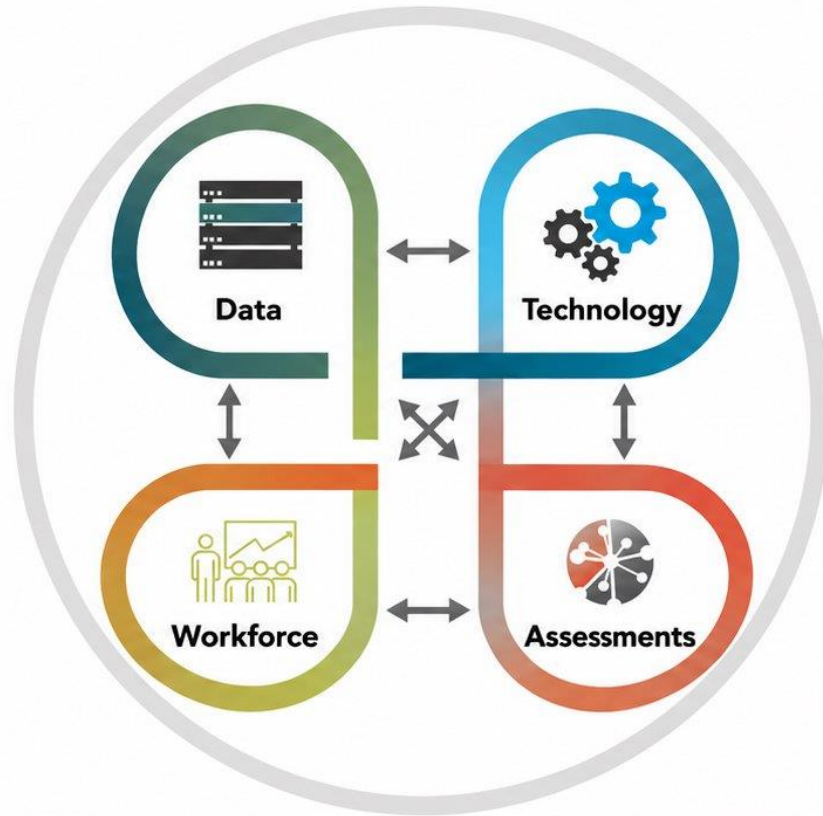


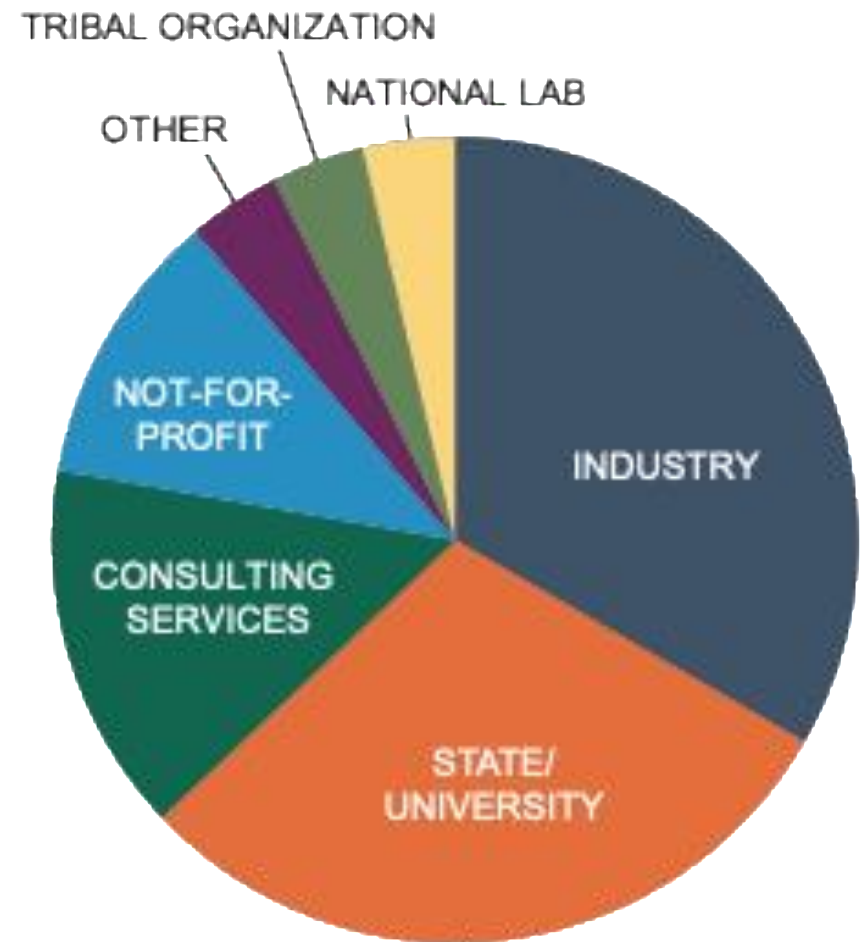


American Resources for a **Secure** Future:

