbines used in wind farms in Colombia and Egypt, and turbines for hydro-power plants in Pakistan.

The BMZ and German businesses have cooperated in more than one hundred PPP projects in the energy sector in recent years. Examples of PPP measures include the promotion of biogas plants in Thailand, the establishment of a geothermal plant in the Philippines, projects to use vegetable oil in the transport sector in Peru and Tanzania, the use of solar energy in Laos, Morocco, Bangladesh and Brazil and desalination plants for seawater in Tunisia.

Some concrete examples of public private partnerships

One excellent example of how public private partnerships (PPPs) can help overcome energy poverty is the Lokoho project – a small-scale hydro-power for rural development project – launched in July 2005 in Madagascar by the government of Madagascar, German development agencies and the “e7 group”, an association of the world's largest electricity generators. This project demonstrates how development projects can be targeted specifically for rural areas. While the e7 group and the KfW Entwicklungsbank contributed expertise and investment for sustainable generation and distribution of electricity from small-scale hydro-power plants, the GTZ, working on behalf of the BMZ, helped the partner side ensure that the generated electricity was used to foster growth and reduce poverty.

4. Renewable energy pays off



In the future, the world must draw its energy from more sustainable sources. This can be achieved partly by making more efficient use of energy and partly by harnessing renewable energy sources; in particular wind and hydro-power, solar energy, geothermal energy and biomass. Today, the sustainable potential of these forms of energy is far from having been reached.

Thousands of times more energy than we need

Renewable energies have been used for millennia. Long before the industrial revolu-

tion, when coal, oil and gas became the main sources of energy for the world, wind, running water, wood and animal fat were the main sources of energy. Currently, renewable energies meet only slightly more than 18 per cent of the world's primary energy needs. A large percentage of this is accounted for by the traditional, often unsustainable, utilisation of biomass. Modern forms of renewable energy could generate far more power. The sun alone radiates so much energy that we could cover total human energy needs 15,000 times over. Wind power, geothermal energy and other renewable sources of energy have similar

potential, so we need only harness a small fraction of the potential. Experts reckon that by 2050, the world could meet well over half of the total demand for energy from renewable sources. In most countries, it would not only be technically possible to meet total energy needs from renewable sources, but it would also be quite feasible economically. This is the central conclusion of a study published by the Renewable Energy Policy Network for the 21st Century (REN21 2008 b).

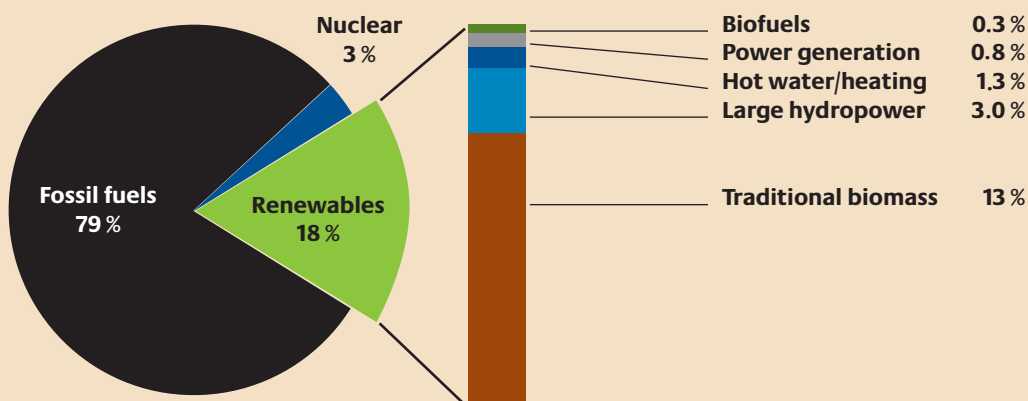
Costs continue to fall

In combination with new energy-saving technologies, renewable energies can meet all the criteria required to protect the environment and the global climate. The most important cost factor for renewable energies is not the operating costs but the initial capital costs of the technolo-

gies and of building new plants. For some years now however, these costs have been falling as a result of technical innovation and because the quantities produced have been rising. Over the last fifteen years, for instance, the costs of wind turbines have fallen by one third, while photovoltaic systems today cost less than 40 per cent of their price fifteen years ago. Considering the rising prices for oil and natural gas, the costs of renewable and fossil fuels can be expected to converge further.

