Photo: Axel Griesch

Dear Readers,

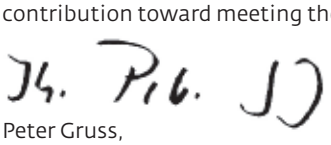
We are currently confronted with a seemingly insoluble dilemma: According to the International Energy Agency (IEA), global demand for energy will increase by around 50 percent by the year 2030. Yet during the same period, carbon dioxide emissions worldwide must be cut in half if we are to limit global warming to around 2 degrees Celsius by the end of the century. Such is the summary of current forecasts in the eyes of the German Advisory Council on Global Change. There is only one way out of this precarious situation: through intensive research into entirely new technical approaches to energy generation and conversion. It is not enough to tinker with our current energy mix in order to bring us much closer to the goal of sustainable energy supply. What we need, instead, are innovations of the kind that only basic research can provide.

Max Planck scientists are thus working to develop new materials for solar cells and fuel cells; they are attempting to reproduce the solar furnace here on Earth, and to extract energy from plant waste; they are exploring ways to store hydrogen more safely and more compactly; and they are laying the foundations on which to make batteries so efficient that they can also power vehicles.

As the former chief economist of the World Bank, Nicholas Stern, writes in his book *The Global Deal*, new technologies and investment opportunities in low-carbon-dioxide and renewable energies will, in the coming decades, become the principal drivers of sustainable economic growth. They also offer the only chance to slow down the global rise in temperatures associated with climate change. Stern therefore calls for more public-sector support for technology and research: "It is of the utmost importance," Stern writes, "that research institutions throughout the world receive the support they need to impartially develop new ideas."

If new results are to contribute as rapidly as possible to resolving the energy issue, basic research should ideally be working hand in hand with applied research. This is precisely the function of many joint projects shared between Max Planck and Fraunhofer Institutes, two of which we present in this issue: In the ProBio project, scientists at the Max Planck Institute for the Dynamics of Complex Technical Systems are working together with colleagues at the Fraunhofer Institutes for Factory Operation and Automation and Ceramic Technologies and Systems to develop a new generation of fuel cells that are powered ultimately by biomass. Furthermore, chemists at the Max Planck Institute for Solid State Research are cooperating with the Fraunhofer Institute for Silicate Research in order to draw out particularly heat-resistant ceramics to create new types of fibers for composite materials.

However, these fundamental technical challenges are not the only issues that climate change and future energy supply pose for us. The human sciences, too, are confronted with new questions. Researchers at the Max Planck Institute for Comparative Public Law and International Law are studying the legal implications of geoengineering: How can large-scale interventions aimed at restricting climate change be compatible with international law if there is a risk that they may have undesired side effects? The articles in this issue of MaxPlanckResearch alone show the scale of the tasks the world, and scientific research in particular, is facing in the short and medium term. They also clearly demonstrate that the Max Planck Society is making a major contribution toward meeting these challenges.



Peter Gruss,
President of the Max Planck Society