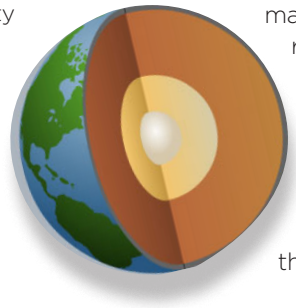
U.S. DEPARTMENT OF ENERGY | Office of the Under Secretary for Science and Energy

Subsurface Technology and Engineering Research, Development, and Demonstration (SubTER) Crosscut

Subsurface Challenges

Mastering the subsurface for energy production and storage and for the management of energy waste streams constitutes a substantial energy challenge. The Department of Energy (DOE) has implemented a new collaborative model to address the following common subsurface challenges:

1. Discovering, Characterizing, and Predicting
   - Accurately characterizing the subsurface using integrated geophysical and geochemical technologies
   - Quantitatively inferring subsurface evolution under current and future engineered conditions
   - Finding viable, low-risk resources
2. Accessing
   - Safe, cost-effective drilling and completions with properly managed wellbore integrity
3. Engineering
   - Creating/constructing desired subsurface conditions in challenging high-pressure/ high-temperature environments
4. Sustaining
   - Maintaining optimal subsurface conditions over multi-decadal or longer time frames through complex system evolution
5. Monitoring
   - Improving observational methods to advance the understanding of multi-scale complexities through system lifetimes



Why is the SubTER Crosscut Important?

Subsurface energy sources satisfy over 80% of total U.S. energy needs. Finding and effectively exploiting these resources while mitigating impacts of their use constitute major technical and socio-political challenges. Still, the opportunities are vast. Next generation advances in subsurface technologies will enable increases in domestic natural gas supplies, as well as 100+ GWe of clean, renewable geothermal energy. The subsurface provides hundreds of years of safe storage capacity for carbon dioxide (CO_2), and opportunities for environmentally responsible management and disposal of hazardous materials and other energy waste streams. The subsurface can also serve as a reservoir for energy storage for power produced from intermittent generation sources. These opportunities have immediate connection to societal needs and Administration priorities. Clean energy deployment and CO_2 storage are critical components of the President's Climate Action Plan, necessary to meet the 2050 greenhouse gas (GHG) emissions reduction target. Increasing domestic energy supply from greater hydrocarbon resource recovery, in a sustainable and environmentally sound manner, is also an Administration goal that enhances national security and fuels economic growth.

JASON Letter Report on State of Stress in Engineered Subsurface Systems

A report prepared for SubTER by the independent JASON advisory group recommends that **"DOE take a leadership role in the science and technology for improved measurement, characterization, and understanding of the state of stress of engineered subsurface systems in order to address major energy and security challenges of the nation."** JASON recommends coordinated research and technology development at dedicated field sites to connect insights from laboratory scales and models to operational environments.

Read the JASON Report at www.energy.gov/articles/2014-jason-report-state-stress-engineered-subsurface-systems

Learn more about SubTER

www.energy.gov/subsurface-tech-team

Contact us

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Who's Involved?

Representing the geosciences, research, modeling, technology development, policy, and stakeholders, the participating DOE program offices include:

Office of Fossil Energy
Office of Energy Efficiency & Renewable Energy
Office of Nuclear Energy
Office of Environmental Management
Office of Science