A National Cooperative
Subsurface Assessment Program

Study Background

- **National Petroleum Council:** The NPC is a federally chartered advisory committee of ~200 members that provides advice on any matter relating to oil and natural gas industries
- **Request:** The NPC was asked to articulate the potential value of a national resource assessment program
- **Team:** The study team included >50 subject-matter experts from diverse backgrounds
- **Scope:** The scope included nearly all subsurface industries - oil and gas, geothermal, mining, storage, and emerging resources, such as geologic hydrogen
- **Engagement:** Consulted various state and federal agency representatives, including DOE, USGS, MMA (previously BOEM and BSEE), IOGCC, and AASG

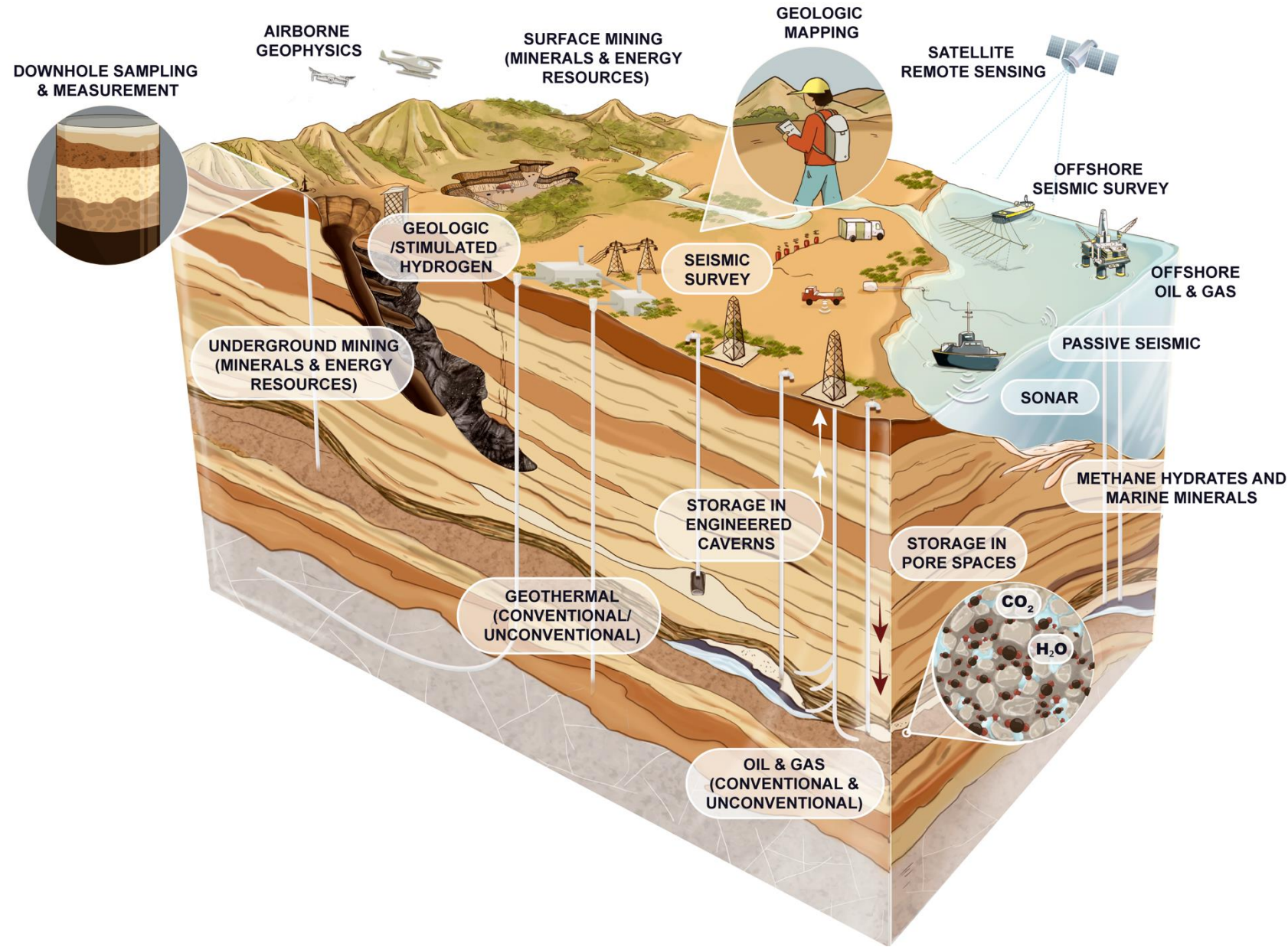


Study Committee and Coordinating Subcommittee Composition

The Subsurface as a National Asset