Renewable energies are often at a disadvantage because fossil fuels are being strongly subsidised. Politicians are called on here to remove the obstacles that stand in the way of renewables. If the further development and utilisation of renewable technologies are specifically promoted and political leaders ensure a level playing field on energy markets, major progress can be made.

Renewable Energy Share of Global Final Energy Consumption, 2006



Source: Renewables 2007 – Global Status Report. REN21 2008.

Solar energy

One form of energy with huge potential is solar power. Because of the relatively high costs of photovoltaic (PV) cells, photovoltaic plants still generate less than 0.1 per cent of global electricity. In isolated areas, however, which are not connected up to the national grid, solar energy can already be the best way to establish an efficient energy supply. Rural electrification is an important precondition for access to education, communication, medical care and industrial activities – and thus for overcoming poverty.

Solar energy can be harnessed in two ways – to generate heat (solar thermal applications) or to generate electricity, using photovoltaic plants or solar-thermal power stations.

In solar thermal applications the sun's rays are used to heat water or other liquids. Plants that use reflectors to focus the sun's rays on a container holding the liquid are particularly efficient. The hot water can be used for heating or, in the form of steam, to generate electricity. In view of the rate at which solar thermal power station capacities are currently being extended in industrialised countries, costs can be expected to drop sharply worldwide. Further drops in costs and efficiency gains can be expected as new technologies hit the markets such as Fresnel



Senegal: Private utility provides power for rural areas

One project in Senegal shows how important the early participation of the village community and the involvement of the private sector are for the success of development projects. People living in rural parts of Senegal have practically no access to electricity. In 2007 only 17 per cent of the rural population was so fortunate. By 2012, however, the government would like to supply 50 per cent of the rural population with electricity. Private utilities will have a key role to play in achieving this objective. First, rural Senegal was divided into various supply areas, for which concessions could be obtained. The private utilities then granted a concession are required to provide access to electricity for up to 60 per cent of the population of their area within a three-year period, with provisions varying from one region to another. In return, they will be given an initial grant, partly financed by Germany. In return, they must guarantee energy supply to the concession area for a period of twenty-five years. This concept is particularly well suited to areas close to the national grid and to larger villages. To make it possible to supply isolated areas too, a second procedure was developed, which promotes electrification on the basis of local initiatives. Villages not currently covered by concessions can submit their own applications for an energy supply and can look for private-sector utilities themselves. With some assistance from German agencies, the pertinent processes have been devised and back-up energy is now provided for some 50 isolated villages.

Solar driers offer promising ways of preserving vegetables, fruit and timber, opening up new marketing opportunities for developing countries.

collectors, direct vaporisation units and solar chimneys, as well as new thermal storage systems.

In photovoltaic units, the energy of the sun's rays is converted directly into electrical energy, which requires special PV solar cells. Today PV cells are generally made of silicon. In future, however, they could be produced from organic materials, which would make them much cheaper to manufacture. Because they have no moving parts, solar cells are extremely robust and involve little maintenance. This makes them a particularly attractive option for decentralised power generation in developing countries with a lot of sunshine.

Other technical applications for solar power, such as solar-powered cooling or drying procedures are also very attractive for use in developing countries and emerging economies, and their potential is far from being exhausted. Since the utilisation of solar energy does, however, depend on the weather, the time of day, and the time of year, improved storage technologies will have to be developed.



Wind power can already hold its own

Use of wind power has boomed over the last few years. It is currently experiencing the highest growth rates among all of the technologies to harness renewable energy sources. Wind energy already accounts for about six per cent of electricity consumed in Germany, and about one per cent of global electricity consumption. At favourable locations, modern wind turbines can generate electricity for about the same price as conventional power stations.

