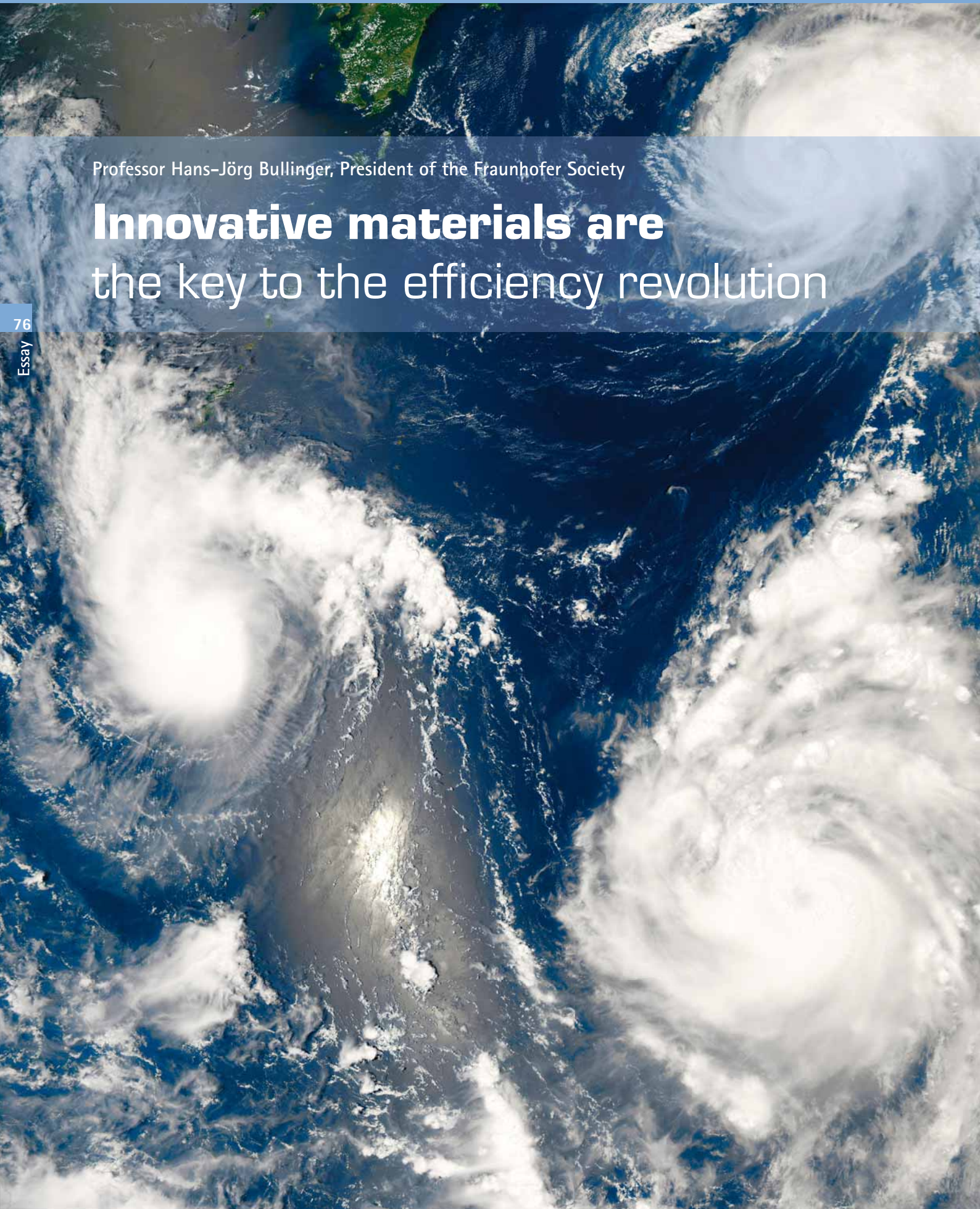


Professor Hans-Jörg Bullinger, President of the Fraunhofer Society

Innovative materials are the key to the efficiency revolution



Climate champion: Professor Hans-Jörg Bullinger, President of the Fraunhofer Society, considers chemical and materials research as the technological pacemakers in climate protection.



Calculations show that Germany has the potential to cut its CO₂ emissions by as much as 40 percent by 2020. This would not only make a lasting contribution to climate protection, it would also benefit the economy. In his essay, Professor Hans-Jörg Bullinger argues that such an achievement is only possible if companies take advantage of the opportunities offered by efficiency technologies and access new markets with innovative products.

According to projections by the International Energy Agency (IEA), world energy demand will increase 50 percent by 2030. At the same time, fossil fuels, which today supply over 80 percent of primary energy, will deplete steadily and soar in price. We can only escape this dilemma by developing renewable energy sources and, more importantly, starting an efficiency revolution: the consumption, conversion, storage and distribution of energy will undergo fundamental change over the next decade. The primary objective must be to conservatively manage non-renewable resources, reduce specific energy consumption and minimize losses. This is the only way we can preserve Germany's economic efficiency.

Climate protection pays and has a positive impact on the labor market, as demonstrated by the KlimInvest 2020 Project, carried out by the Fraunhofer Institute for Systems and Innovation Research (ISI) and the Potsdam Institute for Climate Impact Research (PIK). What our study also showed is that enhancing energy efficiency is the key to reducing greenhouse gas emissions in the various sectors of our industrial society.

Industry, which consumes 40 percent of all energy, is capable of cutting energy consumption by up to 30 percent in the medium term.


Industry could cut energy consumption by 30 percent

Roughly 40 percent of energy consumption and 20 percent of CO₂ emissions in Germany are attributable to buildings. Annual CO₂ emissions currently total 170 million tons. The greatest effects can be achieved by modernizing building stock. Old buildings can be retrofitted with climate-friendly technologies. Further potential can be exploited by improving insulation and materials or developing new ones, such as vacuum panels and phase change materials, until we achieve the zero-emissions building.

Research and development activities in chemical and materials engineering are pacemakers of technology that play a key role in numerous climate innovations. For example, high-performance materials and systematic lightweight construction are what make efficiency gains in automotive and power plant

engineering possible in the first place by advancing innovative construction methods, materials and technologies.

New, high-performance electrical energy storage systems, fuel cells or organic solar cells are also essentially the result largely of materials development activities, as are high-tech phosphors and light-emitting diodes. One-fifth of the electrical energy we consume worldwide is used for lighting, the majority being lost as heat, because conventional incandescent light bulbs are relative inefficient. OLED technology for highly efficient lighting is heralding a revolution in this sector as well. New, customized materials enable solutions to today's challenges. However, the economy must take advantage of the opportunities offered by efficiency technologies and open up new markets with innovative products.

 www.fraunhofer.de/en/
The website of the Fraunhofer Society provides further information on this subjects.