America's energy future—geothermal, nuclear, wind, solar, hydroelectric, and fossil fuels—is fundamentally tied to the subsurface as demand is rising for secure, domestic energy and mineral resources.

Core Message: The nation needs renewed investment in subsurface resource assessments to identify and de-risk new opportunities.

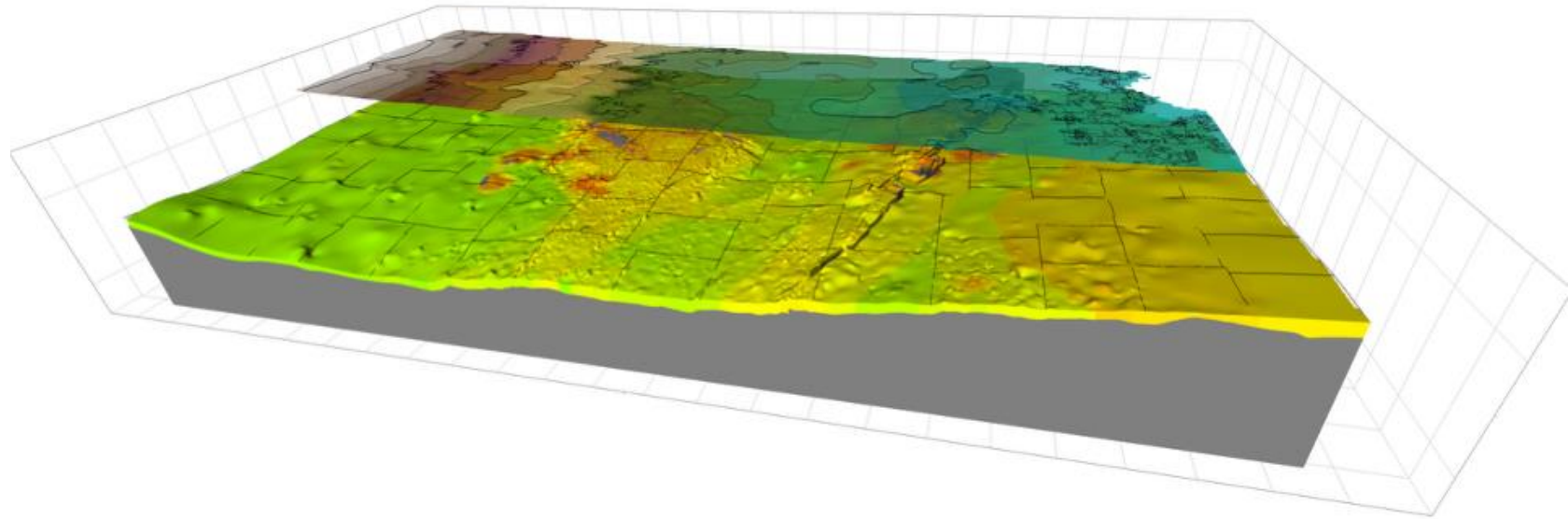


Definition and Value of Assessments

Subsurface assessments: the systematic integration of one or more datasets to produce quantitative estimates of the distribution of a geological resource.

- Industry assessments: optimized to support decisions on specific assets or specific areas.
- Public assessments: often regional and conducted without direct commercial incentives to provide neutral, objective benchmarks.

FINDING: Public assessments provide foundational value across a wide range of stakeholders by reducing uncertainty, enabling informed decision-making, and supporting safe and efficient resource development.



