Inside Geothermal

NORTH AMERICA

House Energy Spending Bill Readjusts Budget Cut

U.S. House appropriators have introduced a spending bill for U.S. federal energy and water departments that would spend USD 3.65 billion more in 2018 than President Trump requested for the agencies, reports The Hill.

The bill, which funds the U.S. Department of Energy (DOE), nuclear weapons oversight, the Army Corps of Engineers and other departments, would spend USD 37.56 billion total in 2018, a USD 209 million cut from current funding levels.

The measure is seen as a rejection of Trump’s budget proposal, which looked to deeply slash spending for the initiatives funded by the legislation. Renewable energy research, for instance, would be cut by USD 986 million over current levels to USD 1,104 million, but that is USD 468 million less than the cuts for which Trump had aimed for, as reported in the July/August GRC Bulletin.

Geothermal Technologies Office Announces Play Fairway Analysis Phase III Selections

The U.S. Department of Energy’s Geothermal Technologies Office (GTO) has announced it will continue funding for 5 projects aligned with Phase III Play Fairway Analysis (PFA) activities. GTO will award up to USD 5 million in additional funding to 5 of the original 11 projects from the 2014 PFA Funding Opportunity Announcement. The awards will address the overarching theme of uncertainty quantification and reduction in geothermal exploration, specifically through the development of Geothermal Play Fairways. Phase III awardees will move the projects into an exploratory drilling campaign that will test the Phase I and II developed models’ ability to discover new resources.

The selected Phase III awardees are:
- Nevada Bureau of Mines and Geology, University of Nevada-Reno – Reno, Nevada
- University of Hawaii – Honolulu, Hawaii
- University of Utah – EGI Great Basin – Salt Lake City, Utah
- Utah State University – Logan, Utah
- Washington Division of Geology and Earth Resources – Olympia, Washington

5 Projects to Receive USD 15 Million to Investigate Wellbore Integrity

The Geothermal Technologies Office (GTO) and the Office of Fossil Energy (FE) have announced the selection of 5 projects to receive up to USD 15 million in funding to investigate wellbore integrity research subjects via a Lab Call announcement. This funding opportunity will address two topic areas: Wellbore Diagnostics and Integrity assessment in legacy wells, and Sensors and Tools for Autonomous Completions and Long Term Monitoring of Wellbore Integrity.

GTO and FE partnered in response to a report published by FE in October 2016 titled Ensuring Safe and Reliable Underground Natural Gas Storage. The report states that to lower the risk for wellbore failure, operators should prioritize integrity tests that provide hard data on well performance through monitoring, logging, and mechanical integrity testing. Well Integrity testing should also use multiple methodologies and not rely on a single diagnostics, and use continuous real time monitoring.

The selected awardees include:
- Sandia National Laboratories
- National Energy and Technology Laboratory
- Los Alamos National Laboratory
- Lawrence Berkeley National Laboratory

Calpine Successfully Re-Contracts 225 MW Geothermal Energy PPA

Southern California Edison (SCE), has agreed to re-contract for 225 MW over 10 years with Geysers Power Company, LLC, a subsidiary of Calpine Corp. for electricity generated by geothermal power plants in The Geysers geothermal field in Northern California.
License Terminated for Black Rock Geothermal Power Plant

CalEnergy, owned by Warren Buffett’s Berkshire Hathaway Energy, has asked the California Energy Commission to terminate the license for building the Black Rock geothermal power plant on the shores of the Salton Sea in Southern California.

The company had requested and received extensions of the construction start deadline in 2007, 2011 and 2014, but this time decided to move on rather than pay a USD 27,678 annual compliance fee that had been due at the end of June, reports The Desert Sun.

GRC Board Member Dennis Kaspereit, who spent 10 years as CalEnergy’s director of geothermal resources and now works at Geothermal Resource Group, said Black Rock faced the same headwinds as all geothermal projects in the region — the difficulty of securing financing and a power purchase agreement with a utility.

"It all comes down to the return that they need,” he said. Kaspereit doesn't think CalEnergy is especially interested in building new geothermal plants at the Salton Sea anymore.

"Berkshire Hathaway is big. They've got a lot of wind, they've got solar, they've got other areas. (Geothermal electricity generation is) a complicated thing to do,” Kaspereit said.

Two Companies With History of Involvement in Geothermal Energy Projects Announce Merger

Jacobs Engineering Group Inc. and CH2M Hill Companies Ltd. have announced they have entered into a definitive agreement under which Jacobs will acquire all of the outstanding shares of CH2M in a cash and stock transaction with an enterprise value of approximately USD 3.27 billion, including approximately USD 416 million of CH2M net debt.

CH2M is a world-renowned design, engineering and program management firm, and is a leader in key infrastructure and government service sectors that Jacobs has previously targeted for growth, including water, transportation, environmental and nuclear.

