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Climate Protection

DBU Expert information

More momentum for climate protection

Human-induced climate change is becoming increasingly perceptible. Global warming is currently around 1 °C compared to the second half of the 19th century. As a consequence, we are currently experiencing more and stronger extreme weather events, and changes in the earth system have become demonstrable. These include, for example, the decline of arctic ice and the worldwide bleaching of coral reefs.

The German population is also aware of the effects of climate change. At present, 74 % of the people are demanding more commitment to climate protection. 22 % consider the current level of commitment to be sufficient, and only 3 % think that less should be done (according to a survey conducted in 2018 by the German public broadcaster ARD). This means there is a lot of support for climate protection within the German society.

The Paris Agreement on Climate Protection was signed in 2015. Therein, the global community committed itself to reducing global warming to significantly less than 2 °C, if possible even to 1.5 °C. The reason for this planetary boundary lies in the self-reinforcing effects that would occur if this number is exceeded and that would then further intensify climate change. Examples of this are an ice-free Arctic – as the water surface, which is darker in comparison to ice, leads to an increased absorption of solar energy – or the release of climate-damaging methane through the defrosting of permafrost soils.

The Intergovernmental Panel on Climate Change (IPCC) states in its current report that the 1.5 degree target is still achievable. This would require »swift and drastic measures«. The report shows that consequential costs rise significantly with every tenth of a degree in the temperature's increase.

The Deutsche Bundesstiftung Umwelt (German Environmental Foundation, DBU) supports the goals of the Intergovernmental Panel on Climate Change and promotes the development of solutions for climate protection. In this expert information on climate protection, we present examples of our funding activities and discuss the consequences of climate change with the winner of the 2015 German Environmental Award, Prof. Dr. Mojib Latif.

We thus aim at providing impetus to climate negotiations and to the forthcoming structural change in Germany. The IPCC report makes it clear that we need faster action for climate protection and for the implementation of the Paris Climate Agreement.

Special Report of the Intergovernmental Panel on Climate Change (IPCC) on global warming by 1.5 °C
Debra Roberts, co-chairperson of IPCC Working Group 2 on the risks of climate change to nature and society, said on the occasion of the publication of the 1.5 °C Global Warming Special Report:

»The next few years are probably the most important in our history. The decisions we make today must ensure a safe and sustainable world for all human beings both now and in the future.«

DBU promotes climate protection and energy projects

Global climate change represents one of the greatest challenges of the 21st century. Whether companies, private households, the federal government, the federal states or local authorities – they all have to develop action strategies, and climate protection measures must be implemented everywhere.

The German Environmental Foundation wants to point out solution approaches for climate protection at very different levels. In its promotional business, the DBU is guided by the Sustainable Development Goals - SDG as established by the United Nations and by the concept of planetary boundaries, in each of which climate protection plays a central role.

This becomes particularly clear when it comes to the topic of energy. Keeping in mind the climate goals that Germany has agreed to pursue, the DBU supports a variety of measures in the area of **»renewable energies, energy saving and energy efficiency«** that contribute to climate protection. In addition to the expansion, distribution and storage of renewable energies, a great deal of potential is ascribed to increasing energy efficiency and implementing energy-saving measures in industry, business, trade and the service sector. The focus is also on the overall energy system. Among other things, the DBU supports measures intended to link the consumption sectors of energy, heat and mobility. In addition to the development and testing of new technologies, digitisation plays a major role in all areas, as does the environmental and social sustainability of different measures. Aspects of participation and social acceptance are just as important for the DBU as target-group-specific communication and educational measures.

In addition to the areas mentioned above, urbanisation is also an important part of the DBU's funding activities. On the one hand, urban areas offer great potential for energy saving and innovation. On the other hand, cities are particularly vulnerable to the impacts of climate change. Here, the DBU is supporting projects that contribute to climate protection and climate adaptation.

In our funding topic **»Neighbourhood Development and Renewal«,** measures to reduce the consumption of resources, to conserve the natural resources, to protect the climate and to adapt to climate change are supported in particular. In this regard, approaches for the energetic renewal of neighbourhoods and for the storage and use of renewable energies can be taken into consideration, as can be the resource-conserving modernisation of grid-connected infrastructures and innovative concepts of a green infrastructure.

Green roofs are able to improve the urban climate.

