

Enel Salt Wells - Courtesy of Enel Green Power – North America

**How to Utilize the National
Geothermal Data System (NGDS) and
Create Your Own Federated Data
Network with “Node-In-A-Box”**

**PUBLIC TRAINING
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Manager**

**Department of Energy’s
Geothermal Technologies
Office**

[http://www1.eere.energy.gov/geothermal/
data_systems.html](http://www1.eere.energy.gov/geothermal/data_systems.html)

How to Utilize the National Geothermal Data System and Create Your Own Federated Data Network

10:30 AM-10:45 AM EST Overview (DOE)

10:45 -11:15 AM EST NGDS Live Demo (AZGS)

- How to use the NGDS to find relevant data based on webinar user poll
- NGDS User Interface and search capabilities

11:15 AM-12:00 PM EST - NGDS Node-in-a-Box Adoption and Utility for Providing Data through NGDS. (SCR / AZGS)

How to install and implement an NGDS Node-in-a-box (NIAB) software, if you want to become a node on the NGDS. Participants interested in providing access to geoscience and other data can use this free, open source NIAB application.

- The NIAB software installation process
- Batch importing and uploading of shared datasets
- The registration of data resources
- Loading and exposing data as a node on the NGDS network

As part of the Obama Administration's Open Data Policy to make federally managed information usable, discoverable, and easily accessible to the public the NGDS is a project funded by the Department of Energy's (DOE) Geothermal Technologies Office (GTO) will serve as a platform for sharing consistent, reliable geothermal-relevant technical data with users of all types, supplying tools relevant for their work.

As aggregated data supports new scientific findings, this content-rich linked data ultimately broadens the pool of knowledge available to fuel discovery and development of commercial-scale geothermal energy production. DOE's node on the NGDS, referred to as the Geothermal Data Repository (GDR), is where GTO funds' recipients upload their project data. Growth in the depth and breadth of data accessed through NGDS will progressively yield higher quality analyses at every stage of geothermal development, from exploration through sustained production. This in turn will serve to drive down risks and costs that have historically deterred investment in geothermal projects.

The NGDS's Node-in-a-Box (NIAB) software, created by project awardees to facilitate easy submission as a node on the NGDS's federated network, is based on the [U.S. Geosciences Information Network](#) (USGIN) and [CKAN](#), which is also being utilized by [Data.gov](#). The platform allows industry participants, academia, and commercial and government stakeholders to become data providers and access data that is searchable through the NGDS.

Join us and learn all about the NGDS!

- Chartered Strategic Planning and Analysis Working Group to assist in developing a preliminary data system design to meet both internal and external requirements such as:
 - Gather and map geospatial data such as depth, heat flow, temperature, key political/cultural attributes and key market data.
 - Gather plant/production information for both existing and planned facilities, (e.g., plant name, nameplate capacity, plant description, operating characteristics, initial year, current status).

