

GEOHERMAL WEBSITES

Tonya "Toni" Boyd

Geo-Heat Center
3201 Campus Drive
Klamath Falls, OR, 97601, USA
E-mail: boydt@oit.edu

ABSTRACT

The Internet has become such an important part of our every day life. It can be used to correspond with people across the world, a lot faster than to send a letter in the mail. The Internet has a wealth of information that is available to anybody just by searching for it. Sometimes you get more information than you ever wanted to know and sometimes you can't find any information.

This paper will only cover a small portion of the websites and their links that have geothermal information concerning reservoir engineering, enhanced geothermal systems, hot dry rock and other aspects of geothermal. Some of the websites below are located in the US others international, such as, geothermal associations, and websites where you can access publications. Most of the websites listed below also have links to other websites for even more information.

STANFORD GEOHERMAL PROGRAM

<http://ekofisk.stanford.edu/geotherm.html>

This website provides information on their program and their graduate study. They also have a section for their downloadable reports and publications. Some of the technical reports they have available go back to 1973. There are overview reports from 1990 on including Quarterly reports. As you all probably know they have information on their upcoming Geothermal Workshop. All the proceeding from the Geothermal Workshops from 1997 to the current can be searched for on their website. The database can be search by any word in the title, author name, keyword, year or session.

GEO-HEAT CENTER

<http://geoheat.oit.edu>

The Geo-Heat Center provides dissemination of geothermal information and technology transfer. The transfer of technological information to consultants,

developers, potential users, and the general public is an important element in the development of direct heat utilization of geothermal energy. Their main focus is on the use of low to moderate temperature resources and small-scale power. Their website includes an interactive direct-use map, information on co-located resources, and a database on geothermal wells and springs for 16 western states. They also have downloadable technical papers and bulletin articles on all types of geothermal applications and resources, plus a geothermal heat pump newsletter.

GEOHERMAL RESOURCES COUNCIL

<http://www.geothermal.org/index.html>

The Geothermal Resource Council (GRC) has a searchable library containing bibliographic information of articles from a variety of publications on all aspect of geothermal worldwide. This database will inform you on where the publication is located and if you do not have the publication how you can order it. A new addition to their website for GRC members is access to all the GRC Transactions volumes 1 through 27 and GRC Special Reports volumes 1 through 19 as downloadable PDF files. If you are a member of the GRC you can download papers free of charge. The non-member section of the library database allows the same searches and a preview of the above publications only. They also provide information on becoming a member of the organization and their Annual Meeting.

INTERNATIONAL GEOHERMAL ASSOCIATION

<http://iga.igg.cnr.it/index.php>

They provide information on geothermal energy use around the world, world conferences on geothermal, and links to related web sites. They have an interactive map of the geothermal of the world, plus a table of electrical generation and direct use applications for each country. There is also a summary of each country's applications that have

been summarized from the World Geothermal Congress proceedings papers, which will be updated after the WGC2005 conference. They also have a link to where you can search for IGA Geothermal Conference Papers database (hosted on the Stanford Geothermal Program website). This database search covers World Geothermal Congress proceedings from 1995 and 2000, European Geothermal Congress 2003, Iceland Geothermal Conference 2003, International Geothermal Workshop, Russia 2003, Beijing International Geothermal Symposium, 2002, Geothermal Energy in Underground Mines, Ustron, Poland 2001, and Stanford Geothermal Workshops 1997 – 2004. There is also a database to search for Past IGA newsletters from Issue 1 to 49.

WORLD GEOTHERMAL CONGRESS 2005

<http://www.wgc2005.org>

This website contains information on the World Geothermal Congress 2005 meeting. Some of the links includes information on their short courses, technical program, organizing committee, calendar and deadlines and accommodation.

