



中国科学院
CHINESE ACADEMY OF SCIENCES



Leopoldina
Nationale Akademie
der Wissenschaften

Joint Announcement of the second *Science for Future*-Conference
by the Chinese Academy of Sciences (CAS) and the German National
Academy of Sciences Leopoldina:

On the Path to Carbon Neutrality

The Chinese Academy of Sciences and the German National Academy of Sciences Leopoldina have worked together on the basis of a close partnership and mutual trust for many years. In 2018, we launched the *Science for Future* initiative with the goal of highlighting the important role of basic science for society. Under this initiative, we will hold a joint conference in the autumn of 2024 on the challenges of achieving carbon neutrality. With this announcement, we wish to underline the importance of the topic in preparation of our joint conference.

With the Paris Climate Agreement of 2015, 196 parties committed to significantly reduce their carbon emissions in order to hold the increase in the global average temperature to below 2 °C above pre-industrial levels. Achieving carbon neutrality means emitting no more greenhouse gases than can be removed from the atmosphere. Carbon sinks can be part of the biosphere, such as consolidation and enhancement of carbon sequestration in forests and wetlands, or recognized as an important component of anthropogenic carbon sinks such as utilization or storage of carbon post capture from air or point sources. The achievement of carbon neutrality, however, hinges on the rapid reduction of carbon emissions from fossil energy sources that cannot be substituted by any carbon management technology.

The world's largest industrialized nations have a major role to play in mitigating the harmful effects of climate change. It is therefore the responsibility of the major industrialized nations – including China and Germany – to control and reduce their greenhouse gas emissions, particularly CO₂, to a level that is likely to have a mitigating effect on the climate crisis.

National strategies

China and Germany both have strategies to achieve carbon neutrality within the next few decades. China aims to peak its CO₂ emissions before 2030 and achieve carbon neutrality before 2060. Germany aims to become carbon neutral by 2045. Reducing the use of fossil fuels, increasing the share of renewable (clean) energies such as solar, wind or

hydropower, promoting ecological conservation, vegetation restoration as well as systemic carbon cycle management including carbon capture and use are part of both countries' strategies. Increased electrification of transport, industry, heating and cooling systems with clean electricity supported and augmented by low-carbon hydrogen and its derivatives are key elements in the respective low-carbon energy strategies of our countries.

Obstacles

Both China and Germany continue to rely heavily on fossil fuels in their energy systems. The share of coal, natural gas, and petroleum still accounts for more than three-quarters of the energy mix of both countries. Obstacles to achieving carbon neutrality are posed by lacking maturity and world-scale demonstration of the relevant technologies, by economic reasons and resource scarcity, for example in energy-related construction and building refurbishment/renovation, by challenges in transforming industrial energy-intensive processes, and greenhouse gas-intensive agricultural practices, by missing changes in land-use patterns and by lacking adaptation of consumer habits.

Potentials

Both countries are ambitiously driving forward the expansion of renewable energies in all sectors, conservation and restoration of the ecology, and have set the achievement of carbon neutrality as a major goal for the decades to come. For both China and Germany, the most important segments of resource-efficient technologies are the energy systems, energy efficiency and sustainable mobility. In both countries, intensive research is being conducted on energy conversion, on carbon utilization and storage and on the development of essential novel industrial processes and the necessary materials for sustainable techno-economic ecosystems. Based on fundamental insights, the rational design concept will lead to upgrades and scaling of existing technological solutions and allow to find groundbreaking new ones.

Science-related topics in the context of carbon neutrality

Given that the challenges in China and Germany are similar in many respects, the German National Academy of Sciences Leopoldina and the Chinese Academy of Sciences believe that the following topics are crucial to achieve carbon neutrality.

Transition to a carbon neutral energy system:

- ▶ Reduction and gradual substitution of fossil fuel and build-up of carbon-neutral and resilient energy systems through efficient clean energy conversion accompanied by storage or reconversion processes, demand side management and the roll-out of smart grids.
- ▶ Pathways of the clean and low-carbon transition in industry, particularly in heavy industry.
- ▶ Defossilization of the transportation sector by evolving e-mobility and implementation of the production and use of e-fuels (where necessary).
- ▶ Monitoring of emissions and balance to ensure precise assessment and prediction of global carbon balance.

Renewable energies and carbon-neutral technologies:

- ▶ Innovations in the application of clean technologies.
- ▶ Adequate long-term support and infrastructures for the translation of basic research results into innovation.
- ▶ Academia-industry cooperation in translational research and scaling development.

Carbon sink function of ecosystems:

- ▶ Ecological protection and restoration to enhance the function of ecological carbon sinks.
- ▶ Long-term monitoring and assessment of carbon sequestration in natural ecosystems.
- ▶ Application modes for carbon utilization and storage in natural systems.

International cooperation on energy and climate issues:

- ▶ International cooperation within the framework of partnership-based associations, e.g., climate alliances.
- ▶ Access to data sources for monitoring the current status of all terrestrial compartments and focus on the identification of effects arising from the introduction of sustainable energy systems.
- ▶ Global carbon dioxide pricing mechanism and a global carbon market.
- ▶ Availability of carbon neutral technologies at affordable prices for the green and low-carbon transition of the society.

Science for Future-Conference 2024 “On the Path to Carbon Neutrality”

The guiding questions for the joint conference by CAS and Leopoldina to be held in Berlin on October 29 and 30, 2024 will be based on the above listed topics. High-ranking scientists as well as young scientists from both countries will present the latest research on these topics and will discuss and compare national approaches to tackle the challenges on the path to carbon neutrality.



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