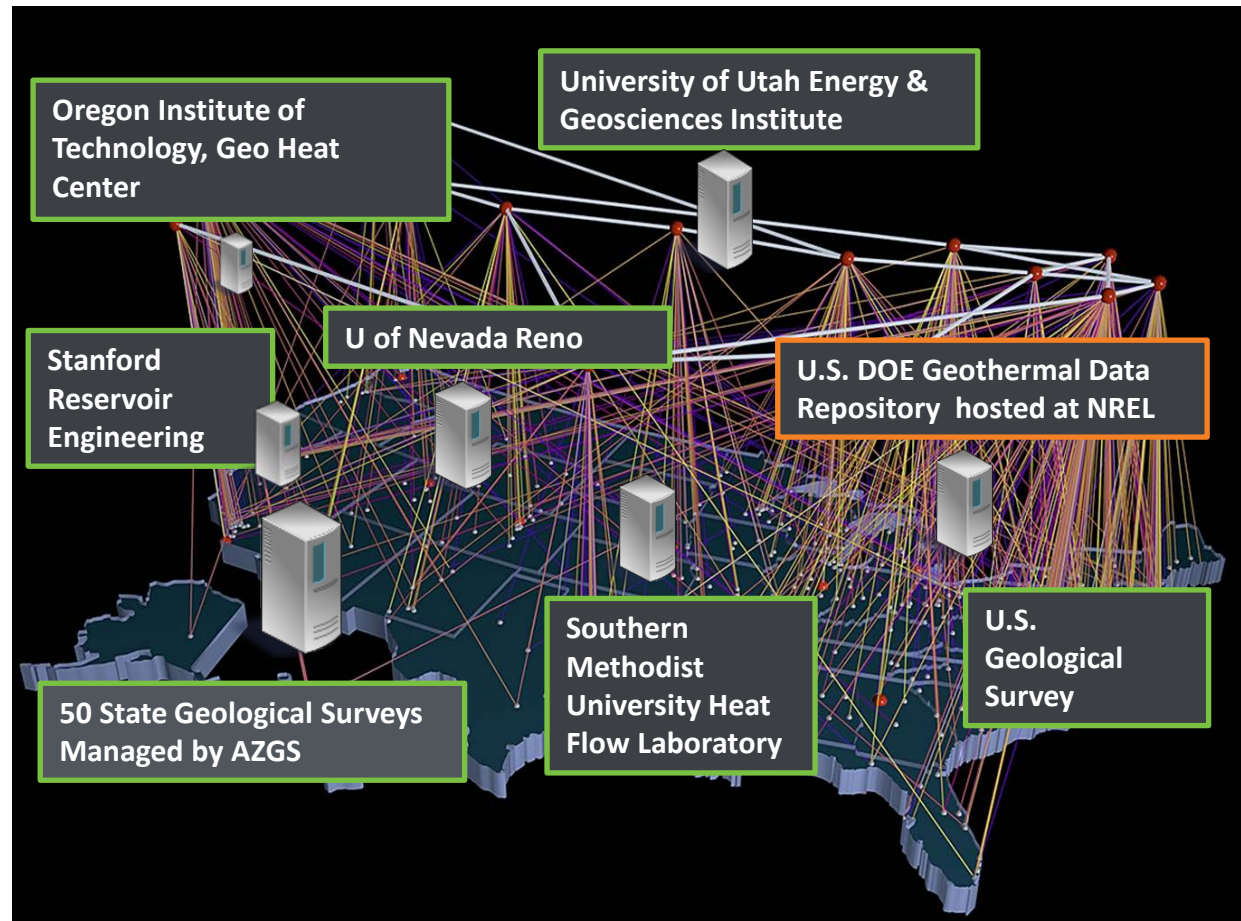
- Produce event history for established sites (e.g., well drilling, stimulation events and results, acoustic emissions mapping, well testing, geochemistry)
- Gather well/drilling information (e.g., well profile, drilling data – depth w. time, rate of penetration, bit records, costs, logs, flow rate tests)
- Map geologic information (e.g., stratigraphic column, formation mechanical properties, completion information, core photos, thermal properties, fracture ID logs-scans, stress data-scans, geophysical logs-scans)
- Develop supply estimates based on system analysis (e.g., in-place power, recoverable power, assumed mass flow rate, capital costs, O&M costs, levelized cost of generation, methodology description)



- Background
- Vision
- Design Objectives
- Data Providers**
- Node-In-A-Box
- Demo
- U.S. Geosciences Information Network



- Background
- Vision
- Design Objectives
- Data Providers**



Data Provider	Data Item
Stanford Reservoir Engineering Dept.	Bibliographic Database for Proceedings from the annual Stanford Geothermal Workshop and PANGAEA publications count: 13356 metadata records with location keywords.
	Metadata Records for 3 Adsorption Data publications (data spreadsheet, publication, and final report).
GeoHeat Center, Oregon Institute of Technology (OIT)	Geothermal publications metadata <ul style="list-style-type: none"> 678 technical papers submitted.
	Co-located well sites. <ul style="list-style-type: none"> 1462 records OIT Geothermal Areas, Wells, Thermal Springs tier 2 web service.
	Klamath Falls #57310 document. <ul style="list-style-type: none"> 19 page complete report with well tests, chemical analysis, and project assessment.
	Documentation and registration of data set describing 404 Co-located Sites
	Documents and data related to the Klamath Falls #57310 project will be scanned and publicly accessible online with metadata.

Data Provider	Data Item
University of Utah, Energy & Geoscience Institute (EGI)	2350 well log records indexed in NGDS Well Log Observation Content Model with links to scanned logs.
	7430 metadata records created for scanned documents (publications, maps, reports).
University of Nevada, Nevada Bureau of Mines and Geology (NBMG)	440 online geologic maps with metadata. <ul style="list-style-type: none"> 27 layers in tier 3 OneGeology service.
	526 geothermal publications with links.
	832 scanned notices, permits, and literature online with associated metadata.
	Geothermal exploration activity map web applications. <ul style="list-style-type: none"> 14 web map applications with 205 web services.
	Nevada Direct Use and Power Plant tier 3 Content Model services with links.