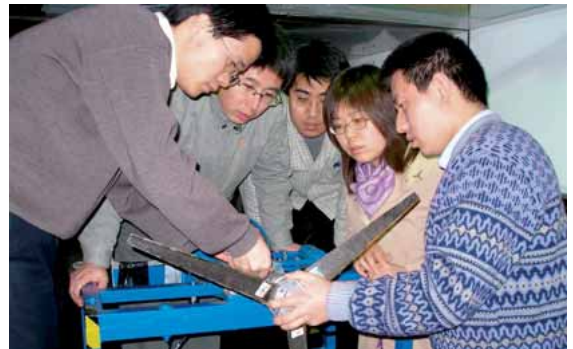
In developing countries and emerging economies, wind energy has huge economic potential. In India, China and Egypt in particular, capacities have been expanded enormously in recent years. Meanwhile, many other developing countries have built and are operating their first wind farms. Although the initial investment costs of projects in these countries are higher than in industrialised countries (because manufacturers incur higher costs for planning, transport, assembly and maintenance) these disadvantages are offset in many cases by the excellent wind conditions that prevail. Wind energy also can often be used to replace expensive diesel for power generation. The downside of wind turbines is that they do not generate power in calm weather. This can, however, be offset by ensuring a mix of power generation options within the national grid. Wind turbines can be combined with diesel generators, for example, which can ensure uninterrupted power supplies and save large amounts of fuel and CO₂ emissions.

Overcoming initial obstacles:

Transferring know-how and finding partners for Argentina, Brazil and China

In many countries wind energy is still in its fledgling stages and has to struggle with lack of information and objections. To ensure that renewable energies are as firmly as possible anchored in the mainstream in energy strategies, training in renewable energy technologies is being provided to experts from the energy sector as part of German development cooperation. In the case of wind farms, this means establishing and consolidating technological cooperation arrangements between plant manufacturers in partner countries and in Germany. Decision-makers in energy and planning ministries, along with technical experts and managers of energy utilities, manufacturers of renewable energy systems and further training institutions, in particular from Argentina, Brazil and China, receive further training in the form of workshops and seminars in-country and attend training courses for international leaders in Germany. The partners now organise further training

courses on their own, often using e-learning options. Many former participants of these training sessions today hold leading positions in energy and regulatory authorities, in industry and in training facilities.



Practical know-how transfer is vital if we are to expand the use of renewable energy technologies.



Hydro-power already generates 20 per cent of electricity

Hydro-power is the only renewable energy source which already generates a significant percentage of our electricity. Worldwide, 20 per cent of electricity is generated from water – this is equivalent to the total power generated by the EU. In fact, Latin America meets three quarters of its demand for electricity from hydro-power. One of the most attractive aspects of this technology is the low cost of power generation. In contrast to wind or solar power plants, hydro-power plants also produce uninterrupted power – at least as long as droughts do not interrupt the water supply. Hydro-power can play a major part in further expanding the use of renewable energies, also in terms of adjusting to climate change and the expected geographical and temporal shifts in precipitation that will



accompany it. The issue of sustainability has to be examined in great detail, however, for every new hydro-power station. The construction of new hydro-power stations, especially the large-scale projects, is a major intervention in the natural ecosystems and the social fabric of a region. The local population suffers extreme hardship if their homes sink beneath the waves, particularly if they are not granted adequate compensation for their land. The people living on the lower reaches of the river are also affected as the construction of a dam can eliminate many traditional sources of income.

World Commission on Dams (WCD)

The increasing resistance from groups affected by dam projects led to the founding of the World Commission on Dams (WCD) in 1998. With the involvement of critics and advocates of dam projects, joint recommendations for decision-making, as well as the planning, construction and management of dams were elaborated. The 2000 report of the WCD is a milestone in the history of dams as a development tool. The dam controversy reveals a very fundamental debate about the meaning of sustainable development, the objectives, and the means for achieving those objectives.

