

## **Subsurface Bulk-Scale, Non-Thermal Energy Storage for the Energy Transition**

### **Abstract**

Increasing use of intermittent renewable energy sources (solar PV and wind) for electrical power generation is creating enormous demand for bulk-scale long-duration energy storage. Assessing the technical and economic feasibility of various energy storage approaches requires an understanding of the size of the U.S. energy system and how energy is used. The concepts of power capacity and energy storage capacity along with demand requirements need to be understood. Subsurface porous media reservoirs have been used for natural gas storage for over 100 years, and offer a large opportunity for bulk-scale long duration storage by compressed air energy storage and hydrogen storage. Brief primers on compressed air energy storage and underground hydrogen storage will be presented, along with discussion of other subsurface non-thermal energy storage options, such as gravitational potential energy systems.

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Curt is a Senior Scientist (retiree affiliate) at Lawrence Berkeley National Laboratory. His area of expertise is numerical model development and applications for coupled subsurface flow and transport processes. Curt is the author of more than 120 peer-reviewed papers and book chapters, co-author of a textbook on CCS (*Introduction to Carbon Capture and Sequestration*, by Smit, Reimer, Oldenburg, and Bourg), and is the Editor in Chief for storage of *Greenhouse Gases: Science and Technology*.