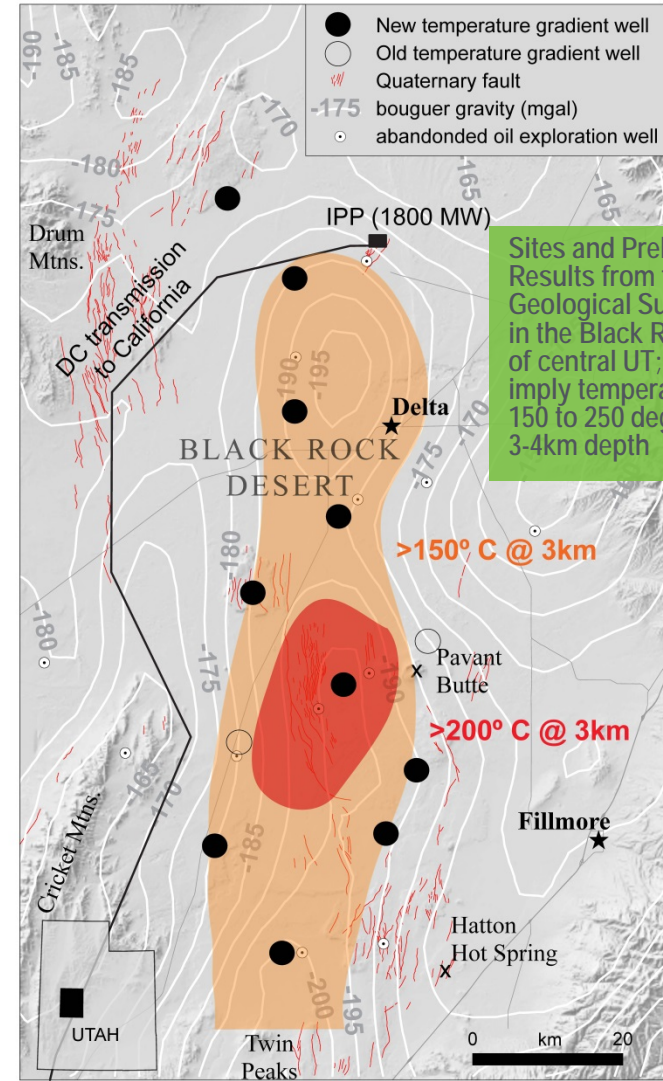
Data Provider	Data Item
Southern Methodist University	<ul style="list-style-type: none">Nationwide heat flow data on >36,000 wells.>6,000 related resources tied to wells.~1200 publication PDFs.
Bureau of Economic Geology (BEG) at U of Tx	<ul style="list-style-type: none">Texas reservoir analysis (137 reservoirs)Well data on ~30,000 wells with ~45,000 well logs.~400 publication PDF's.
Cornell Energy Institute	<ul style="list-style-type: none">~9,000 wells in NY & PA with heat flow calc., including est. temp @ depth to 10K meters.~600 publication PDF's.Economic Analysis report & maps.
Geothermal Resources Council (GRC)	<ul style="list-style-type: none">Bibliographic information for >33,000 pubs.>12,000 PDF's.New online library website containing concise abstracts.

Data Provider	Data Item
MLKay Technologies	<ul style="list-style-type: none">• > 1 million Texas oil and gas wells.• Including location, flow, test, depth, age, wellbore, etc.
Texas Tech U.	<ul style="list-style-type: none">• >8,000 Gulf of Mexico wells.• >42,000 wireline logs associated with wells.• Best off-shore data collection of its kind, including BHT, location, corrected BHT, etc.
U. of North Dakota	<ul style="list-style-type: none">• Thermal Conductivity data for MN and ND.• Radiogenic Heat Production data for MN.• Temp @ depth data for 6 states.• Significant contributions to SMU's nationwide heat flow dataset.• ~ 143 publication PDF's.
Siemens Corporate Technology	(Providing systems integration)

New temperature gradient wells completed in UT, ID, WA, & WI; pending wells in OR & NV



DOE Arlene Anderson and ID Geological Survey PI, John Welhan pose at one of three drill sites within the Blackfoot-Gem Valley of SE ID



Sites and Preliminary Results from the UT Geological Survey wells in the Black Rock Desert of central UT; results imply temperatures of 150 to 250 degrees C at 3-4km depth