It is important to identify all legitimate interest groups when negotiating development plans and agreements. The WCD recommendations involve seven strategic priorities and corresponding policy principles for water and energy resources development – gaining public acceptance, comprehensive options assessment, addressing existing dams, sustaining rivers and livelihoods, recognising entitlements and sharing benefits, ensuring compliance, and sharing rivers for peace, development and security.

Indonesian plant manufacturers now export hydro-power technology

Indonesia generates environmentally-friendly and affordable electricity using small-scale hydro-power plants. To tap the enormous additional small-scale hydro-power potential that exists in Indonesia, support is being provided under German development cooperation for the Indonesian project “Small-scale hydro-power plants for sustainable economic development”. The successes are substantial and tangible. More than 85 per cent of technical equipment is now manu-

red in Indonesia, cutting costs by about 40 per cent as compared to importing all the equipment. The local manufacturers are in fact now exporting to ten countries in Asia, Africa and Europe. On the basis of the standard design for small-scale hydro-power projects, developed within the framework of the intervention, more than 150 plants have been completed so far, supplying about 30,000 households, rural enterprises and public facilities with sustainable power.



Small hydro-power plants, like in Indonesia, supply rural areas with sustainable energy.

“Cooking revolution” in Uganda and southern Africa

Only five per cent of the rural households of Uganda has access to electricity. The other 95 per cent spend a large percentage of their income on expensive alternatives which can also represent a health hazard. The enormous consumption of fuelwood from 28 million Ugandans is leading to the destruction of entire forests. For this reason, the BMZ is working together with the Netherlands via GTZ to promote the dissemination of modern cooking stoves in Uganda. And the investment is paying off. Every one euro invested saves fuelwood, prevents health hazards and prevents emissions of greenhouse gases, thus generating economic returns on the order of 25 euros after ten years. Every

second woman reports a drop in the incidence of respiratory diseases and burns after using improved stoves. Currently, 400,000 energy-saving cooking stoves are in use in eight regions of Uganda – generating annual savings of 440,000 tonnes fuelwood and 680,000 tonnes of CO₂.

In eight further sub-Saharan African countries, improved stoves are being distributed on a large scale. One major factor in ensuring the success of these efforts is that small local producers develop and distribute the stoves.

Biomass: the oldest form of renewable energy

Even in the Stone Age people warmed themselves around wood fires. Today, traditional biomass is still the most important source of renewable energy. Worldwide more than two billion people use fuelwood or charcoal for

cooking and heating. In many sub-Saharan African countries it is the only energy source available to 90 per cent of the population. The traditional utilisation of biomass is, however, not without problems. The energy content of the biomass is used extremely inefficiently, which means that the demand for biomass is



Efficient clean stoves like the “rocket stove” are very successful in Africa.



Local production is key for the wide spread distribution of efficient clean stoves.

very high. Open fires are also a health hazard. The World Health Organization (WHO) estimates that 1.5 million people die every year as a result of smoke in the kitchen. Most of them are women and children. Finally, natural resources, especially local forests, are jeopardised by the traditional use of biomass. In the future, biomass must be used much more efficiently. The technology is simple and inexpensive. Simple wood-fired ovens can replace open fires, and the use of small-scale biogas plants can lead to high efficiency gains.

As a result of rising oil prices and efforts to achieve climate protection targets, agrofuels have taken on a greatly increased role as a substitute for fossil fuels in recent years. This offers developing countries new opportunities for development as a result of additional value added and employment in rural areas. Many developing countries are hoping that the production of biomass will bring foreign exchange savings, new export opportunities

and a solution to their domestic energy and transport problems. The growing demand for agricultural feedstocks for energy generation does however pose some problems. It increases pressure on natural resources, contributes to the global rise in food prices and thus is an additional threat to food security for the poorest sections of the population in developing countries, who spend the greatest proportion of their income on food. It can also generate considerable social and ecological risks in developing countries, for example by displacing small farmers from productive land, imposing poor working conditions on plantation workers and destroying the environment and biological diversity. As part of German development cooperation, partner countries are therefore being advised on how to develop and implement sustainable biomass production strategies that address the issue of food security, encompass social and environmental safeguards and rule out any form of land use that is harmful to the climate.

