U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

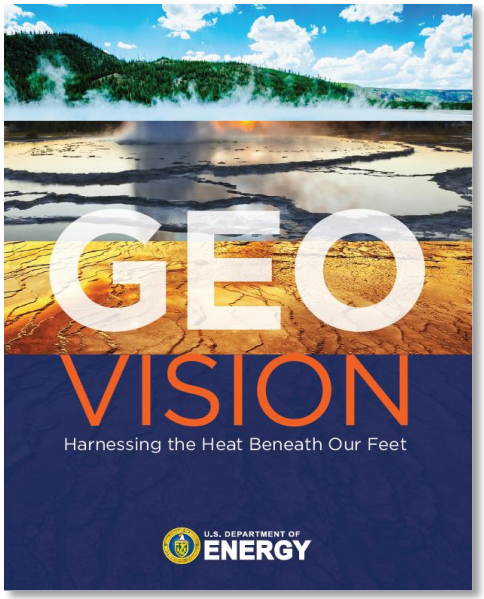
Geothermal Technologies Office

October 19, 2020

Dr. Susan G. Hamm, Director

Image: Calpine

R&D Priorities

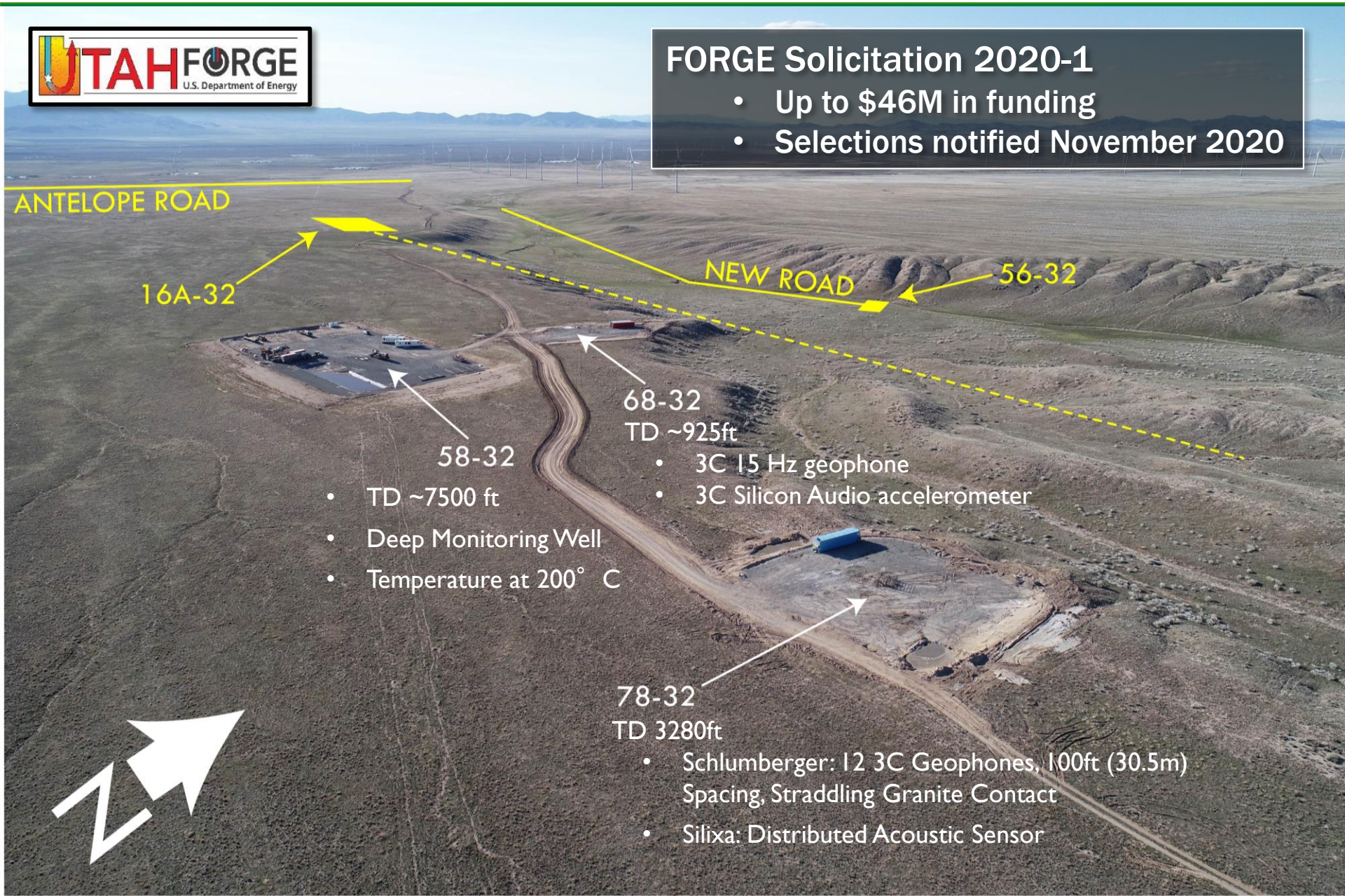


- Unlock the potential of enhanced geothermal systems (EGS).
- Advance technologies to increase geothermal energy on the U.S. electricity grid.