ENERGY & GEOSCIENCE INSTITUTE - UNIVERSITY OF UTAH

<http://egi-geothermal.org/>

Under the links on their main page they have a link to the popular “Red Brochure” and a link to GIS Projects. The “Red Brochure” is a publication that has some general information on geothermal and is a great publication to inform people about geothermal. The link for GIS Projects includes a Geothermal Internet map server, which was created by using ArcIMS. This map server has several layers, which can be visible or active. As you zoom into the map you are presented with more layers. Some of the layers include thermal springs; geothermal study areas/fields, faults and surface geology, county boundaries just to name a few that can be viewed. You can also get information about areas they have studied – an example would be the Dixie Valley area. After getting information about the area, a link is provided to another page which provides some publications on the area, raster data for the area, plus some of the ArcView files are available. Of course at the time I looked at the pages not every area had all this information.

SOUTHERN METHODIST UNIVERSITY GEOTHERMAL LABORATORY

<http://www.smu.edu/geothermal/>

They have a couple of databases on their website. The Regional Geothermal Database of US is a database of primarily regional or background wells

that has been used to determine the heat flow for the United States. The Western Geothermal Areas Database is a database of over 5000 wells in mainly high temperature geothermal areas from the Rockies to the Pacific Ocean; all wells within a geothermal area are located where available; the majority of the data are from company documents, well logs and publications. Many of the wells were not previously accessible to the public. They have also produced a Geothermal Map of North America and they explain where the information came from to produce the map. They also have some publications that are downloadable from their website and links to other websites and information.

THE GLOBAL HEAT FLOW DATABASE OF THE INTERNATIONAL HEAT FLOW COMMISSION

<http://www.heatflow.und.edu/index2.html>

This website provides information on heat flow for all over the world. They have maps and databases in either Excel or ASCII format for most of the world. The data presented on the maps use a color-coded format using the visible light spectrum so that warm colors (reds) indicate high heat flow and cool colors (violet) indicate low heat flow. The spectral range for each data map is 0 to 200 mW/ m² in intervals of 10 mW/ m². Heat flows greater than 200 mW/ m² are assigned the warmest color.

DEPARTMENT OF ENERGY - GEOTHERMAL ENERGY PROGRAM

<http://www.eere.energy.gov/geothermal>

Describes the U.S. DOE Geothermal Energy Program and provides information and news on geothermal energy. They also have a link on their website under their tab “Information Resources” which provides links to all the National Labs publications that are available for downloading or information on how to request the publications on their respective websites.

NATIONAL RENEWABLE ENERGY LABORATORY (NREL) GEOTHERMAL TECHNOLOGIES PROGRAM

<http://www.nrel.gov/geothermal/>

The information on this website is organized by topics such as technology description, program summary, research and development projects, and publications. The publications listed are downloadable PDF files.

DEPARTMENT OF ENERGY - GEOTHERMAL ENERGY TECHNICAL SITE

<http://geothermal.id.doe.gov/>

This website is maintained by Idaho National Engineering and Environmental Laboratory (INEEL). They have links to several publications including their research program annual reports, articles and a recent Dixie Valley Workshop. They also provide information on the geothermal resource maps they have produced and links to download the maps.

SANDIA NATIONAL LABORATORIES: GEOHERMAL RESEARCH DEPARTMENT

<http://www.sandia.gov/geothermal/>
<https://cfwebprod.sandia.gov/cfdocs/GPI/>

Sandia provides information on the different projects they are working on and an email link to the person in charge of the project. They also provide links to several downloadable publications with more to be added at a later date.

GEOHERMAL ENERGY ASSOCIATION

<http://www.geo-energy.org>

The Geothermal Energy Association website includes information on existing and planned power plants. Some of that information includes contact information and where they are located. Also includes information on the next Geothermal Energy Trade Show that runs in conjunction with the Geothermal Resources Council Annual Meeting.

