[PS]National Geothermal Data System*

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Search and Discovery Article #80225 (2012)**
Posted June 18, 2012

*Adapted from extended abstract prepared in conjunction with poster presentation at AAPG Annual Convention and Exhibition, Long Beach, California, April 22-25, 2012. Please refer to companion article, "Online, Interactive Assessment of Geothermal Energy Potential in the U.S.A.," by Lee Allison et al., Search and Discovery Article #80226 (2012).

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Abstract

The goal of the U.S. Department of Energy's National Geothermal Data System is to design, build, implement, deploy and populate a national, sustainable, distributed, interoperable network of data and service (application) providers. These providers will develop, collect, serve, and maintain geothermal-relevant data that operates as an integral component of NGDS. As a result, the geothermal industry, the public, and policy makers will have access to consistent and reliable data, which in turn, reduces the amount of staff time devoted to finding, retrieving, integrating, and verifying information. With easier access to information, the high cost and risk of geothermal power projects (especially exploration drilling) is reduced.

Five separate NGDS projects provide the data support, acquisition, and access to cyber infrastructure necessary to reduce cost and risk of the nation's geothermal energy strategy and US DOE program goals focused on the production and utilization of geothermal energy. The U.S DOE Office of Energy Efficiency and Renewable Energy Geothermal Technologies Program is developing the knowledge and data foundation necessary for discovery and development of large-scale energy production while the Buildings Technology Program is focused on other practical applications such as direct use and residential/commercial ground source heat pumps. The NGDS provides expanded reference and resource data for research and development activities (a subset of the US DOE goals) and includes data from across all fifty states and the nation's leading academic geothermal centers. Thus, the project incorporates not only high-temperature potential but also moderate and low-temperature locations incorporating US DOE's goal of adding more geothermal electricity to the grid. The program, through its development of data

integration cyberinfrastructure, will help lead to innovative exploration technologies through increased data availability on geothermal energy capacity. Finally, the project will contribute new data from previously unexplored locations. NGDS is being built using the US Geoscience Information Network (US GIN) data integration framework to promote interoperability across the Earth sciences community and with other emerging data integration and networking efforts.

National Geothermal Data System

Arlene Anderson (US Department of Energy, Geothermal Technologies Program), David Cuyler (Sandia National Laboratory), Walter Snyder (Boise State University), M. Lee Allison (Arizona Geological Survey), David Blackwell (Southern Methodist University), & Colin F. Williams (USGS)

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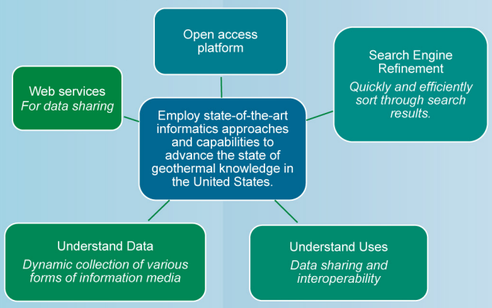
NGDS Design Objectives



Multiple projects in collaboration

- DOE Geothermal Data Repository — *Boise State University*
- National Resource Assessment & Classification — *USGS*
- National Temperature and Heat Flow Data and Maps — *Southern Methodist University*
- State Geological Survey Contributions — *Association of American State Geologists*
- Energy and Geosciences Institute — Oregon Institute of Technology; Stanford Reservoir Engineering

NGDS is a nationwide network of data repositories hosting geothermal-relevant data. Each participating data "node" receives, manages and provides content independently. Data are made publicly available through a distributed framework and a unified catalog search interface provided by the NGDS.

U.S. DEPARTMENT OF ENERGY This material is based upon work supported by the **Department of Energy** and by **National Science Foundation** grant EAR-0753154

The "killer app" for data integration in the U.S.

goal

•To design, build, implement, deploy and populate a national, sustainable, distributed, interoperable network of data and service (application) providers.

strategy

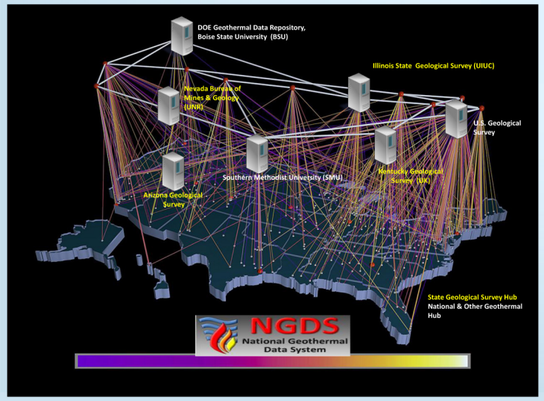
- Data providers will develop, collect, serve, and maintain geothermal-relevant data that operates as an integral component of NGDS.

success

•The geothermal industry, the public, and policy makers will have access to consistent and reliable data.

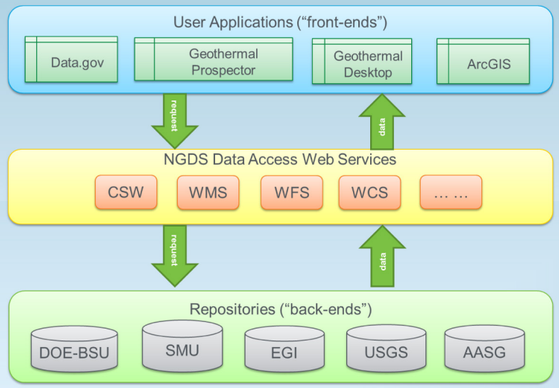
•The high cost and risk of geothermal exploration & development is reduced.