- Support R&D to expand geothermal energy opportunities throughout the U.S.

R&D Priorities

Unlocking the potential of enhanced geothermal systems (EGS).

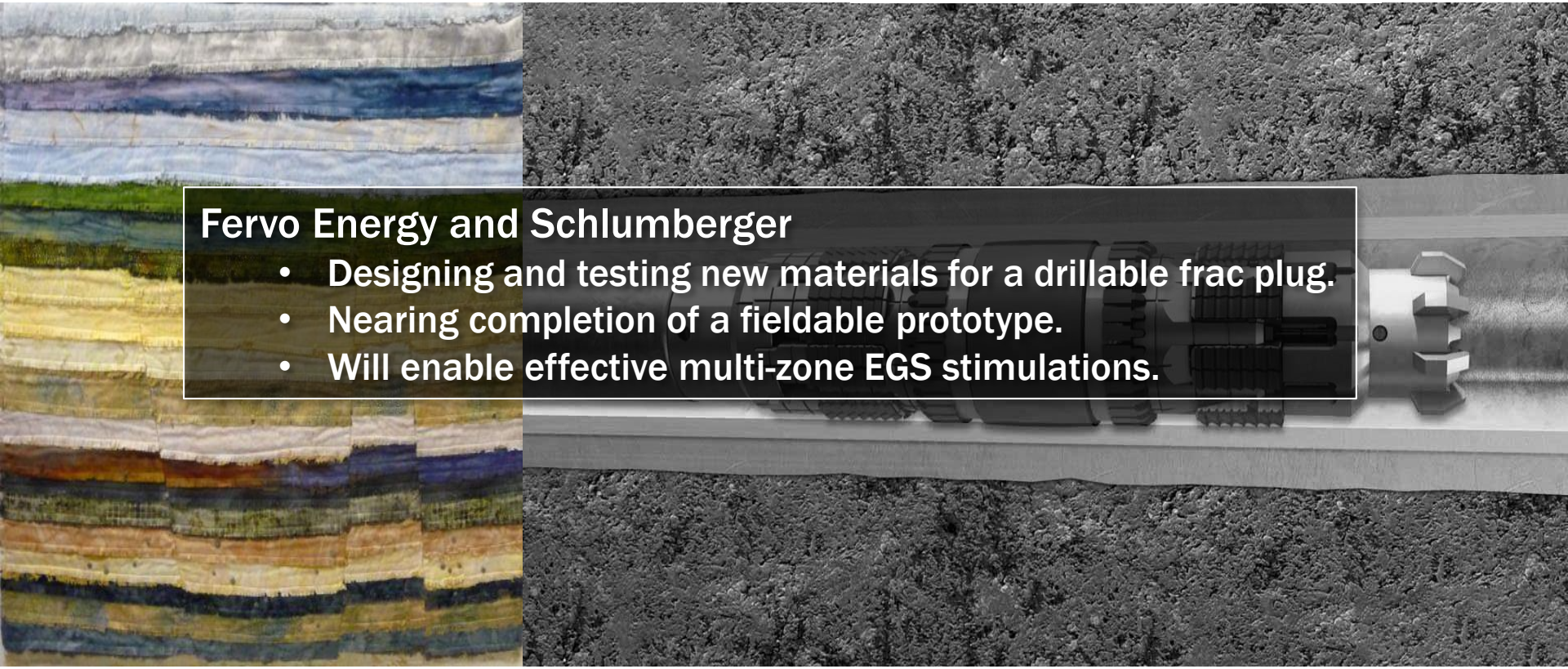
The Milford FORGE Site



Zonal Isolation

FERVO ENERGY

Schlumberger



Fervo Energy and Schlumberger

- Designing and testing new materials for a drillable frac plug.
- Nearing completion of a fieldable prototype.
- Will enable effective multi-zone EGS stimulations.