State-wide 3D subsurface assessment of deep formation adequacy for carbon waste sequestration.
(Kansas Geological Survey Subsurface Dynamics Laboratory)

Investing in Subsurface Knowledge Benefits All Industries

- Geologic mapping, geochemical analysis, geophysical imaging, and targeted drilling are repeatedly high-value inputs across essentially all subsurface resource types.
- Many resources overlap within the same subsurface regions so that data collected for one resource may be useful to another.
- Integrated assessments focused on characterizing a volume of Earth, rather than a single resource, can support multiple resource sectors.
- Significant subsurface data has already been collected, including well logs and well core and samples.

												
		CONVENTIONAL OIL AND GAS	UNCONVENTIONAL OIL AND GAS	CONVENTIONAL GEOTHERMAL	UNCONVENTIONAL GEOTHERMAL	CONVENTIONAL MINING	UNCONVENTIONAL MINING	COAL	GEOLOGIC HYDROGEN	DYNAMIC STORAGE-PORE SPACE	DYNAMIC STORAGE-CAVERNS	PERMANENT STORAGE
SUBSURFACE MODELING												
WELL-BASED	WELL CORE/CUTTINGS											
	WELL LOGS											
	PUMP/WELL TESTS											
	DOWNHOLE MONITORING											
FIELD LABORATORY	GEOCHEMICAL ANALYSIS											
	GEOLOGIC MAPPING											
SEISMIC	2D SEISMIC											
	3D SEISMIC											
	4D SEISMIC											
ELECTRICAL/ELECTROMAGNETIC	EM SURVEYS											
	MAGNETOTELLURIC SURVEYS											
	RESISTIVITY SURVEYS											
POTENTIAL FIELD/RADIOMETRIC	MAGNETIC SURVEYS											
	GRAVITY SURVEYS											
	RADIOMETRIC SURVEYS											
REMOTE SENSING AIRBORNE AND GROUND-BASED	SONAR-BASED MAPPING											
	RADAR-BASED IMAGING											
	LIDAR											
	OPTICAL IMAGING											
	THERMAL IR IMAGING											

ESSENTIAL

USEFUL

LIMITED USE

Pillars of a Subsurface Assessment Program



Data: High-quality subsurface datasets are essential for assessments. Preserving and expanding these valuable datasets improves assessment accuracy, resolution, and efficiency.



