

For a Sustainable Tomorrow

Energy, Resources, Storage: Geosciences Change the World

How do we produce enough emission-free energy to meet our personal and industrial demands? What do we do when at certain times there is more energy being produced than needed: How can we store it reliably? What are the opportunities offered by geothermal energy, and is there natural hydrogen to be found underground? How do we remove CO₂ from its natural cycle and store it permanently, ensure reliable mobility without fossil fuels, meet the growing global resource demand, and which resources are especially critical? Where do we get the volumes of groundwater needed for drinking but also for agriculture as the world population keeps growing? What are the necessary regulatory policies for all of this?

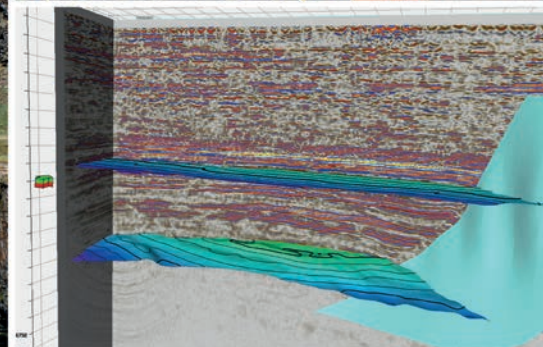
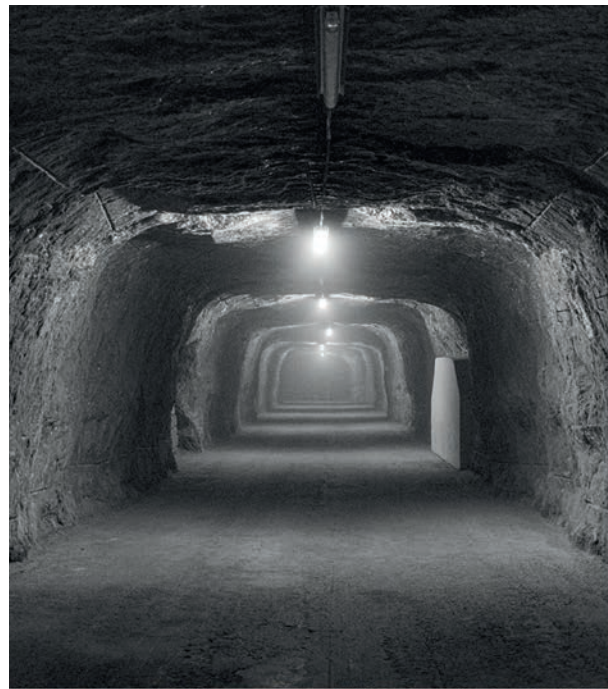
The questions are manifold and increasingly urgent. What is at stake is nothing less than the preservation of our livelihoods. Against this backdrop, an energy transition and a mobility transformation are not merely optional, they are desperately needed. And they will not happen naturally but require lots of resources and large storage systems, as is demonstrated by the overwhelming majority of studies. Applied interdisciplinary solutions are therefore needed more than ever. "We will have to rely on expertise from geosciences," KIT President Professor Holger Hanselka is certain and, in this light, he opened the virtual conference GeoKarlsruhe21 "Sustainable Earth – from processes to resources" hosted jointly by KIT and Deutsche Geologische Gesellschaft – Geologische Vereinigung (DGGV, German Geological Society) in September 2021. "Whether it is drinking water or food, metals or plastics, building materials or storage caverns for hydrogen – without geosciences, neither the energy transition nor modern

life in general would be possible," says Professor Christoph Hilgers of the Institute of Applied Geosciences (AGW), who chaired the conference.

Around the globe, the conference was met with a positive response, as was reflected by the high number of participants: Around 700 scientists from basic

more importantly, for discussions. "Communication between science, economy, and society is especially vital," KIT Vice-President Professor Thomas Hirth states after participating in the panel. "After all, knowledge transfer to technical and industrial applications will become even more important in the future."

on geothermal energy, resources, and deep underground potential. The founders, including professors as well as expert institutions, want to promote scientific, social, and political debate. "Many global challenges are geoscientific topics. We want to embrace the responsibility to utilize the environment and the planet sustainably," Hilgers says.



New hydrogen stores underground, vital resources like drinking water, new materials for batteries: Geosciences are significantly contributing to reaching numerous sustainability goals. (Photos: C. Hilgers, N. Goldscheider)

and applied sciences as well as representatives of economy, industry, institutions, and ministries from 36 different countries gathered online for talks and,

This was one of the reasons for the foundation of a national expert section of the DGGV-FUTURE during the conference. The section is pooling expertise

At KIT, the AGW contributes to this with its work focusing on energy, storage, resources, and groundwater. ■