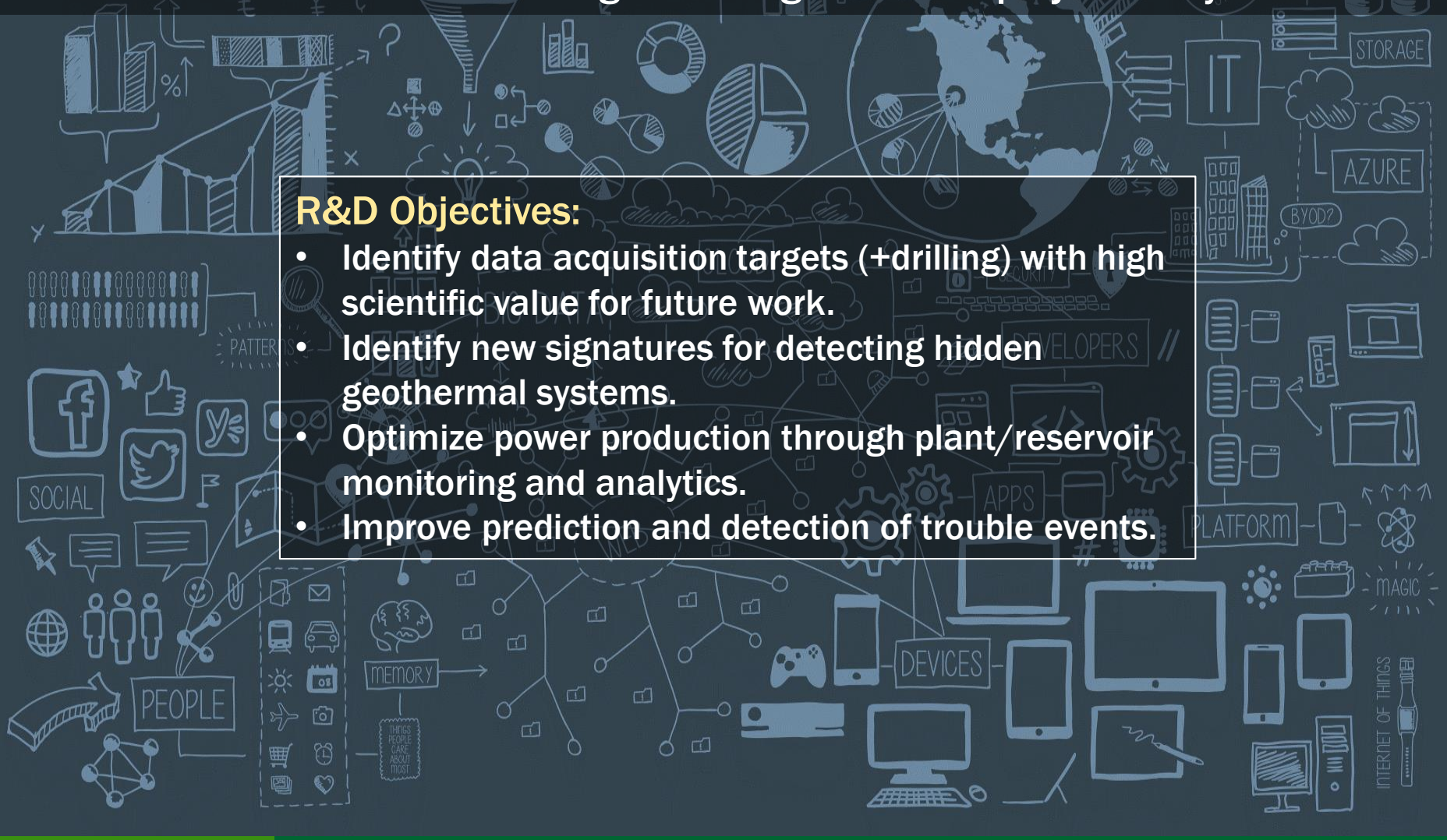
Image: Schlumberger

R&D Priorities

Advancing technologies to increase geothermal energy on the U.S. electricity grid.