Kenya: One tenth of electricity generated from geothermal power – and the figure is rising

Africa's largest geothermal power station goes by the name of Olkaria II and can be found in the Rift Valley in Kenya. Steam at a temperature of up to 300 degrees Celsius flows into the power station from about twenty 2,000-metres-deep holes drilled in the Earth, where it is used to drive two turbines with a combined capacity of up to 70 megawatts. Today 12 per cent of Kenya's electricity is generated from geothermal power. And there are plans to raise this figure. Experts put the exploitable potential of geothermal power for Kenya alone at about 2,000 MW, which is roughly double the country's current total electricity production. The Olkaria II project cost 200 million euros, of which 17 million was contributed as part of German development cooperation. Similar projects are planned by the GEF and UNEP in Ethiopia, Kenya, Tanzania and Uganda.

Geothermal power: many advantages

The vast heat available in the depths of the Earth can be used to generate heat and electricity, around the clock. Today, geothermal energy is used to meet only about 0.4 per cent of primary energy needs worldwide. Its potential, however, is almost inexhaustible. Experts calculate that more than ten times the current global energy consumption could be generated every year by tapping into geothermal power. Where conditions are favourable, electricity generated from geothermal power can already compete with traditional power generation methods.

To date, geothermal power has rarely been used because of difficulties in accessing subterranean resources. Preliminary tests are needed on the ground surface along with expensive exploratory drilling in order to establish the geothermal potential of a region. This means that the initial investment costs can be quite high. Once resources have been identified, however, they can be harnessed at a very low risk and cost.



The largest geothermal power station in Africa: Olkaria II in Kenya.

5 • Energy efficiency



To ensure sustainable energy supplies for the world, it is not only the development of renewable energies that is important. More than half of primary energy used worldwide is lost somewhere along the energy chain between generation, transport and final consumption. There is an enormous potential for saving energy along this supply chain. In the medium term, we must, in particular, manage to decouple economic development from rising energy consumption. If we do not manage to significantly enhance energy efficiency in the near future, the aim of achieving sustainable energy management and successful climate

protection will remain firmly out of our reach. Also for developing countries energy efficiency is a crucial issue. The poor already pay disproportionately for their energy, generally use “lower-quality” energy, and then also do not use efficiently even that energy. Thus individuals in poor regions benefit enormously from energy efficiency measures. Many developing countries face the issue of how they can meet the growing demand for energy of their populations. The more efficiently they use the available energy system the less additional power generation capacities will be needed. This reduces the overall investment required.

China: Modernised coal-fired power stations and combined heat and power solutions reduce emissions of CO₂

China has overtaken the USA as the world's largest producer of CO₂ emissions. It is estimated that the electricity consumption of the 1.3 billion Chinese will be six times the current level by 2050. Since coal is China's most important energy source, and since about 75 per cent of China's electricity is generated in outdated coal-fired power plants, enormous quantities of CO₂ are released, along with sulphur dioxides, nitrous oxides and dust. Dust and sulphur dioxide are a pollution hazard in urban areas, where many people suffer from respiratory diseases. Germany, itself traditionally a coal-producing country, can help by offering energy-efficient and environmentally-friendly technologies. One extremely effective option is to raise the efficiency of power stations by introducing combined heat and power solutions and extending the network of community heat and power supplies. Through its development cooperation, Germany is assisting China in modernising six power stations, which should cut carbon dioxide emissions by about 600,000 tonnes a year.