Cyrq Energy Adds Solar PV Array at Patua Geothermal Power Plant

Empower Energies, Inc. of Maryland, USA, has announced the completion of a 14.5 MW PV solar array at the Patua geothermal power plant in Churchill County, Nevada owned by Cyrq Energy, based in Salt Lake City, Utah.

Empower advised Cyrq on the development and design of the project, including the selection of the solar equipment, which included approximately 45,360 photovoltaic (PV) solar panels, and the EPC for the construction and commissioning of the project.

Ormat Looking to Expand Geothermal Energy Business through Acquisitions

According to S&P Global Market Intelligence, Ormat Technologies Inc. is exploring potential acquisitions in geothermal energy and energy storage following its USD 35 million acquisition of demand response and battery storage solutions provider Viridity Energy Inc. said CEO Isaac Angel on an earnings call.

"We are actively looking both for geothermal projects and for power plants that we can buy, enhance or operate," Angel said. "On the storage side, we're looking for companies that will add value from technology side or projects ready to develop and we will enter with the developer and build it.”

Ormat Technologies, Inc. will be exhibiting at the GRC Annual Meeting & GEA GeoExpo+ from October 1-4 in Salt Lake City, Utah, USA.

Nevada Geothermal Lease Sale to be Held October 26

The Bureau of Land Management’s Elko District has completed an Environmental Assessment for parcels of public land nominated this year for a competitive geothermal lease sale.

These parcels have the potential for future geothermal exploration and development,

viridityenergy
Inside Geothermal

according to the agency. The BLM is considering offering up to 5 parcels, comprising about 12,615.28 acres of land in northeastern Nevada in a competitive Geothermal Lease Sale to be held on October 26.

For more information, contact Tom Schmidt, Project Lead at the BLM Elko District, at 753-0200 or email at TuscFO_NEPA@blm.gov.

Three New Wells at San Emidio II Geothermal Project Tap 320°F Plus Resource

U.S. Geothermal has announced that it has successfully intersected a high temperature resource in the three additional wells drilled in the southwest zone of the resource area at its San Emidio II development project in Nevada.

Drilling began on June 1st and the three wells were deepen based on their high thermal gradient and bottom hole temperature. Well 78-20 was drilled to 2,387 feet deep, intersected the geothermal resource at 2,314 feet, and has a measured flowing temperature of 324°F. Well 18-21 was drilled to 2,177 feet deep, intersected the geothermal resource at 1,874 feet, and has a measured flowing temperature of 325°F. The third well (28-21) was drilled to 2,799 feet deep, intersected the geothermal resource at 1,900 feet, and though less permeable than the other two, has a measured flowing temperature of 321°F. For comparison purposes, the wellfield at the San Emidio I project is currently producing at an average temperature of 278°F. All wells were completed with a 6 ¼ inch bottom hole diameter and a 4 ½ inch perforated casing liner.

Borealis Geopower to be Subsidiary of New Start-Up Renewable Energy Company

Borealis Geopower has announced it has entered into a binding term sheet with fellow Calgary, Alberta company P Squared Renewables Inc., which sets out the material terms and conditions pursuant to which the parties have agreed to complete a transaction that will result in Borealis becoming a wholly owned subsidiary of P Squared. The term sheet was negotiated at arm’s length and is effective as of July 1, 2017. The merger should be effective by the end of September.

P Squared Renewables Inc. is a start-up renewable energy company, currently building its portfolio of geothermal, solar, wind and energy storage projects, which will include power generation and technology development. Projects targeted will initially be located in Canada with future global expansion.

In addition, The Rocky Mountain Goat reports that Borealis Geopower is ready to start drilling at the Canoe Reach geothermal project in Valemount, British Columbia.

“We have drilling authorization for an area near the marina, and the Griffin Sawmill area,” said Alison Thompson, a principal with Borealis. “Of course, we need funds to be able to complete that work. We are taking concrete efforts to make sure we execute flawlessly.”

The company intends to build a 15 MW geothermal power plant and sell the power to B.C. Hydro and other customers via direct electricity sales.

Grupo Enal Develops a 500 kW Geothermal Portable Power Plant

Mexican geothermal energy developer Grupo Enal has developed a portable and easy to install distributed geothermal generation plant that can be fitted in exploratory wells to start production before the main geothermal plant is settled, reports Renewable Energy Mexico.

According to Gerardo Hiriart, Director General of Grupo Enal, "We came to this solution while working for a producer that needed to start generating energy to support the development of their geothermal projects. Our client was considering either diesel generators or solar roofing. However, we decided to take advantage of the existing geothermal resource placed there. After some engineering, we created the first geothermal plant for distributed generation with a production capacity of 20kW.”

After further engineering and hard work, Enal has now developed a 500 kW portable geothermal power plant that is ready to be tested in real life conditions.
This portable plant can be used to start what Gerardo calls pre-production, a phase in which a small energy production is done while also characterizing the wells in real-time by acquiring data such as pressure, temperature, enthalpy and pH, among others. This allows for an easier engineering phase with more data. The electric energy produced in pre-production can be either used by the project developer, or sold to the grid under what is called the distributed generation scheme, therefore providing economic help to the project developers.