Machine Learning for Geothermal Energy

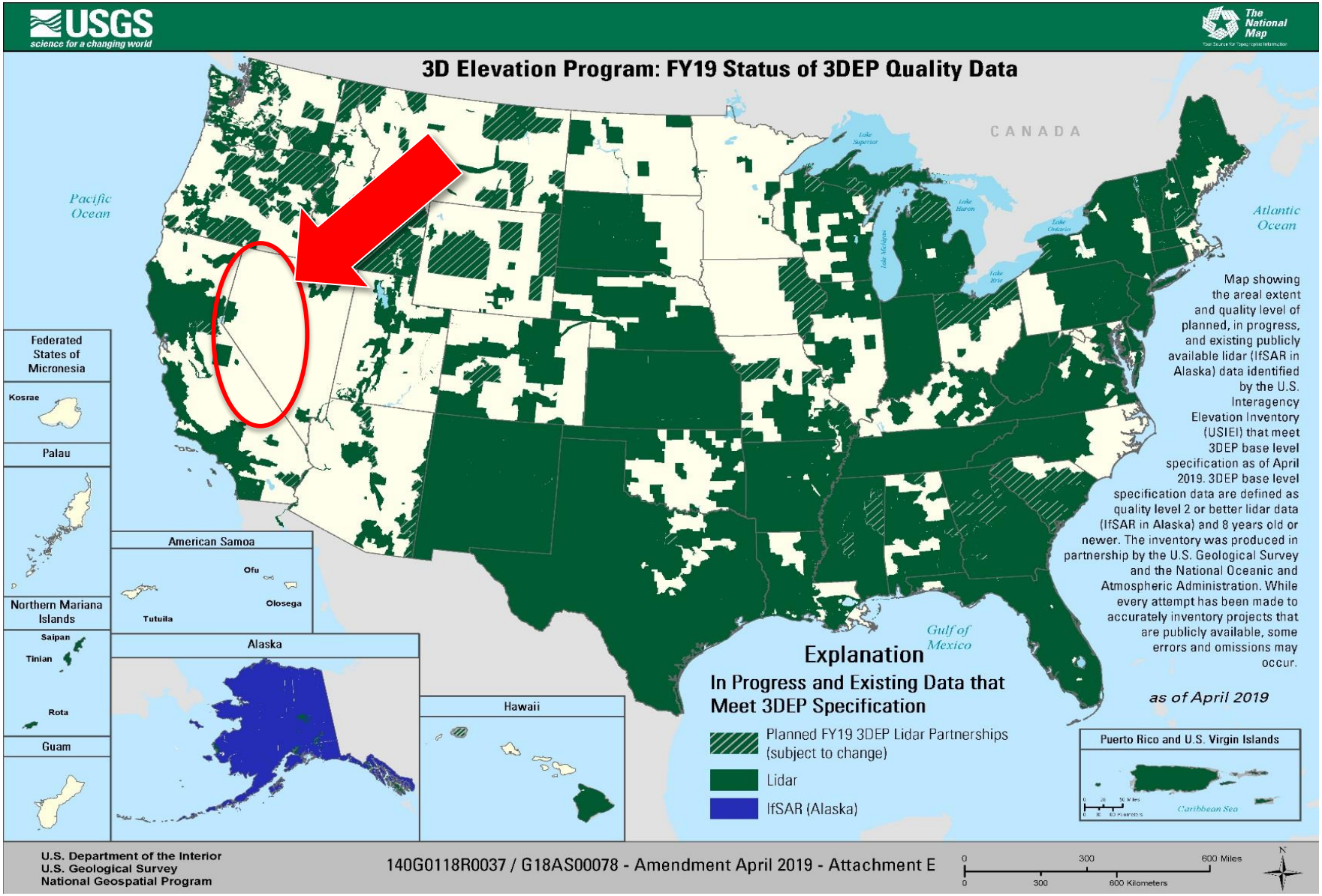
Machine Learning offers substantial opportunities for technology advancement and cost reduction throughout the geothermal project lifecycle.



R&D Objectives:

- Identify data acquisition targets (+drilling) with high scientific value for future work.
- Identify new signatures for detecting hidden geothermal systems.
- Optimize power production through plant/reservoir monitoring and analytics.
- Improve prediction and detection of trouble events.