A wide spectrum of opportunities, especially in developing countries

The possible options for making more efficient use of energy are many and varied. Often only simple changes are needed to generate huge improvements. To name but a few examples, better insulation in buildings, more efficient cook stoves, modernisation of electricity networks, and raising the level of efficiency of conventional coal-fired power stations reap large energy gains. The final consumer can also save power in many ways. Old and bad habits die hard, but private households must be informed about the potential for energy savings and urged to change their habits to contribute to energy savings. This also applies to developing countries.

Movement needed in the transport sector

The transport sector is responsible for about one quarter of worldwide CO₂ emissions. And the rapid increase in private vehicles, in Asia, will triple these emissions over the next 25 years according to figures from the Asian Development Bank (ADB). A wide variety of options exist for making transport more energy-efficient and more climate-friendly. These include improving traffic flows and local public transport systems. Goods transport can be shifted from the roads to the railways, long-term integrated regional transport plans can be developed and fuel



The Bus Rapid Transit (BRT) system in Jakarta, Indonesia. The methodology for BRT has been the first approved CDM transport methodology for large scale projects.

taxed, thus providing incentives to manufacture energy-efficient vehicles. Vehicle owners can cut their costs, reduce emissions and often increase the service life of their vehicle by reducing their fuel use.

Energy efficiency and renewable energies go hand in hand

A high level of energy efficiency is also important for the utilisation of renewable energy. The more efficiently energy is used, and the lower the overall energy requirements of the population are, the easier it is to meet these needs from renewable sources alone. Sustainable energy supply is possible if energy efficiency gains go hand in hand with efforts to reduce dependence on fossil fuels, by promoting the utilisation of renewable energies.



Brazil: Energy-efficient construction and sustainable architecture for the climate

Energy-efficient construction techniques adapted to the local climate in conjunction with the use of renewable energies to meet remaining energy requirements lay the foundations for a substantial reduction in emissions of greenhouse gases in the building sector. In a programme supported by German development cooperation, architects, civil engineers, city planners and municipal decision-makers in the energy and planning sectors are learning to develop and use sustainable urban planning concepts that account for the need for more energy-efficient building planning. Urban planning concepts of traffic flow reduction and information on the use of alternative fuels round off the training programme.

In the Brazilian town of Manaus, compulsory regulations are being incorporated in invitations for tender for the construction of public buildings within the framework of this programme. The Faculty of Architecture of Manaus University is also involved. It has launched a new course in sustainability in urban areas and on the buildings of Amazonia, open to architects, civil engineers and city planners. Negotiations are also ongoing with the government of the state of Rio de Janeiro regarding options to take into account energy efficiency and socially acceptable concepts in the renewal of major favelas, or slum areas.

The modernization of windows – as here in China – saves energy and helps the environment.

Final remarks



Humankind's energy needs are growing. In order to satisfy those needs, we need a global shift in our approach to energy, based on a spirit of partnership. This is an issue on which the fate of developing countries and emerging economies hinges. Energy is crucial to economic development. In view of continuing climate change, however, there is no choice but to move away from fossil fuels to renewable, cleaner and safer forms of energy. It is already technically possible for all energy needs to be covered from solar energy, hydropower, biomass and geothermal energy. To increase the share of renewable energy sources in primary energy consumption, which currently stands at 18 per cent, efforts must, however, be made to

support the expansion of those forms of energy. How national and regional energy markets are managed and how rapidly renewable energies expand their market share is all a question of policy-setting. There is therefore an urgent need to examine what adjustments can be made to current government subsidies for fossil fuels, which amount to some 230 billion euros worldwide each year. In its development policy, Germany's aim is for developing countries to share in the opportunities offered by renewable energies, to enjoy sustainable economic development and to give more people access to energy.

ANNEX

Stakeholders:

BGR	Bundesanstalt für Geowissenschaften und Rohstoffe, www.bgr.bund.de
DED	Deutscher Entwicklungsdienst gGmbH, www.ded.de
DEG	Deutsche Investitions- und Entwicklungsgesellschaft mbH (KfW-Gruppe), www.deginvest.de
DIE	Deutsches Institut für Entwicklungspolitik, www.die-gdi.de
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit GmbH, www.gtz.de
InWEnt	Internationale Weiterbildung und Entwicklung gGmbH, www.inwent.org
KfW	Entwicklungsbank, www.kfw-entwicklungsbank.de

All stakeholders are working on behalf of the Federal Ministry for Economic Cooperation and Development to promote renewable energies and enhance energy efficiency in developing countries.