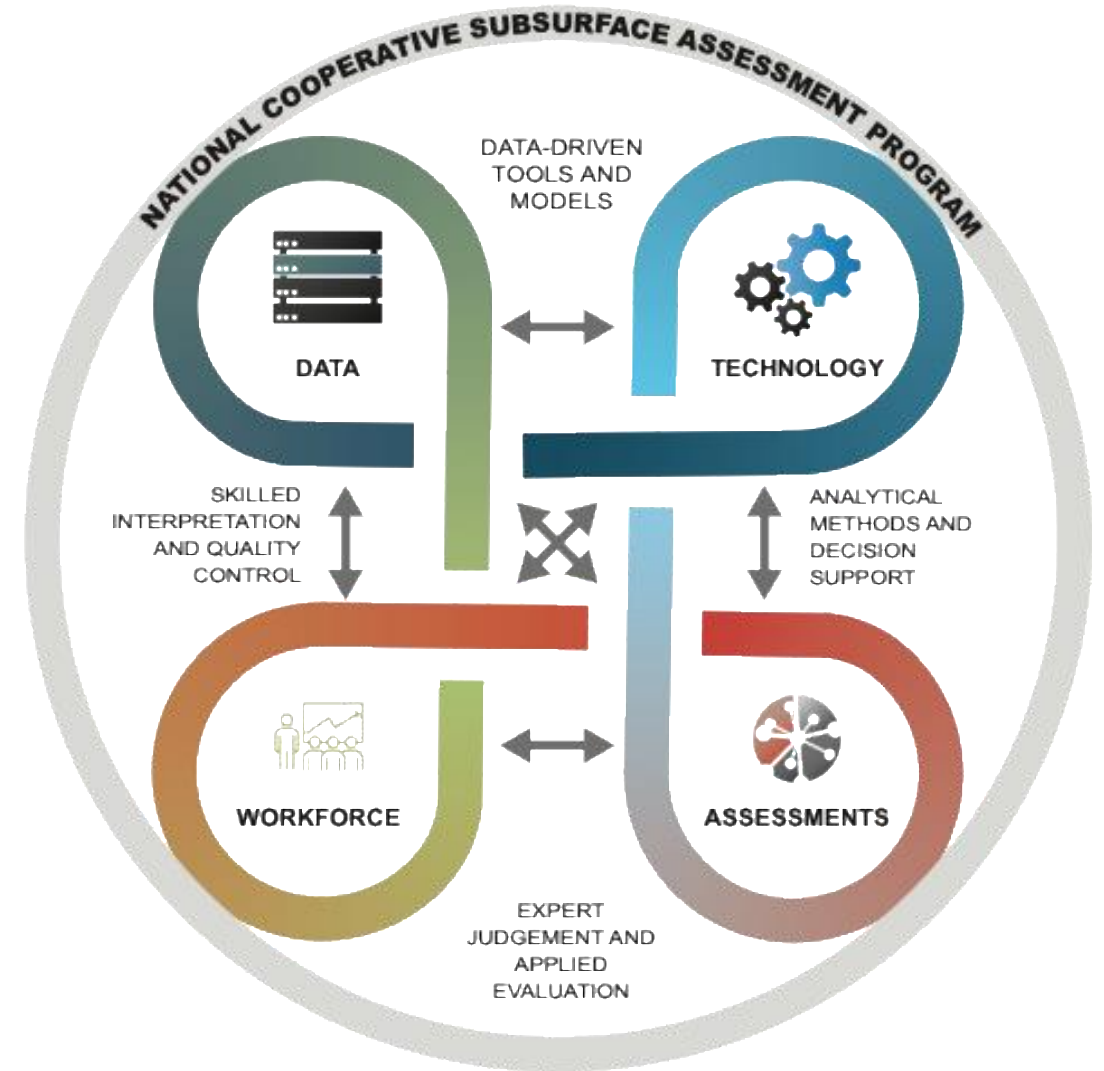
Technology: Advancement and deployment of technologies can significantly improve the predictive capability of subsurface assessments, while expanding the resources that can be recovered.



Workforce: Subsurface evaluation, data management, and modeling skills are essential to interpret data, integrate large datasets, evaluate uncertainty and risk, and translate technical results



Assessment: Methodologies must keep pace with emerging technologies and resources.