Machine Learning: Tackling New Territory in Western Nevada



GeoDAWN: An Interagency Collaboration

USGS science for a changing world

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

GeoDAWN follows on the success of GTO's Play Fairway Analysis initiative

GeoDAWN
Geoscience Data Acquisition for Western Nevada

The USGS Earth Mapping Resources Initiative and USGS 3D Elevation Program (3DEP), Department of Energy Geothermal Technologies Office, Natural Resources Conservation Services, and Bureau of Land Management have partnered to conduct airborne geophysical and 3DEP lidar surveys over parts of Nevada and California to collect information on undiscovered geothermal, critical mineral, and groundwater resources in the western Great Basin and the Walker Lane region.

Geothermal Resources

Recent discoveries have indicated significant potential for geothermal resources in western Nevada, which is already the second-largest producer of geothermal energy in the Nation. This survey will collect information that will highlight which areas to focus on next.

Critical Minerals

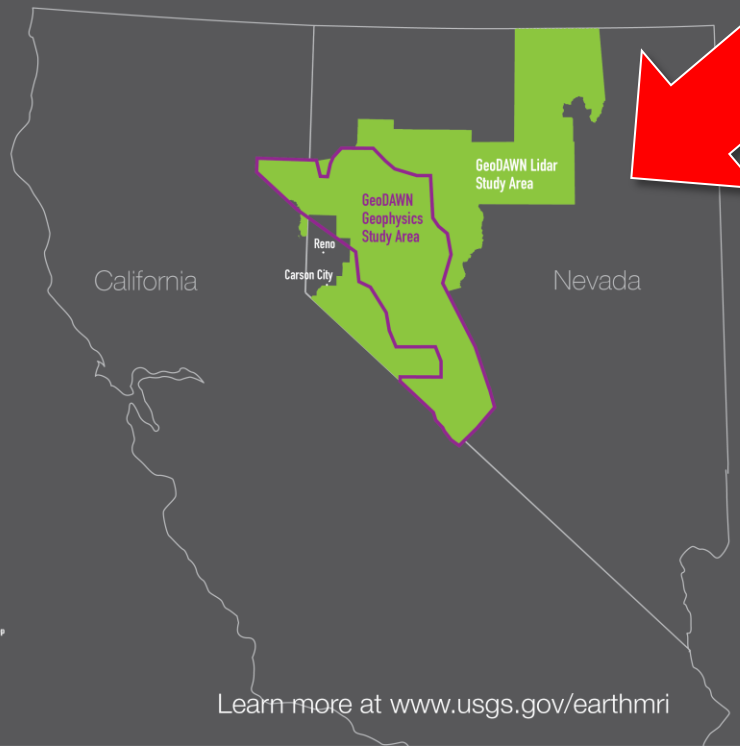
The western Great Basin is home to many mineral resources that have been deemed critical by the Department of the Interior, particularly lithium. Lithium is an important commodity for batteries and modern electronics. The study area will focus on lithium- and boron-bearing clays, sediments, and brines.

Groundwater & Agriculture

The airborne geophysical and 3DEP lidar data will reveal more than just energy and mineral resources. The aeromagnetic data will shed light on groundwater potential, while the new lidar and radiometric data will allow for detailed mapping of soils critical for agriculture.

Geohazards

The Walker Lane region of western Nevada and adjacent areas in California contain several areas that could trigger seismic activity. The new topographic and geophysical data should help identify the faults in the region and enable scientists to learn more about the potential for seismic hazards.



*Project Status: In progress as of September, 2020.

Sources: 1 https://ngmdb.usgs.gov/emri 2 https://www.usgs.gov/special-topic/earthmri 3 https://www.usgs.gov/core-science-systems/ngp/3dep

U.S. Department of the Interior
U.S. Geological Survey

Learn more at www.usgs.gov/earthmri

R&D Priorities

Supporting R&D to expand geothermal energy opportunities throughout the U.S.