State Geological Survey Providers

Ongoing project, #'s as of 01-27-2014

Data Provider	Summary of Data Provided
Participating State Geological Surveys, and Universities (50 State Representation)	Total Expected Deliverables: 1,083
	Total Online Deliverables to Date: 988
	Percent Complete: 91.23%
	Total Data Points (09/16/2013): 6,296,352
	Total Data Services: 323* in 531 layers
	Total Map Services: 138
	10 Gravity/Aeromag maps
	22 OneGeology Maps
	106 WMS Maps

*Services may include 2-3 deliverables based on the state’s annual Scope of Work (SOW)


State Geological Survey Providers

Ongoing project, #'s as of 01-27-2014

Data Provider	Data Item
Participating State Geological Surveys, and Universities (50 State Representation)	Borehole Temperature total collected data points are 497,102
	Thermal Conductivity total collected data points are 36,612
	Well Header total collected data points are 1,728,745
	Well Log total collected data points are 671,028
	Well Test total collected data points are 26,396
	Borehole Lithology Intervals total collected data points 1,852,362
	Active Fault total collected data points 41,997
	Drill Stem Test total collected data points 26,627

Federal Guidance – Open Data Policy

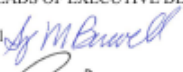
Managing Information as an Asset


 EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

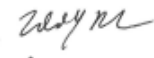
THE DIRECTOR May 9, 2013


M-13-13

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

FROM: Sylvia M. Burwell, 
Director

Steven VanRoekel, 
Federal Chief Information Officer

Todd Park, 
U.S. Chief Technology Officer

Dominic J. Mancini, 
Acting Administrator, Office of Information and Regulatory Affairs

SUBJECT: Open Data Policy—Managing Information as an Asset

Information is a valuable national resource and a strategic asset to the Federal Government, its partners, and the public. In order to ensure that the Federal Government is taking full advantage of its information resources, executive departments and agencies (hereafter referred to as "agencies") must manage information as an asset throughout its life cycle to promote openness and interoperability, and properly safeguard systems and information. Managing government information as an asset will increase operational efficiencies, reduce costs, improve services, support mission needs, safeguard personal information, and increase public access to valuable government information.

Making information resources accessible, discoverable, and usable by the public can help fuel entrepreneurship, innovation, and scientific discovery – all of which improve Americans' lives and contribute significantly to job creation. For example, decades ago, the Federal Government made both weather data and the Global Positioning System (GPS) freely available to anyone. Since then, American entrepreneurs and innovators have used these resources to create navigation systems, weather newscasts and warning systems, location-based applications, precision farming tools, and much more.

Pursuant to Executive Order of May 9, 2013, *Making Open and Machine Readable the New Defaults for Government Information*, this Memorandum establishes a framework to help institutionalize the principles of effective information management at each stage of the information's life cycle to promote interoperability and openness. Whether or not particular information can be made public, agencies can apply this framework to all information resources to promote efficiency and produce value.

Specifically, this Memorandum requires agencies to collect or create information in a way that supports downstream information processing and dissemination activities. This includes using machine-readable and open formats, data standards, and common core and extensible metadata for all new

"Information is a valuable national resource and a strategic asset to the Federal Government, its partners, and the public. . . Departments must manage information as an asset throughout its life cycle to promote openness and interoperability. . . "

"Specifically, this memorandum requires agencies to collect or create information in a way that supports downstream information processing and dissemination activities. . . Using machine readable and open formats, data standards, and common core and extensible metadata for all new information creation and collection efforts . . . "

Federally Funded Scientific Research

Increasing Access to Results

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
WASHINGTON, D.C. 20502

February 22, 2013

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

FROM: John P. Holdren *JPH*
Director

SUBJECT: Increasing Access to the Results of Federally Funded Scientific Research

1. Policy Principles

The Administration is committed to ensuring that, to the greatest extent and with the fewest constraints possible and consistent with law and the objectives set out below, the direct results of federally funded scientific research are made available to and useful for the public, industry, and the scientific community. Such results include peer-reviewed publications and digital data.

Scientific research supported by the Federal Government catalyzes innovative breakthroughs that drive our economy. The results of that research become the grist for new insights and are assets for progress in areas such as health, energy, the environment, agriculture, and national security.

Access to digital data sets resulting from federally funded research allows companies to focus resources and efforts on understanding and exploiting discoveries. For example, open weather data underpins the forecasting industry, and making genome sequences publicly available has spawned many biotechnology innovations. In addition, wider availability of peer-reviewed publications and scientific data in digital formats will create innovative economic markets for services related to curation, preservation, analysis, and visualization. Policies that mobilize these publications and data for re-use through preservation and broader public access also maximize the impact and accountability of the Federal research investment. These policies will accelerate scientific breakthroughs and innovation, promote entrepreneurship, and enhance economic growth and job creation.