GEOHERMAL-BIZ.COM

<http://www.geothermal-biz.com/home.htm>

This website provides development information for the geothermal entrepreneur. They have information on financing geothermal direct use and small-scale power projects. They also provide information on why geothermal energy should be used for state agencies, electric power companies and environmental groups. Their calendar of events is the most comprehensive that I have found.

THE UNITED NATIONS UNIVERSITY - GEOHERMAL TRAINING PROGRAMME

<http://www.os.is/page/unugtp>

This website explains what the United Nations University does and explains about their program plus what training they provide and the selection process for becoming a candidate.

A significant part of the practical training is done in connection with the research projects of the Fellows. In many cases the participants bring with them data from geothermal projects in their home countries, but sometimes the research projects are integrated with

geothermal exploration or utilization projects that are in progress in Iceland at the time of training. The project topic is always selected with respect to the conditions of the home country of the participant. Many of the project reports are written in such a way that they serve as manuals for performing certain measurements or interpretations dealt with in respective reports.

The Training Programme publishes all the project reports. Since 1994, the reports have been published in the annual book "Geothermal Training in Iceland" which has an international publishing code (ISBN 9979). Copies can be obtained upon request. The reports are mailed regularly to former UNU Fellows and many of the leading geothermal institutions in the developing countries. UNU-GTP reports from the years 1999 to 2003 are now available for downloading from their website.

EUROPEAN GEOHERMAL ENERGY COUNCIL – EGEC

http://www.geothermie.de/egec_geothernet/menu/fra meset.htm

This website has a tremendous amount of information on their website, but it is easy to forget where you are in their website. They have three different levels that you can enter into (Beginners, Professional and Scientist), but once you enter into a level you can access information in all the levels.

The Beginners level includes information on what is geothermal, why we should use it, geothermal short course and basic information on the countries with geothermal. The Professional level has information on country overviews, project information, applied technology, geological information, research overview and future potential and developments. The Scientists level includes information on research projects, scientific papers and congress information.

GREAT BASIN CENTER FOR GEOHERMAL ENERGY

<http://www.unr.edu/geothermal>

CALIFORNIA ENERGY COMMISSION

<http://www.energy.ca.gov>

CALIFORNIA DEPARTMENT OF CONSERVATION – DIVISION OF OIL, GAS AND GEOHERMAL RESOURCES

<http://www.consrv.ca.gov/DOG/index.htm>

NEW ENERGY AND INDUSTRIAL TECHNOLOGY DEVELOPMENT ORGANIZATION (NEDO) - GEOTHERMAL ENERGY DEVELOPMENT DEPARTMENT

<http://www.nedo.go.jp/chinetsu/indexe.htm>

This website provides information on the types of projects that NEDO are involved in.

HOT DRY ROCK

Swiss Deep Heat Mining Project

<http://www.dhm.ch/dhm.html>

The website includes information on the Hot Dry Rock geothermal energy program in Switzerland. There is also information about the technology and the ongoing development program, including photos, maps, and diagrams.

European HDR project, Soultz-sous-Forets, France

<http://www.soultz.net/>

This website provides basic information on the HDR Soultz project and status of the current phase of the project.

Stadtwerke Bad Urach (German)

http://www.geothermie.de/bad_urach.htm

This website is in German, but they provide pictures and graphics of the project, plus there are links to other HDR projects in the world.

CADDET

They provided information on full-scale commercial geothermal energy projects and case studies.

<http://www.caddet.co.uk/html/geo.htm>

INTERNATIONAL DISTRICT ENERGY ASSOCIATION

<http://www.districtenergy.org/>

WASHINGTON STATE UNIVERSITY ENERGY PROGRAM

<http://www.energy.wsu.edu/projects/renewables/geothermal.cfm>

PUBLICATIONS AVAILABLE ONLINE

Geopubs – USGS Western Region Geologic Publications

<http://geopubs.wr.usgs.gov/>

This webpage provides links to geologic publications by the USGS on Scientific Investigation Reports and Maps, Fact Sheets, Geologic Investigations Series Maps, Circulars and Open-File Reports from 1988 to 2005, which can be viewed sorted by state or topic.