•Increase geothermal base load power production



Locations of "Charter" NGDS Hubs, where data integration, curation and development are underway. NGDS is built on the US Geoscience Information Network (USGIN) data integration framework

Basic NGDS Structure



SMU NGDS Publication Keywords

Keyword (primary)	Synonyms (or highly related)
well	wells; borehole; boreholes; downhole
geothermal exploration	energy source development; geophysical prospecting; geothermal exploration and development
seismic surveys	seismic survey; seismic refraction; seismic reflection; reflection seismic; reflection; seismic noise
resistivity surveys	electrical resistivity; resistivity; electric conductivity; electrical conductivity
magnetotelluric surveys	magnetotelluric; magnetotellurics; MT survey; electromagnetic surveys; telluric
heat flow	heat-flow; heat flows, heat flow density
well log	well logs; well logging; logs; lgoging; borehole logs; drillers' logs; open hole

Keywords will allow users to search the NGDS. Associating synonyms or highly-related words with "primary" keywords will ensure users are led to reliable and accurate search results

SMU NGDS Publication Keywords

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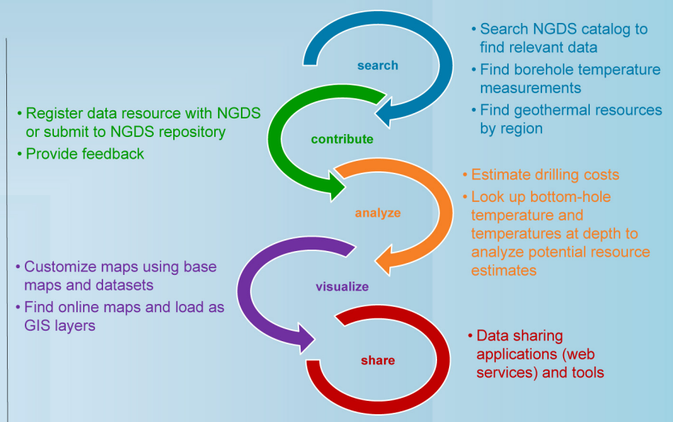
What can you do with the NGDS?

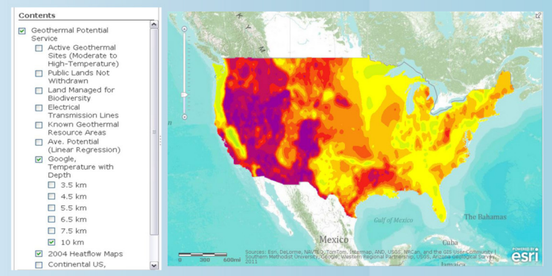


Analysis & Decision Making

Assessing and categorizing the nation's geothermal resources and consolidating all geothermal data through a publicly accessible data system will support research, stimulate public interest, promote market acceptance and investment, and in turn the growth of the geothermal industry.

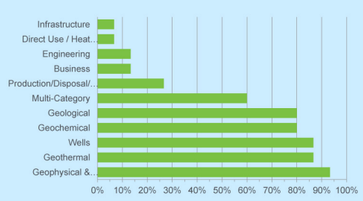
- How are geothermal resources defined?
- How are new classes of larger energy resources characterized?
- How is the management and expansion of known geothermal fields optimized?
- How can a path for technology growth into the future be ensured—providing the science and engineering basis for conventional and enhanced geothermal systems (EGS)?

Analytical Integration

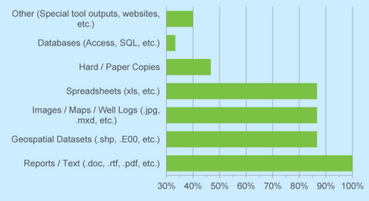


An example of NGDS Analytical Integration is shown here. Where an ESRI ArcGis application is used to PULL IN Google temperature and depth maps as well as SMU 2004 heatflow maps.

Intended Data Categories



Intended Data Formats



State	Funding Amount
Washington	$1,249,146
Nevada	$1,070,639
Utah	$966,834
Oregon	$958,847
Idaho	$873,562
Texas	$743,481
Colorado	$617,021
New Mexico	$605,483
Kentucky	$585,977
Massachusetts	$515,901
Illinois	$507,809
Hawaii	$499,951
Montana	$401,009
Indiana	$378,499
Wisconsin	$329,135

Top 15 Funded States

Drilling Project s	Funding Received
Idaho*	$457,662.80
Nevada*	$504,201.80
Oregon*	$526,803.80
Utah*	$516,294.80
Washington	$648,878.80

Supplemental funding for new data acquisition

Non Drilling Projects	Funding Received
Arizona	$179,976.00
Colorado	$174,763.00
Indiana	$69,975.00
Maine	$49,912.00
Massachusetts	$74,839.00
New Jersey	$49,989.00
New Mexico	$200,000.00
Oklahoma	$20,000.00
Pennsylvania	$83,425.00
Vermont	$78,870.00
West Virginia	$42,858.00