Through the funding topic **»Climate- and Resource-Saving Construction«,** the DBU aims to make a contribution to having a climate-neutral and health-friendly stock of existing buildings by 2050. On the one hand, the potential of having energetically optimised existing buildings shall be demonstrated on the basis of a model. On the other hand, future-oriented concepts and technological approaches must be developed and tested as the primary drivers of innovation. In this regard, the DBU particularly promotes holistic optimisation within one integral planning phase. A specific funding approach is the increased use of wood as a renewable raw material.

The DBU promotes the use and acceptance of wood as a building material.

Please find further information at:
www.dbu.de/foerderthemen

»The solutions exist. All we have to do is utilise them.«

In an interview with the DBU, Prof. Dr. Mojib Latif, Head of the research unit Ocean Circulation and Climate Dynamics at the GEOMAR Helmholtz Centre for Ocean Research in Kiel and winner of the 2015 DBU Environmental Award, comments on the state of implementation of the climate protection objectives and the current consequences of climate change.

Mr Latif, the summer of 2018 was extremely dry and hot, especially in large parts of Germany and Europe. Are these current extreme weather conditions really indications of climate change? After all, such hot summers have also occurred several times in the past, for example in 1976 or in 2003.

Mojib Latif: It is another little piece in the puzzle. Of course there were also hot summers in former times. However, they now occur more frequently due to climate change, i.e. global warming. For example, the very hot days with temperatures of 30 degrees and above have increased significantly over the last decades, as well as tropical nights when temperatures no longer fall below 20 degrees.

Some scenarios already warn of a hot age with global warming by 4 to 6 degrees and a sea level rise of up to 60 meters. How likely do you think such forecasts are?

Mojib Latif: I consider such scenarios to be unrealistic if we meet the target of the 2015 Paris Climate Agreement to limit global warming to well below 2 degrees.

Do you have any hope that climate change can still be halted? How can we limit global warming and still achieve the 2-degree target of the Paris Climate Agreement?

Mojib Latif: Absolutely. Above all, we need to rebuild the world´s energy systems. The solutions exist. All we have to do is utilise them. The past shows that technological change can take place within a few decades.

How much time does mankind still have before the consequences of climate change will spiral out of control?

Mojib Latif: Humans are conducting a gigantic experiment with earth. We are in the midst of climate change, and the effects are already partially overstressing us today, as the summer of 2018 has made very clear. Whether we have already initiated some irreversible processes cannot be confirmed on the basis of the current state of research. The same applies to the question of how much time mankind still has before climate change can no longer be controlled.

Germany was once regarded as a pioneer in climate protection - now we are likely to clearly miss our target of 40 percent less CO_2 emissions than in 1990. What are the reasons? Where do you see the greatest need for action?

Mojib Latif: Politicians only think in the short term. And they are afraid of talking about uncomfortable truths. That is why a topic like climate protection is being put off time and time again. We need radical changes in order to still achieve the Paris Agreement target: mainly in the energy sector, but also in the transport and agricultural sectors.

Earth has already warmed by one degree centigrade since the start of industrialization. Climate impacts such as droughts, forest fires, extreme rainfall and flooding events are on the increase. Do we also need to make a greater effort to adapt to climate change? What do we have to do in this regard?

Mojib Latif: In Germany, we are not yet well adapted to climate change. This is made clear to us year after year during extreme weather situations. We need to prepare better for heat waves and heavy rain. Urban planning, for instance, needs to be reconsidered. There should be more green space and water expanses in the cities, as well as more places in the shade. Planted facades would also have a cooling effect. In addition, you should not cover all the urban space with concrete so that the water can still run off in case of heavy rain. Green roofs could also have a delaying effect and hold back the water for a short time. However, we should not forget climate protection itself, i.e. the reduction of greenhouse gas emissions. For what we are experiencing today is just the beginning.

DBU: Commitment to climate protection in Poland

The DBU is also in great demand as an international partner for the exchange of information, the transfer of knowledge and the promotion of projects. In this respect, the focus of its international funding activities is on Central and Eastern Europe. Here, the DBU has already been active ever since its foundation in 1991, among other things through a scholarship programme. One of the main partner countries is Poland. In the following, some projects from Poland with relevance for the climate protection shall be presented.