The Administration also recognizes that publishers provide valuable services, including the coordination of peer review, that are essential for ensuring the high quality and integrity of many scholarly publications. It is critical that these services continue to be made available. It is also important that Federal policy not adversely affect opportunities for researchers who are not funded by the Federal Government to disseminate any analysis or results of their research.

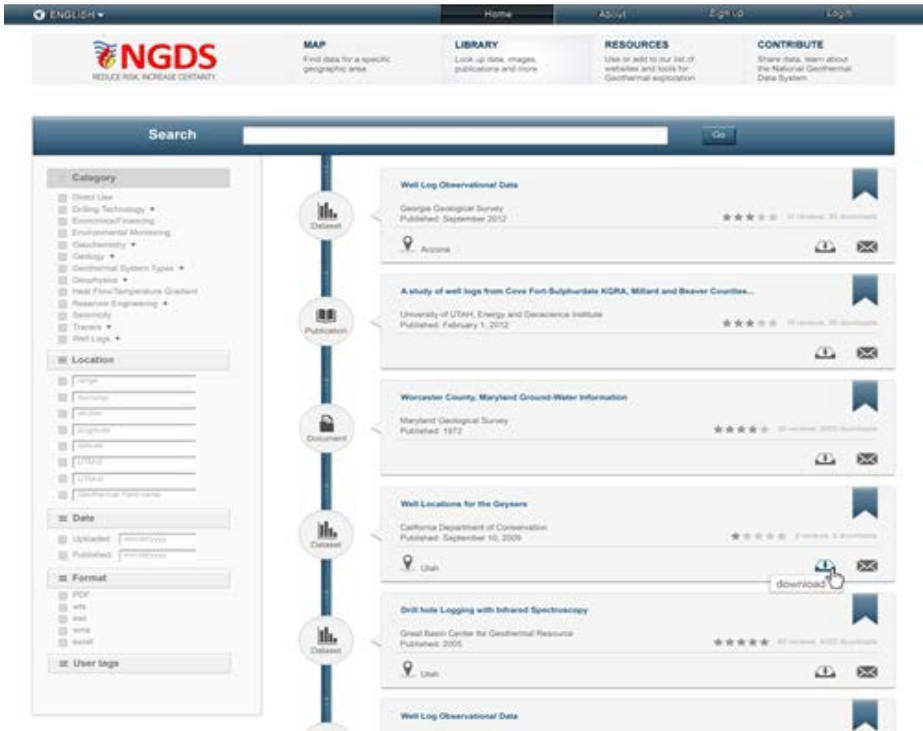
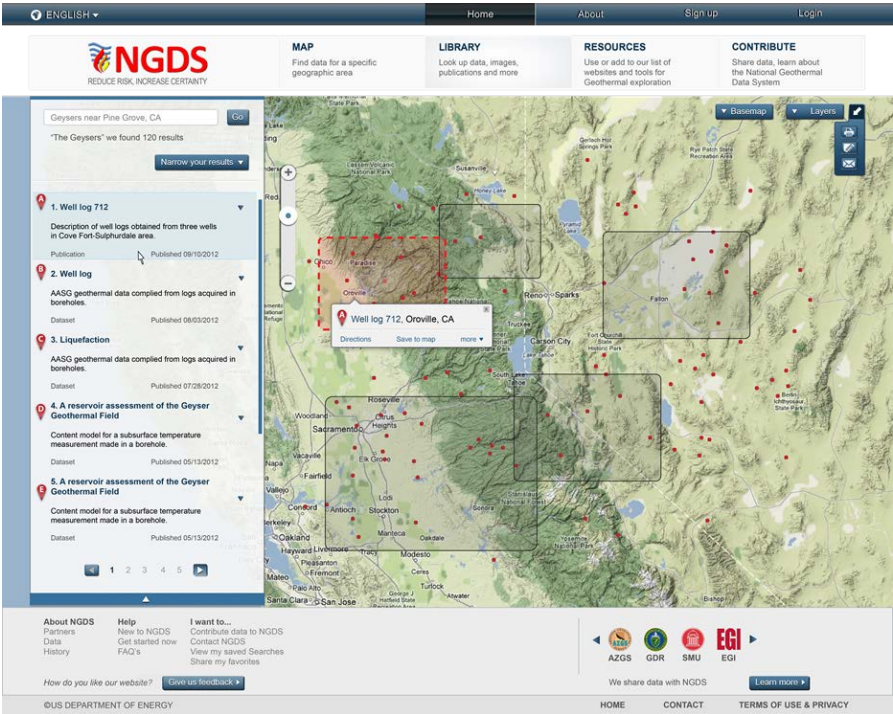
To achieve the Administration's commitment to increase access to federally funded published research and digital scientific data, Federal agencies investing in research and development must have clear and coordinated policies for increasing such access.

