

Abstract

A Sustainable Energy Future - Challenging the Whole Knowledge Chain from Basic Research towards Innovation

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The future of our societies has to be based on a clean, affordable and reliable energy supply. This includes all modes of energy for electricity production, for transportation and for heating and cooling, both for living and for industrial processes. Due to the limitation of fossil resources and due to the mitigation strategies fighting against anthropogenic climate change effects we are undergoing in the 21st century globally a transformation phase from fossil energy sources based on oil and coal towards renewable and climate protecting other sources of energy. These might be based on various forms of solar energy, directly used as solar thermal or photovoltaic energies or indirectly used as wind or biomass, or it might be provided by nuclear fusion or fission even as the latter ones are under public discussion. The energy system integration includes energy transformation, energy storage and distribution and its most efficient way of utilization.

This key lecture will give an overview on the whole research chain from fundamental basic research on materials science and transformation processes up to the implementation challenges including the technology application, the socio-economic questions, the acceptance by citizens, and the necessary innovation steps. With special respect to the German policy and research priorities the transformation of the German energy system and its consequences will be regarded as possible patterns for the future energy research focuses.

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