»Through our international funding activities, we are providing impulse to climate protection. In this regard, we aim to strengthen the transfer of knowledge between Germany and Central and Eastern Europe in particular, but also between Germany and countries outside Europe.«

Dr. Cornelia Soetbeer, Head of Environmental Communication, Cultural Heritage Protection and International Contacts

Exemplary learning locations Bielawa

After the awareness for renewable energies and their relevance for climate protection also grew in Poland at the beginning of the millennium, the DBU promoted the development of Poland´s first solar school in Bielawa in Lower Silesia in 2001. In the meantime, the pilot project has developed into a centre for regenerative environmental technology in cooperation with the vocational schools in Bielawa. The facility offers professional qualifications and opportunities to gain practical experience to craftsmen, plumbers and technicians. In 2013, the aspect of energy efficiency was added to the undertaking through another funding project. Young craftsmen were trained, according to the »learning-by-doing« approach, on the energetic refurbishment of an old hall. The hall is now being used as a learning location for energy-efficient construction. The hall, the solar school and the centre for regenerative environmental technology are exemplary locations of learning for environment-related vocational training, which have earned nationwide recognition in Poland.

Journalist award for climate protection, renewable energies and energy efficiency

Taking into consideration that climate protection is not at the centre of the consciousness of Polish citizens and politicians and that EU targets on CO_2 reduction, on the intensified use of renewable energy sources and on increasing energy efficiency are viewed with scepticism in the public debate and barely discussed in the media, the German Embassy hit upon the idea of establishing an environmental journalist award in Poland in 2012. The journalist award honours outstanding contributions to climate protection, renewable energies and energy efficiency, and contributes to creating awareness among the general public for climate and environmental issues as well as for the opportunities of renewable energies. In 2017, the prize, which is awarded once a year and endowed with € 5,000, went to the editors Joanna Tryniszewska and Joanna Klimowska-Kronic from the public TV channel TVP1 for their eight-part film series »A Breeze of Energy« on the use of renewable energies.

Children protect the climate – an educational competition for primary schools in Poland

The educational competition of the Krakow Children´s University Foundation is aimed at imparting basic knowledge on climate change and climate protection to children and young people at Polish primary schools (7-14 years of age). The project puts out a competition for primary school pupils in Poland, in which they are able to take part with their own local climate protection campaigns. Central topics include the energy relevance of fossil fuels, the potentials of renewable energies, mobility and individual transport, climate adaptation in urban landscapes and one´s own way of behaviour. The main prize of the competition is the chance to participate in the COP24 climate conference in Katowice in December 2018. The winning school classes will have the opportunity to address climate change-related demands to the COP participants. A press conference will also be organised for Polish and foreign journalists, at which the children will ask the conference participants to implement their demands for climate protection and for the fight against climate change. A concluding conference for education experts, pedagogues and scientists at the University of Krakow will mark the end of the project.

DBU: Innovations for climate protection

The goals, which the DBU has set itself for its funding activities, include the objective of reducing greenhouse gas emissions and thus contributing to climate protection through specific practical examples. One thing is clear: a task as complex as climate protection cannot be handled in a mono-disciplinary manner. Therefore, very different approaches are pursued in the funding programme. In addition to technical solutions for the use of renewable energies and greater energy efficiency in industry, trade and commerce, the DBU focuses, for example, on the construction sector, but also supports innovative concepts in environmental education and communication. In the following, exemplary DBU projects from some of these areas shall be presented.

»Small and medium-sized enterprises are not only a driving force of innovation, but also of climate protection. The SME sector is therefore a key partner for the DBU´s funding activities. Together, we implement innovative model projects to protect the environment and the climate. Digitalisation opens up new opportunities and business models and is able to offer real added value for climate protection.«

Alexander Bonde, Secretary General of the German Environmental Foundation

Global complete supply from renewable energies is possible (AZ 33710)

In order to achieve the objectives of the Paris Climate Agreement - i.e. to limit global warming to a maximum of 2 °C or 1.5 °C - the transformation of the energy system towards renewable energy sources and greater energy efficiency must be significantly accelerated. In a DBU-funded study, the Ludwig Boelkow Foundation in Ottobrunn and the Energy Watch Group in Berlin, together with the Lappeenranta University of Technology (Finland), want to show that global and cost-effective complete supply from renewable energies is possible in all sectors (electricity, heat, mobility). The major challenge in the transformation of the energy system is to achieve synergies between different renewable energy resources and different regions. In November 2017, a study on the electricity sector was published as a first partial result, which provides political decision-makers as well as stakeholders from the economy and the civil society with data on the feasibility, financeability and security of supply of an electricity system that is based on renewable energies. The core statement of the study is: A global shift towards 100 % renewable electricity is feasible. And it can be made available at any hour of the day and at a lower cost than offered by the existing system, which is largely based on fossil fuels and nuclear energy. The energy transition is essentially a question of political will, not of technology or cost effectiveness. The study on the electricity sector is available online at: http://energywatchgroup.org/studies