Open Data Policy Requirements	NGDS Capabilities
<i>Domain: all federal agency data; all research data funded by federal agencies</i>	Works for all digital data
<i>Legal Status: Executive Order</i>	DOE-GTO funded
<i>Public access at no cost</i>	X
<i>Searchable/ discoverable</i>	X
<i>Interoperability</i>	X
<i>Scalability</i>	X
<i>Metadata core requirements</i>	X
<i>Open Source</i>	X
<i>Assistance/Education for data creators and end users</i>	X
<i>Community building efforts</i>	X
<i>Description Requirements (What info, access requirements)</i>	X

- Data Resource Repository
 - Documents (Tier 1)
 - Structured data sets (Tier 2, 3)
- Catalog
 - Host a local catalog of data resources(metadata)
 - Aggregate (harvest) metadata from other catalogs
- Web Services
 - CSW (harvest-able catalog service)
 - Data access services (WMS, WFS, WCS, ...)
- User Interface
 - Map-based search/discovery
 - Library search/discovery
 - Uploading data resources
 - Adding/changing metadata in the catalog
 - Finding other on-line resources and tools

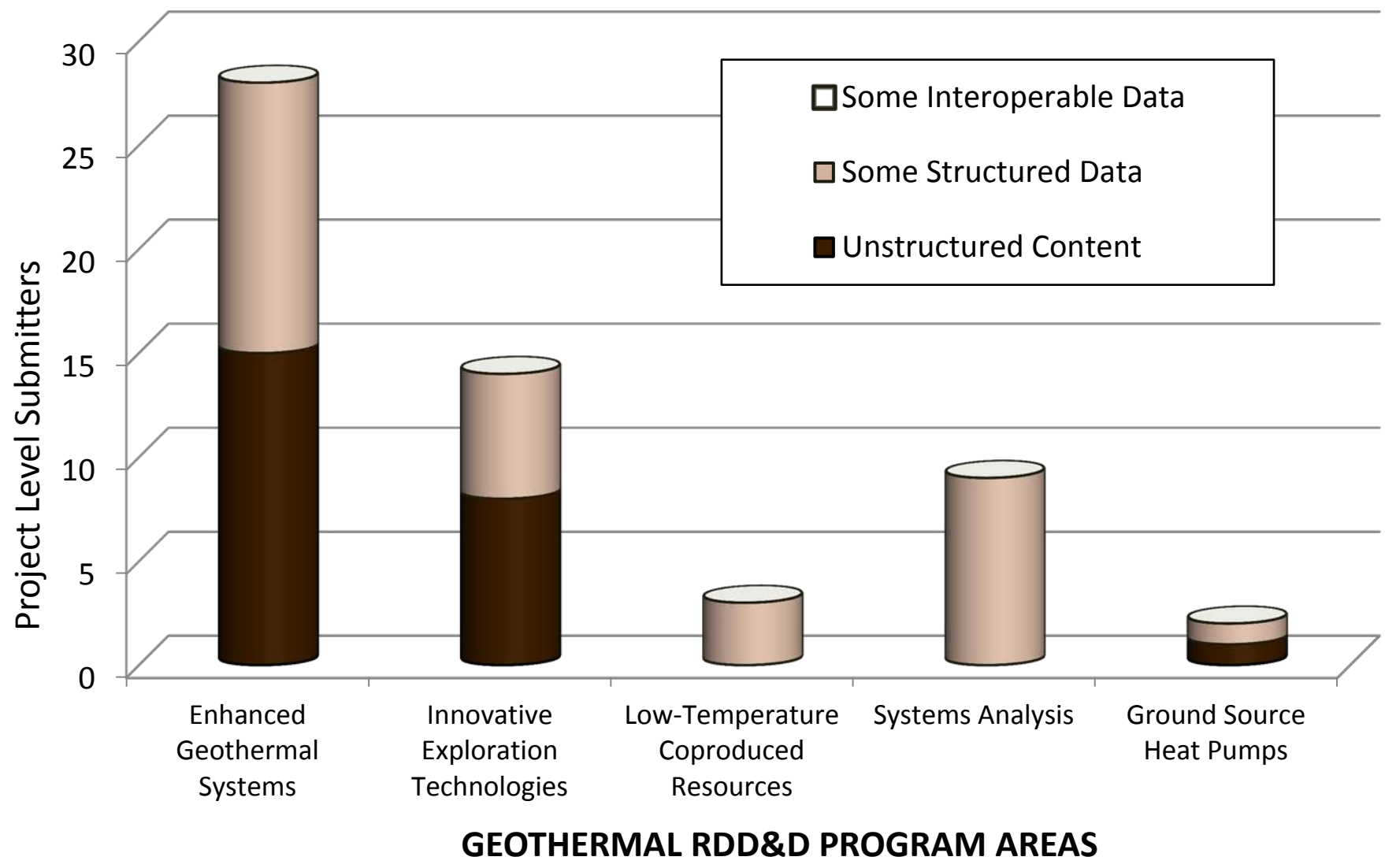
Node-in-a-Box GTO Developed Software Use to Meet Open Data Policy Requirements