USGS Open-File Report 99-425 Geothermal Industry Temperature Profiles from the Great Basin

<http://wrgis.wr.usgs.gov/open-file/of99-425/webmaps/home.html>

This webpage provides a link to the database produced from this report on the Great Basin and an interactive map to access the well data including a temperature log.

Geothermics

<http://www.elsevier.com/locate/geothermics>

This webpage link provides information on the publication Geothermics. Information is also included on how to submit a paper and how to subscribe to the Journal. The table of contents and abstracts to articles is provided free.

DOE's Scientific and Technical Information - Information Bridge

<http://www.osti.gov/bridge/>

The website provides information on Department of Energy research and development reports for such topics as environmental sciences, energy technologies, renewable energy and other topics.

Office of Scientific and Technical Information - Geothermal Energy Technology

<http://www.osti.gov/get/gethome.html>

This website allows you to search for publications from several different databases including Energy Information Administration, Environmental Protection Agency and National Technical Information Service. I found the search mechanism, though, on their website is a little hard to get the publications you are trying to access.

Proceedings for Multiple Integrated Uses of Geothermal Resources - International Geothermal Conference - 2003

<http://www.jardhitafelag.is/igc/nytt/>

They have provided a website where the proceeding of the conference can be downloaded. They can be looked at by session or by author.

WEBSITES WITH PICTURES OR SLIDES

Geothermal Education Office

<http://geothermal.marin.org/>

The Geothermal Education Office has produced a slide presentation with 122 slides. These can be viewed on their website and they provide information on the use of the slides.

National Renewable Energy Laboratory - Photographic Information Exchange

http://www.nrel.gov/data/pix/searchpix.cgi?query=GEOTHERMAL&display_type=tiled&max_display=20&search_home=searchpix_visual.html

This website has 620 pix images concerning geothermal which can be viewed at 20 pictures on a page with a description of each picture.

GEOTHERMAL ASSOCIATION WEBSITES

Most countries have some type of Geothermal Association below are the ones that I have come across in my research for this paper. I am sure there are other association websites, but they might be in their native language only and not English. Some of the websites below are in both their native language and English.

Australian CRC for Renewable Energy Ltd
<http://acre.murdoch.edu.au/refiles/geo/text.html>

Canadian Geothermal Energy Association
<http://www.geothermal.ca/>

German Geothermal Association Welcome to GtV
<http://www.geothermie.de/>

Hungarian Geothermal Association
<http://www.deltasoft.hu/mgte/indexa.htm>

Iceland Geothermal Association
<http://www.jardhitafelag.is/english/index.shtml>

Indonesian Geothermal Association
<http://www.api.or.id/>

Ireland Geothermal Association
<http://www.feasta.org/documents/wells/contents.html?seven/connor.html>

Mexican Geothermal Association
<http://www.ugm.org.mx/agm/>

New Zealand Geothermal Association
<http://www.nzgeothermal.org.nz/>

Polish Geothermal Association
<http://www.pga.org.pl/>

Swiss Geothermal Society _SVG-SSG
<http://www.geothermal-energy.ch/fr/svg/svg.htm>
Turkish Geothermal Association
<http://www.jeotermaldernegi.org.tr/>

HEAT PUMP WEBSITES

Geothermal Heat Pump Consortium
<http://www.geoexchange.org/>

International Ground Source Heat Pump Association
<http://www.igshpa.okstate.edu/>

European Heat Pump Association
<http://www.ehpa.org>

GeoCool Lab - Department of Mechanical Engineering - University of Alabama
<http://bama.ua.edu/~geocool/>

Earth Energy Society of Canada, Ground Source Heat Pumps
<http://www.earthenergy.ca/>

The IEA Heat Pump Centre (HPC)
<http://www.heatpumpcentre.org/>