Energy efficiency in small and medium-sized businesses

Next to the energy sector, the industrial sector is the second largest cause of greenhouse gas emissions in Germany. This means that a major lever for climate protection lies with the industry. The DBU wants to promote innovative approaches, particularly among small and medium-sized enterprises, in order to reduce the use of energy in all processes including the associated operating technology, to reduce the energy consumption of the manufactured products and to achieve a more sustainable use of operating technology.

SME in virtual power plants (AZ 33154)

A virtual power plant is a combination of decentralised electricity producers and consumers which can take over the tasks of a conventional power plant or a pump storage facility by means of coordinated action. The project team around the ebök Institute in Tübingen wants to figure out how small and medium-sized enterprises (SME) from different industries can be integrated into a virtual power plant.

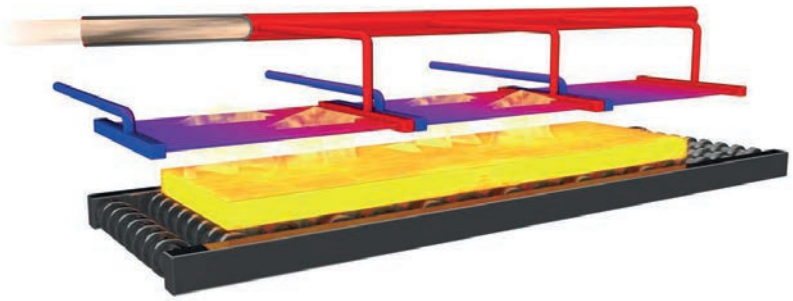
Through flexible operations of their producers and consumers, the companies shall help to compensate for fluctuations in the electricity grid that are caused by fluctuating, regenerative sources. Under the chosen multi-agent approach, in the style of an industrial symbiosis, the companies negotiate their electricity supplies on a communication platform with an aggregator, while retaining complete control over their processes and data. For the virtual power plant, this means a paradigm change from remote control to cooperation. The project team will develop a guideline for SME and aggregators.

Simple determination of electrical parameters (AZ 29990)

Experience has shown that an energy management system in industrial companies has the potential to reduce energy consumption by 5 to 10 % through non-investment or low-investment measures alone. For this purpose, however, the consumption of electricity, heat, gas, compressed air and other media must be recorded at a sufficient number of measuring points within the company. Corresponding measurement technology is often too large for retrofitting, and subsequent installation is costly and time-consuming. In a DBU project, EurA Innovation GmbH in the federal state of Thüringen has now succeeded in developing a new type of measuring system that is able to record electricity consumption much more cost-effectively than was previously the case. This opens up an economical option for energy management and, at the same time, for monitoring systems, in small and medium-sized enterprises as well.

Energy recovery in steel production (AZ 30570)

In steel production, raw iron is first produced in a blast furnace. The finished steel is then cast in continuous casting plants into rectangular steel blocks, the so-called slabs. After the slabs have been cut to size, they still have a temperature of around 1,000°C. They are then placed in a slab store via roller conveyors, where they are cooled down to about 100 °C. The aim of Metallurgie und Umwelttechnik SMS group GmbH was to recover part of this heat and use it as process heat. For this purpose, a suitable heat exchanger was developed which is designed in such a way that it can absorb the radiant heat of the slabs as optimally as possible and feed the heat quantity into the internal network of the production plant. The pilot plant shows that the radiant heat can be used and that further potential to increase performance exists.



Environmental education and communication

The central objectives of sustainability and sustainable development education are to introduce children and young people to nature, environmental issues, natural science and technology time and again along their paths of life. These topics play a central role across all of the DBU's funding areas.