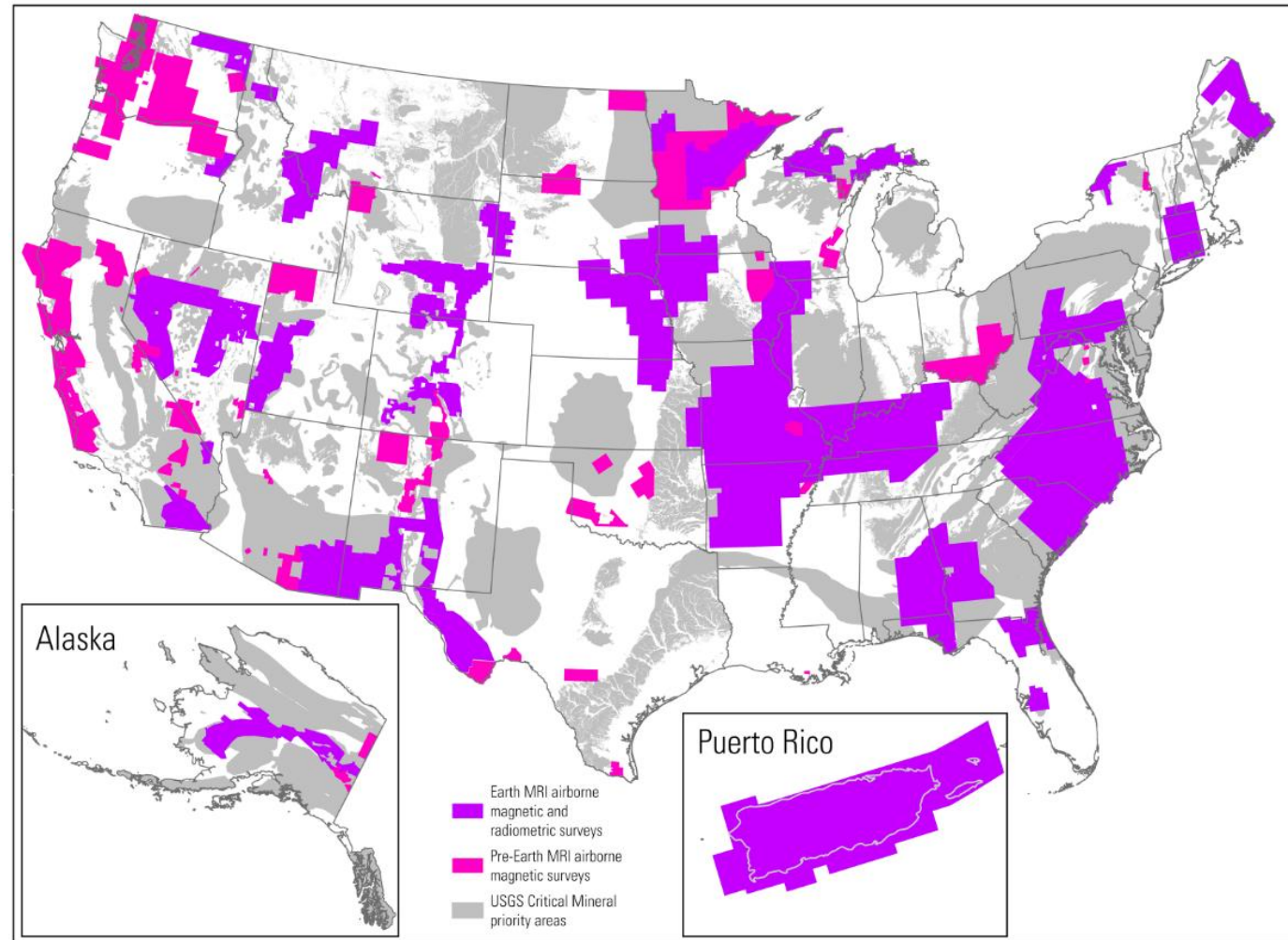
Current Landscape

Select federal / state initiatives:

- USGS, BOEM, and state geological surveys lead data collection and assessments
- EIA provides production, reserves, and outlook data
- DOE supports R&D and demonstration for resource recovery, processing, and storage.
- NSF, national labs, and universities advance technology and workforce skills in subsurface characterization

Opportunities for Improvement:

- Baseline coverage is uneven, legacy datasets are at risk, and high-resolution industry data are not routinely integrated into public assessments.
- Differing mandates, methods, and update cycles limit coordination, while multi-resource assessments remain rare.
- Emerging technologies remain underutilized, while specialized workforce capacity is limited.



Example of federal magnetic and radiometric survey data collection (USGS, 2025)

Data: Recommendations



Acquire Priority Baseline Data to Strengthen Subsurface Assessments: Congress should fund a joint federal-state initiative for subsurface data collection with rapid public access through shared digital repositories.



Develop a National Data Portal to Ease Access to Subsurface Data: Congress should establish a National Data Portal and data standards to enhance public access to interoperable subsurface data.



Recover and Preserve Legacy Subsurface Data: Congress should increase funding to the USGS National Geological and Geophysical Data Preservation Program and establish a National Data Task Force to strengthen data preservation, and develop best practices, recovery strategies, and funding recommendations.



Evaluate Access to Proprietary Data Acquired by Industry: DOI should review existing policies governing the management of proprietary subsurface data and evaluate possible pathways to accelerate access while protecting commercial investments and intellectual property.



Technology: Recommendation



Increase Development of Emerging Technology for Subsurface Mapping and Modeling: DOE, in collaboration with USGS, should increase investment in advanced extraction, subsurface mapping, and modeling technologies through direct R&D funding and public-private partnerships.

Assessments: Recommendations

Accelerate holistic assessments of the Nation's Subsurface Resources:

Resources: USGS and MMA, in cooperation with state geological surveys, should accelerate the multi-resource assessments using DOE-supported technologies, advanced 3D subsurface modeling, AI, and integrated sensors.



Prioritize Assessments of Emerging Resources:

DOI should prioritize national assessments of emerging resources (e.g. geologic hydrogen, superhot geothermal) and collaborate with DOE to integrate emerging and existing technologies into these assessments.



Establish a Collaborative, Long-Term Planning

Process: Congress should establish a long-term planning process within the White House Office of Science and Technology Policy to identify national subsurface resource assessment priorities.