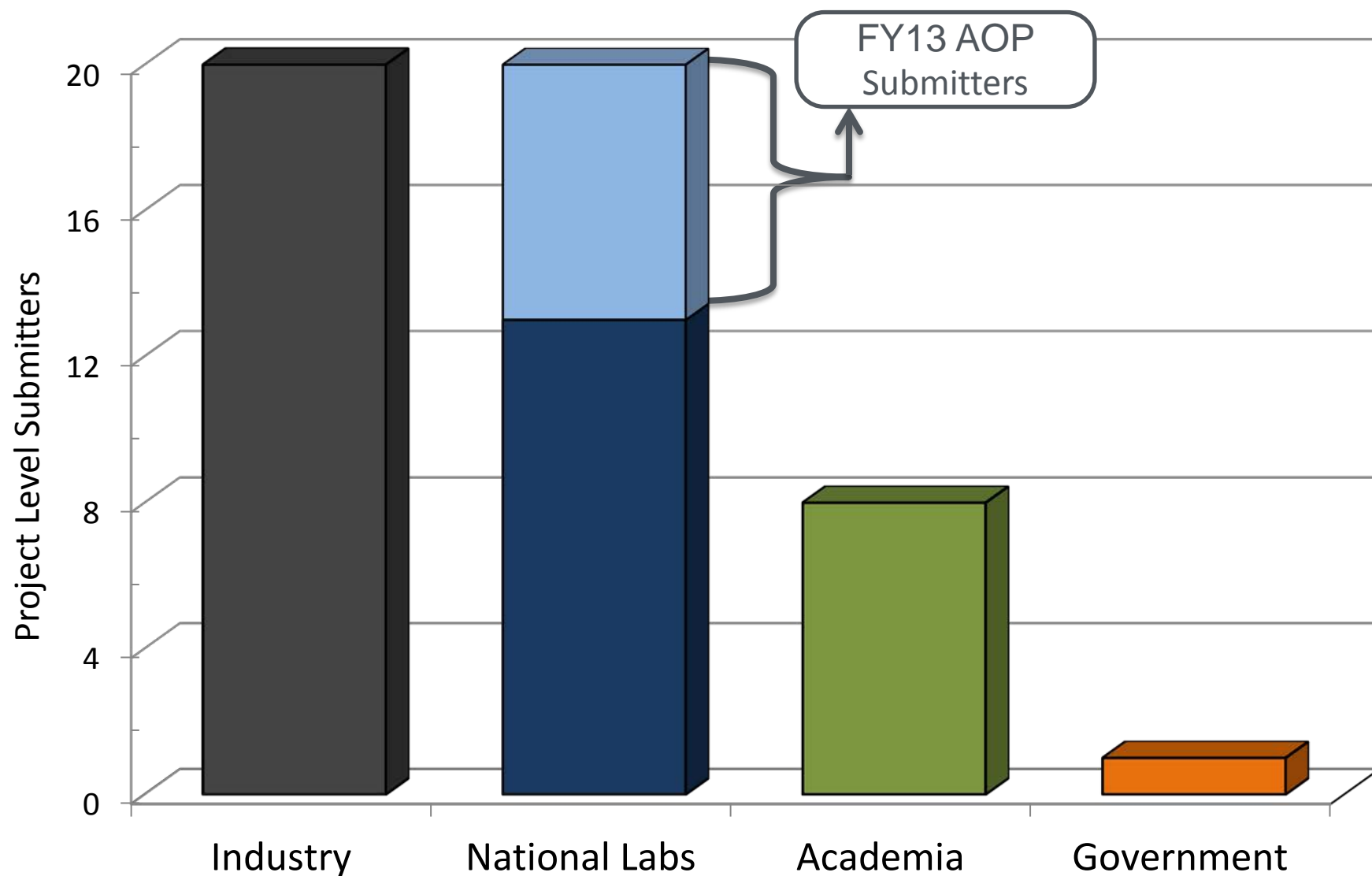
NIAB may be installed in “node” mode and used internally on an intranet searchable by an external system with firewall modifications