Municipality for climate protection (AZ 32848)

Climate protection concepts in cities and municipalities are often the result of close cooperation between municipalities and external experts. To date, it has been rare for young people in particular to be involved as essential players in the future of local government. In a DBU project, the Energy and Environment Centre at the Deister in Springe is working, in focus groups and real laboratories, on how municipal issues can be integrated into school education and how municipalities, teachers and young people can become more closely involved, for example, in climate protection issues. The aim of the project is to increase the acceptance of climate protection through immediate connection with one´s own place of residence and to actively involve young people in shaping their living environments. Specific topics include (bicycle) mobility concepts or participation in neighbourhood developments.

KEEP COOL – a game for climate protection (AZ 31740/33898)

The fact that knowledge about climate change and climate politics can also be imparted in a playful way is shown by the board game KEEP COOL. In a DBU project, the game was digitally adapted in 2016. On smartphones, tablets and PCs young people take over the leadership of metropolises and become actors in global climate politics. In another DBU-funded project, the game is now being developed for Eastern Europe by the Humboldt-University in Berlin. Young people are to be trained and motivated to commit themselves to climate protection, the expansion of renewable energies and the UN sustainable development goals (SDG). The project establishes networks between young people in Eastern European countries with young people from Germany, and encourages them to make a joint effort for the sake of climate protection and the expansion of renewable energies.

Construction

To achieve the federal government's goal of having a climate-neutral stock of buildings by 2050, diverse and interconnected strategies are of great importance within the construction industry. New buildings offer chances for future-oriented concepts and innovative technological approaches. However, the optimisation of existing buildings also offers great potential, for example for energy efficiency measures. This is where the DBU's funding projects in the field of construction are coming in.

Grammar school in energy-plus standard (AZ 29892)

The DBU model project Schmuttertal Grammar School in Diedorf near Augsburg is regarded as a lighthouse project and has already been awarded numerous prizes such as the German Sustainability Award and the German Architecture Prize. Built according to the energy-plus standard, it is a timber construction in modular design, offering a possibility to adapt the educational concept to changing framework conditions. The energy planning department has developed energy-efficient solutions for all energy-relevant aspects of the building in coordination with all the other stakeholders involved in the planning process - on the basis of a reason-able implementation effort and expenditure. The solutions include an outstanding insulation standard, efficient sun shield solutions, aerodynamically efficient ventilation systems, a photovoltaic plant and efficient heat recovery units. The grammar school is thus also a model for climate-friendly construction.

Energy- and resource-saving construction in existing buildings (AZ 22566)

The energy efficiency of existing commercial buildings has so far not been optimised to any great extent. What is ecologically and economically possible in this area is demonstrated by the modernisation of the administrative and operational building of the waste management company in Remscheid, which is being funded by the DBU. In addition to energy efficiency and climate protection aspects, the focus of this project was also on the efficient use of materials and resources.

In the course of the refurbishment, various façade constructions made of synthetic material and glass were compared and examined in terms of their ecological balance sheet. The insulation and lighting functions, the passive and active use of solar energy, design-related and economic consequences and the »ecological backpacks« in extracting raw materials and processing of components were all taken into consideration. As a result of the modernisation, it was possible to reduce primary energy requirements by 75 %. The project made a contribution to a catalogue of measures on energy- and resource-saving construction in existing buildings.

DBU: Solutions for climate protection

The Special Report of the Intergovernmental Panel on Climate Change (IPCC) presented at the beginning of October 2018 shows that limiting global warming to 1.5 °C is still possible. If global climate protection efforts are not significantly intensified, however, the 1.5 °C warming threshold will already be reached in 2040 or even 2030. The effects on humans, but also on biodiversity on planet Earth, would be considerable.

The German Environmental Foundation wants to make its contribution to achieving the objectives of the Paris Climate Agreement and keeping global warming below 1.5 °C. According to the IPCC report, this requires global carbon dioxide emissions to decrease by 45 percent by 2030 in comparison to 2010. In contrast to previous reports, the Intergovernmental Panel on Climate Change has now introduced 2010 as the year of reference in this regard and no longer refers to 1990 as in the past. The reduction to zero emissions will then be necessary by 2050.

Within this context, climate change must not be considered as an isolated phenomenon. According to the concept of planetary boundaries, progress must be made in all the areas that influence the stability of the earth system. In addition to climate change, this applies in particular to biodiversity, nitrogen and phosphorus as well as to changes in terms of land use. Quick and consistent action is hence required in connection with a simultaneous sustainability assessment of the measures concerned.