Workforce: Recommendations

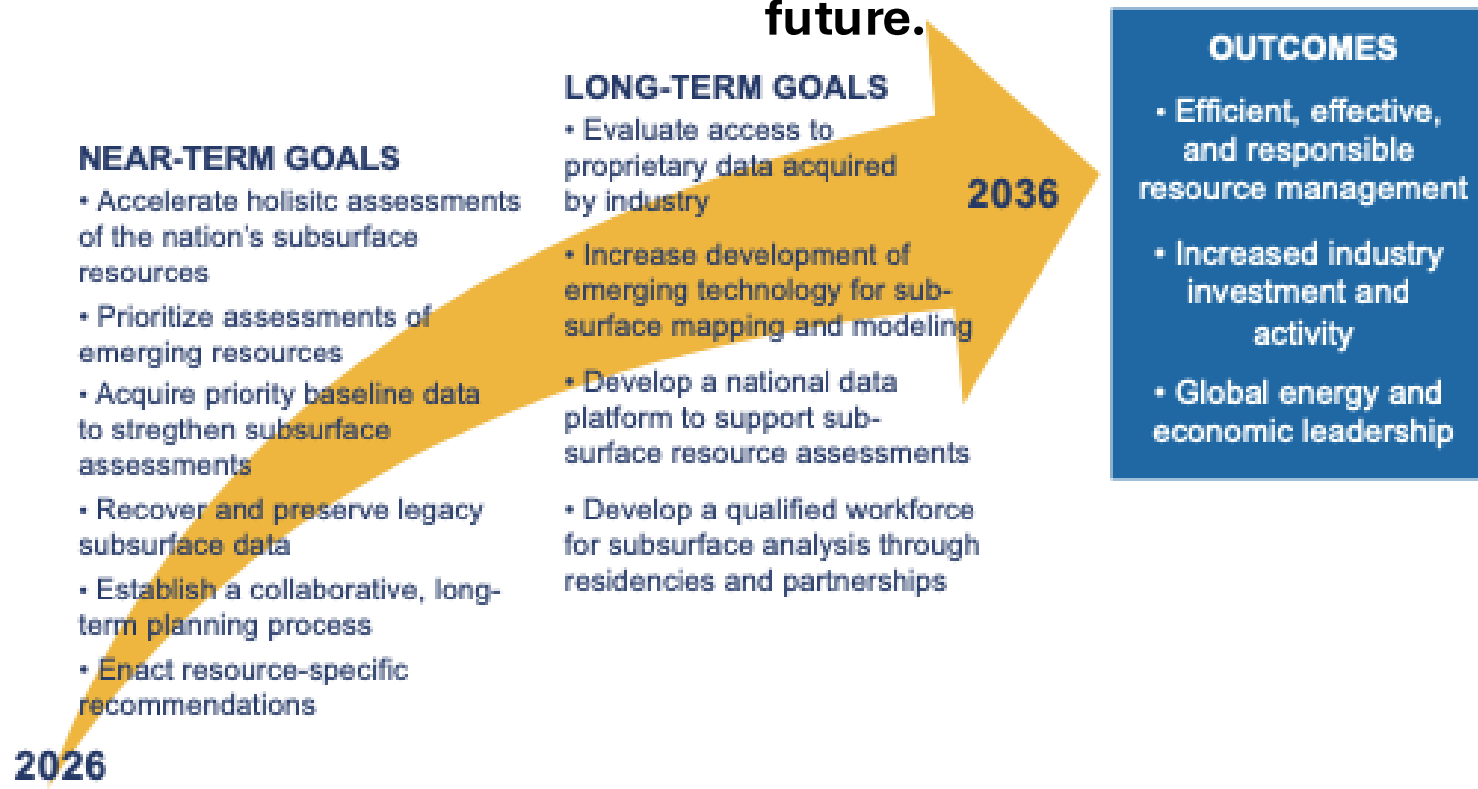


Develop a Qualified Workforce for Subsurface Analysis Through Residencies and Partnerships:

DOE and DOI should partner with state geological surveys, NSF, universities, and industry to create residency, fellowship, and internship programs that build a pipeline of early-career geologists.

A Vision for a Secure Future

Congress should authorize and appropriate a National Cooperative Subsurface Assessment Program that builds on existing agency authorities for resource assessments, data acquisition and management, technology development, and workforce capacity to strengthen the nation's ability to holistically evaluate subsurface resource potential and support a secure energy and economic future.



Download the report



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