Deep Direct-Use Feasibility Studies

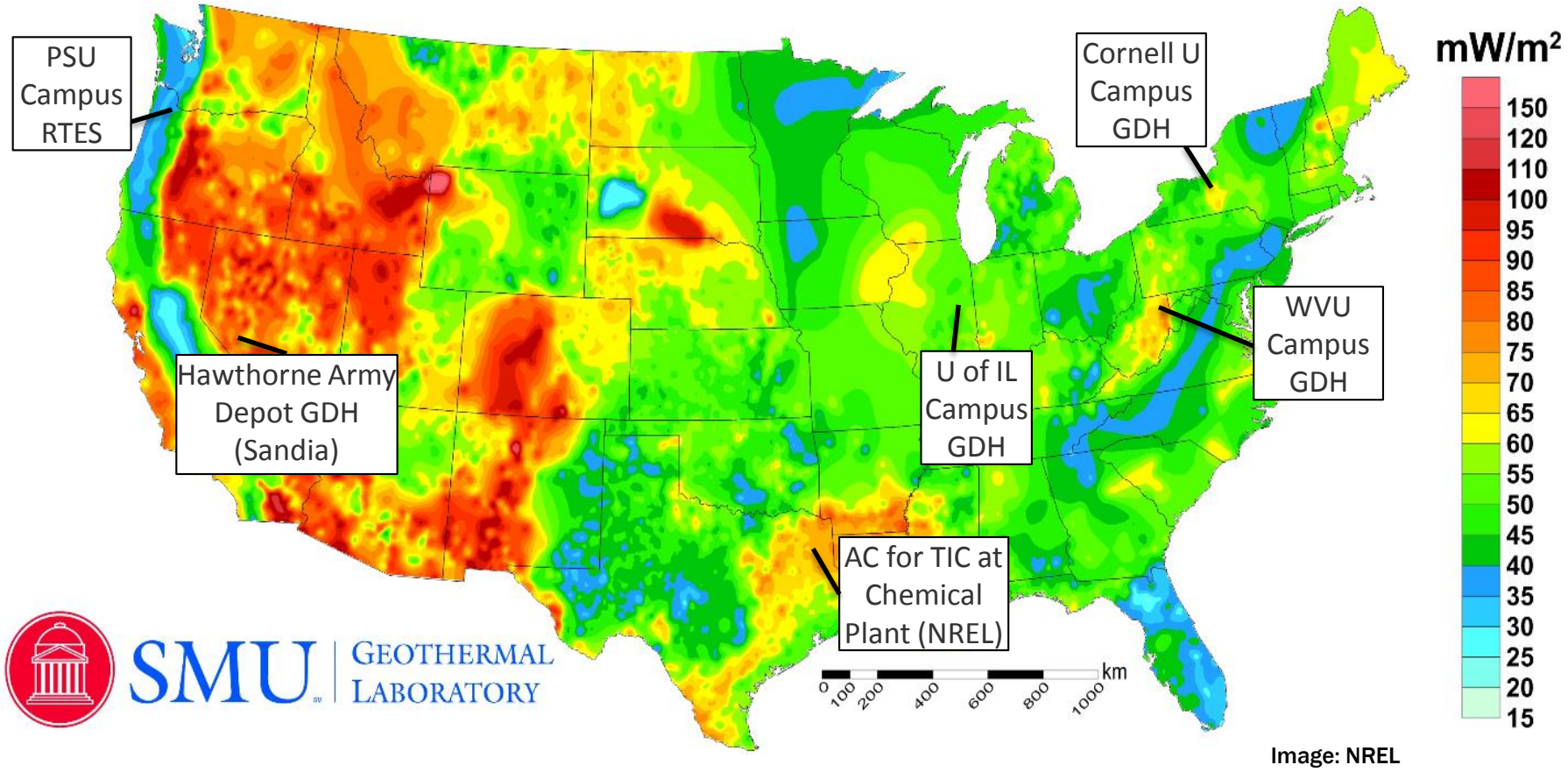
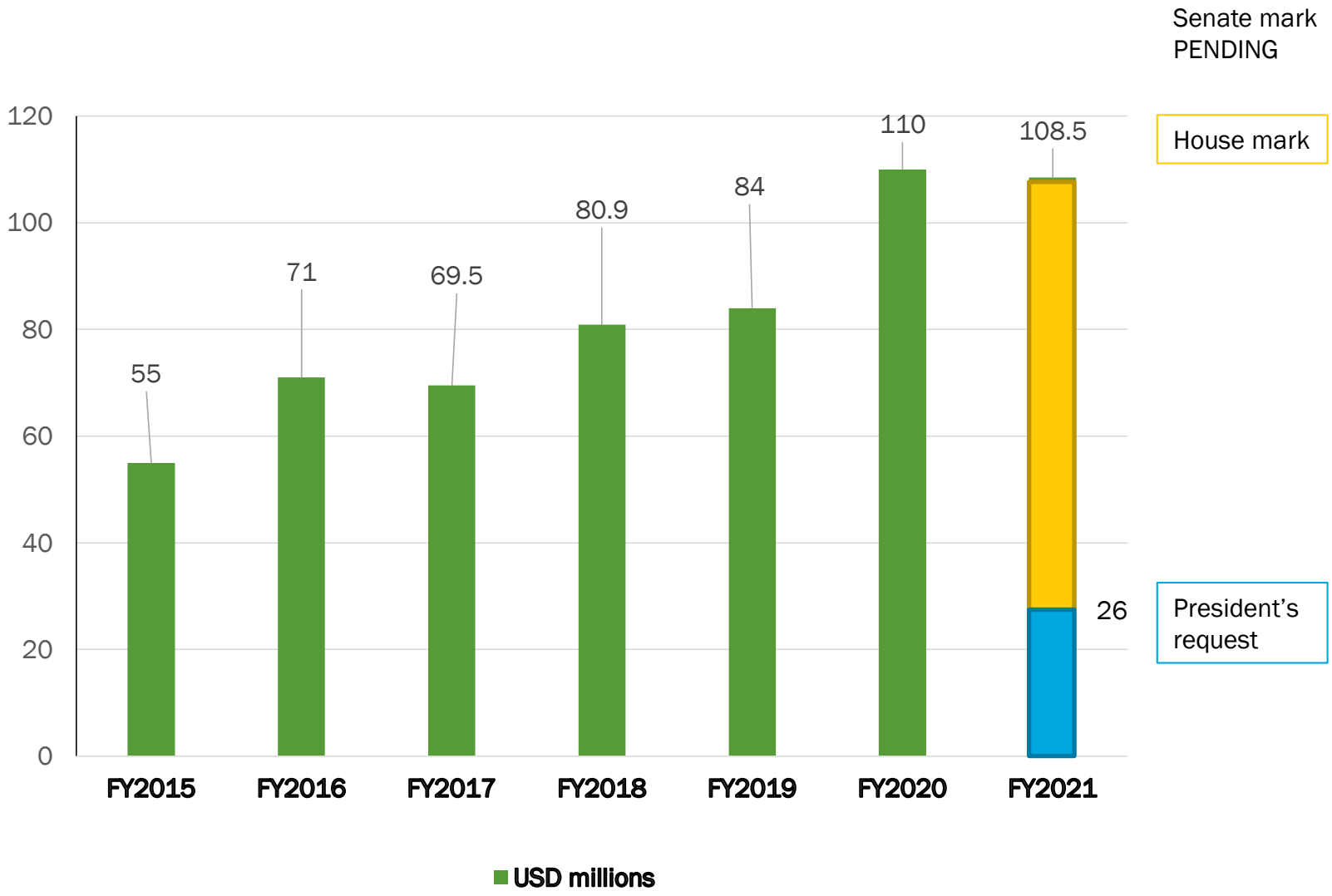