The potentials of energy efficiency

What is needed is a rapid and drastic transformation of our energy system and the economy. This applies to all sectors: energy production, industry, mobility, buildings and land use. The climate targets will only be achievable if energy is used much more efficiently all across our societies. Industrial processes continue to offer great potential in this regard.

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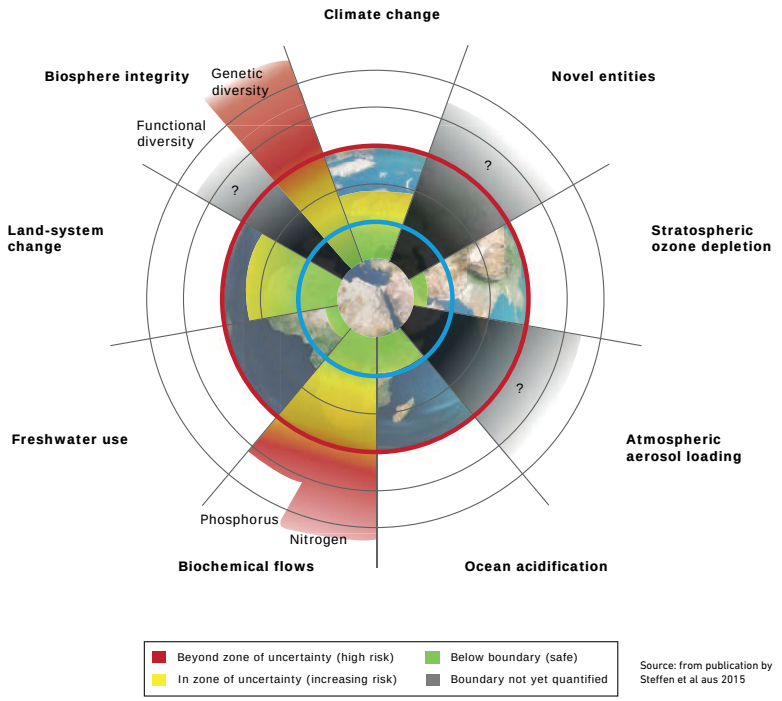
However, energy efficiency must also be increased significantly in terms of buildings and mobility. As soon as possible, new buildings should be designed as energy-plus buildings that consume less energy than they generate over the course of the year. Building with wood also holds great potential. In the transport sector, the alternatives to individual automobile transport and electromobility offer high savings potential. In all these areas, DBU funding provides impetus through innovative and exemplary projects.

Secure energy supply based on renewable energies is feasible if the sectors of heat, electricity and mobility are linked together in a reasonable way. Digitisation is the key to operating such new intelligent networks.

Particular attention must also be paid to the production and processing of energy-intensive materials. This requires alternative materials and new energy-saving manufacturing and processing methods.



The Planetary Boundaries describe nine important fields to maintain the carrying capacity of the earth systems (chart taken from Steffen et al 2015).

Innovative strength of SME
SME with their especially powerful innovative strength in Germany are able to particularly promote such developments. Many innovations are created in this particular area. Small and medium-sized enterprises are therefore a key target group for DBU funding.

Technically, it is possible today to achieve the climate objectives. In addition to technical developments, especially by Germany´s so important small and medium-sized enterprises, research projects, education and communication are also important starting points for climate protection.

The necessary transition to a climate-neutral economy will require considerable efforts. In this context, the German Advisory Council on Global Environmental Change refers to a »great transformation« and draws analogies to the industrial revolution.

This social process must be shaped systematically. Not only technical, but also social and societal innovations are required.

Sufficiency, i.e. the decision in favour of conscious and reduced consumption, can also make its contribution to climate protection. Innovative educational and communication approaches play an important role in this context.

The German Environmental Foundation promotes innovations that contribute to the success of such processes. Together with our partners, we will feed the solutions developed in this manner into the process of transformation and also contribute internationally to the success of the Paris Climate Agreement.

No investment into coal
In order to achieve the climate protection targets, the entire energy required for electricity, heat and mobility must be generated from regenerative sources by 2050. This requires a rapid expansion of renewable energies and, at the same time, the abandonment of fossil fuels such as coal. Since the prices of renewable energies have fallen in recent years, this is economically feasible. The DBU as an institution is making a specific contribution in this respect, having decided already in 2016 not to make any further new investment into the coal sector and to reduce existing commitments.

We promote innovations

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