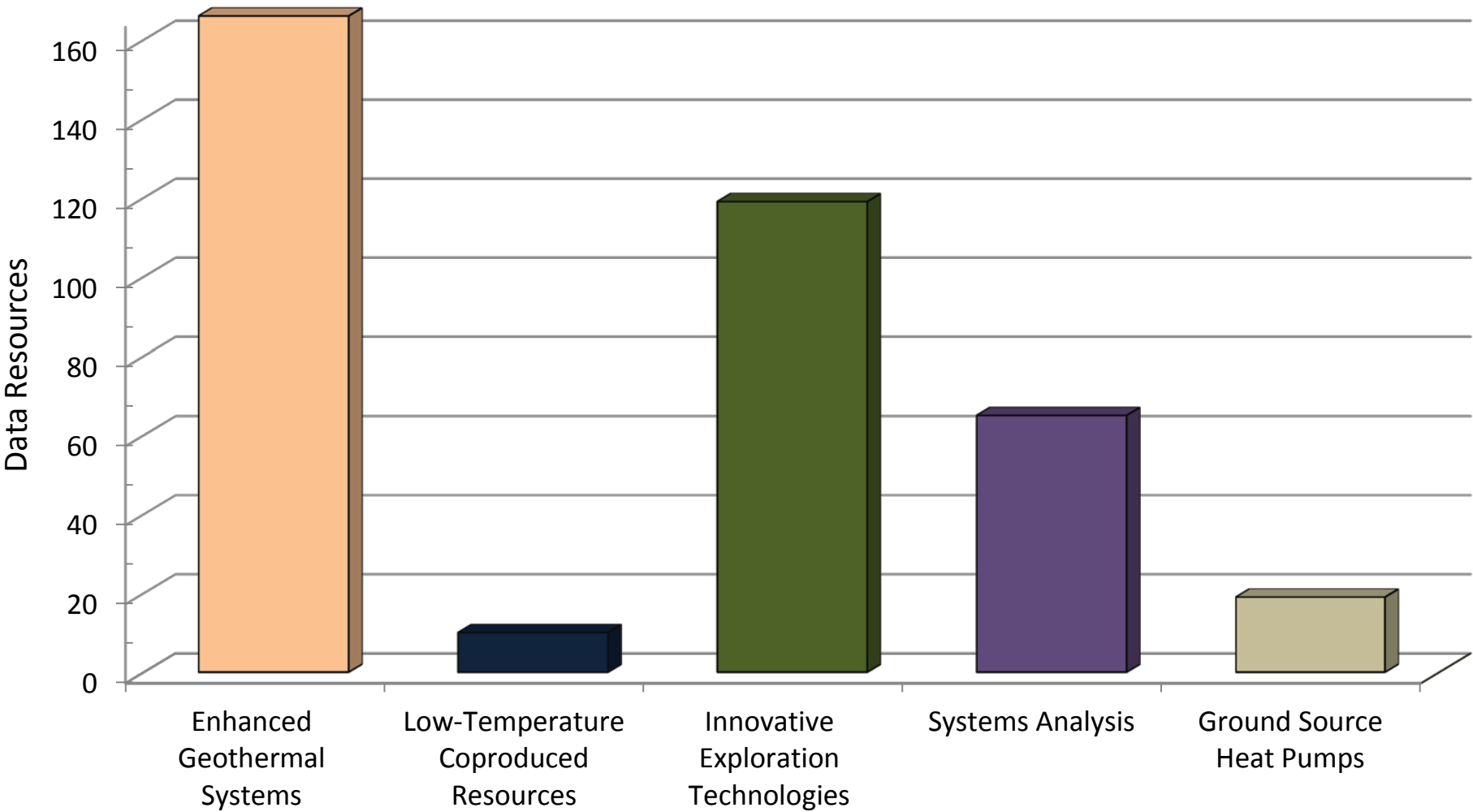
Geothermal Data Repository (GDR)

Data Usability - 57 Submitters as of Dec. 31, 2013





Geothermal RDD & D Program Areas



DOE Geothermal Data Repository (GDR)

Data Usability - 377 Data Resources as of Dec. 31, 2013