International Stakeholders:

ADB	Asian Development Bank, www.adb.org
AfDB	African Development Bank, www.afdb.org
EITI	Extractive Industries Transparency Initiative, www.eitransparency.org
EUEI	EU Energy Initiative for Poverty Eradication and Sustainable Development, www.euei.org
EUEI-PDF	EUEI Partnership Dialogue Facility, www.euei-pdf.org
GEF	Global Environment Facility, www.gefweb.org
IDB	Inter-American Development Bank, www.iadb.org
IPCC	Intergovernmental Panel on Climate Change, www.ipcc.ch
IRENA	International Renewable Energy Agency, www.irena.org
REN21	Renewable Energy Policy Network for the 21st Century, www.ren21.net
UNDP	United Nations Development Programme, www.undp.org
UNEP	United Nations Environment Programme, www.unep.fr/energy
UNFCCC	United Nations Framework Convention on Climate Change, www.unfccc.int
World Bank Group	www.worldbank.org

Documents:

- > Federal Ministry for Economic Cooperation and Development (BMZ) 2007: Sustainable Energy for Development. Sector strategy paper 154. Bonn.
- > Intergovernmental Panel on Climate Change 2007: Climate Change 2007. Synthesis Report. Cambridge.
- > International Energy Agency 2008: World Energy Outlook 2008. Paris.
- > International Energy Agency 2007: Renewable energy supply. An IEA fact sheet. Paris.
- > International Monetary Fund 2008: Food and Fuel Prices – Recent Developments, Macroeconomic Impact, and Policy Responses. Washington.
- > REN21 2008 a: Renewables 2007 - Global Status Report. Paris.
- > REN21 2008 b: Renewable Energy Potentials. Opportunities for the Rapid Deployment of Renewable Energy in Large Economies. Its Impacts on Sustainable Development and Appropriate Policies to Achieve It. Paris.
- > STERN, N. 2007: The Economics of Climate Change. The Stern Review. Cambridge.
- > United Nations Environment Programme 2007: Global Environment Outlook 4. Nairobi.
- > World Bank 2006: The Impact of Higher Oil Prices on Low Income Countries and the Poor: Impacts and Policies. ESMAP Knowledge exchange series No. 1. Washington.

Abbreviations:

ADB	Asian Development Bank
AfDB	African Development Bank
BIREC	Beijing International Renewable Energy Conference 2005
BMZ	Federal Ministry for Economic Cooperation and Development
CDM	Clean Development Mechanism
CEIF	Clean Energy for Development Investment Framework
CIF	Clean Investment Funds
CO₂	Carbon dioxide
DEG	Deutsche Investitions- und Entwicklungsgesellschaft
EITI	Extractive Industries Transparency Initiative
EU	European Union
EUEI	European Union Energy Initiative for poverty eradication and sustainable development
G8	Group of Eight
GEF	Global Environment Facility
GNESD	Global Network on Energy for Sustainable Development
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
IDB	Inter-American Development Bank
InWEnt	Internationale Weiterbildung und Entwicklung gGmbH Capacity Building International, Germany
IPCC	Intergovernmental Panel on Climate Change
IRENA	International Renewable Energy Agency
KfW Entwicklungsbank	KfW development bank
PPP	Public-private partnership
ODA	Official Development Assistance
REACH	Renewable Energy and Climate Change Programme
REN21	Renewable Energy Policy Network for the 21st Century
SECCI	Sustainable Energy and Climate Change Initiative
UNEP	United Nations Environment Programme
WCD	World Commission on Dams
WHO	World Health Organization
WIREC	Washington International Renewable Energy Conference 2008

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