Image: NREL

Next steps: Utilizing different scenarios that incorporate variables such as financing, drilling cost, tax credits, and high utilization factor, researchers will 1) streamline inputs to better compare projects, and 2) evaluate key factors impacting DDU deployment.

GTO Resources: Budget



GTO Resources: New Staff

Our office continues to grow…

Federal Staff

Alexis McKittrick
Program Manager

Alex Prisjatschew
General Engineer

Angel Nieto
General Engineer

Zach Frone
General Engineer

Support Contractors

Lindsay Morse
Project Engineer

Jon Payne
Project Engineer

George Stutz
Project Engineer

Fellows

Elizabeth Brown
ORISE Fellow

Hannah Hughes
ORISE Fellow

Mike O'Connor
AAAS Fellow

GTO-Related Sessions @ GRC

Monday, Oct 19

- Session: International Panel – Geothermal Market Report (NREL)

Wednesday, Oct 21

- POSTER Session: Machine Learning, Advanced Materials, FORGE, and EGS Collab

Thursday, Oct 22

- Session: Enhanced Geothermal Systems
- Session: Exploration & Resource Assessment – Play Fairway Analysis in Nevada
- Session: District Heating & Direct Use: Feasibility to Implementation

Friday, Oct 23

- POSTER Session: Power Plants, Reservoir Engineering, and EGS
- Session: District Heating & Direct Use: Feasibility to Implementation

Thank You!

- Interested in serving as a merit reviewer?
- Questions or comments?
- Webinar topic suggestions?

Contact us: doe.geothermal@ee.doe.gov

To download a PDF of the *GeoVision* report, visit: www.energy.gov/geovision