AUSTRALASIA

Contact Energy Gains Climate Bonds Certification for Geothermal Assets

New Zealand power company Contact Energy Ltd has gained Climate Bonds Certification of its geothermal assets as part of its new Green Loan Borrowing Programme for NZD 1.8 billion (USD 1.3 billion).

This is the first Climate Bonds Certification gained by a New Zealand company. Dennis Barnes, Contact Chief Executive says “Our Green Borrowing Programme is a first for a New Zealand corporation and enables debt investors and lenders to access a broad range of certified green debt instruments issued by a New Zealand company.”

Confidence Shown in the Running of Expanded 50 MW Ngawha Geothermal Plant

The New Zealand Electricity Authority has stated that allowing Top Energy to run its expanded 50 MW Ngawha geothermal plant in-house is unlikely to cause any competition or market issues, reports New Zealand Herald.

The regulator is calling for comments on its draft decision on the Far North distributor’s application for an exemption from electricity industry legislation. That requires distribution firms to establish “arms-length” corporate separation between their regulated businesses and their generation assets if they have more than 50 MW of capacity on its own network.

At present, the 32 MW nameplate capacity of Top’s Ngawha geothermal units, located in the far north of New Zealand, are within regulatory limits.

State Government Support for Extension of Australian Geothermal Plant

Western Queensland has included AUD 15.1 million in its state budget to help expand the Birdsville geothermal power station, the only one in Australia, to 200kW.

The outback town’s existing 80kW geothermal plant, installed in 1992, will be decommissioned after reaching its design life.

ASIA

Philippines Update

Australian company Macquarie, a global investment banking and diversified financial services group, together with Singapore’s GIC - formerly known as Government of Singapore Investment Corporation - is to bid for a one-third stake in Energy Development Corp (EDC) worth USD 1.3 billion.

Indonesian power companies will now only need 30 days - down from the current 1,340 days - to secure the necessary permits and licenses to start a big-ticket power project, thanks to Executive Order (EO) 30 issued by President Duterte.

The EO states that concerned government agencies shall act upon applications for permits involving Energy Projects of National Significance (EPNS) not exceeding a 30-day period. If no decision is made within the specified processing time frame, the application is deemed approved by the concerned agency.
To be considered among the EPNS, power-generation and -transmission projects must have a **capital investment of at least P3.5 billion**, significant contribution to the country’s economic development, significant consequential economic impact, significant potential contribution to the country’s balance of payments, significant impact on the environment, complex technical processes and engineering designs and significant infrastructure requirements.

**Indonesia Update**

According to *Jakarta Globe*, the Indonesian government has laid the groundwork for a **USD 270 million fund to finance geothermal exploration**.

It has allocated Rp 3 trillion (USD 224 million) in the 2017 state budget to a **Government Drilling Fund**, which will be used to finance geothermal exploration. **The World Bank** will contribute a **USD 55.25 million loan** to the fund.

**Rida Mulyana**, director general of renewable energy and energy conservation at the **Ministry of Energy and Mineral Resources**, said the fund will help reduce exploration risks borne by geothermal producers.

Under the scheme, the government will conduct a survey of potential geothermal resources and drill exploration wells, activities that are usually capital intensive.

**Indonesian petrochemical firm Barito Pacific** is readying **USD 700 million** to acquire a 66% stake in **Star Energy Group**. **Barito Pacific President Director Agus Salim Pangestu** expects the acquisition to close by the first quarter of 2018.

In addition, **BCPG**, a Thai listed renewable energy firm, has secured approval to acquire a **33.3% stake** in Star Energy. The deal was valued at up to USD 357.5 million, with the transaction expected to be **finalized in the second quarter of this year**.

The companies would hold stakes in **geothermal power plants** in Indonesia and the Philippines which Star Energy acquired from **Chevron**.

**AFRICA**

**New Zealand – Africa Geothermal Facility to be Established**

The **African Union Commission (AUC) and the New Zealand Ministry of Foreign Affairs and Trade (MFAT)** have signed a **Partnership Agreement**, providing a framework and basis for the establishment and implementation of the ‘**New Zealand – Africa Geothermal Facility**’.

The Facility aims to provide responsive, flexible and timely geothermal technical assistance and capacity development support for focus countries of the **Africa Union Regional Geothermal Programme** including the eligible countries of the **Geothermal Risk Mitigation Facility (GRMF)**, namely Kenya, Ethiopia, Djibouti, Comoros, Rwanda, Uganda, Tanzania, DRC, Burundi, Zambia, Sudan, Eretria, Mozambique and Malawi.

**500 MW Corbetti Geothermal Project to Launch by End of Year**

News agency **Ezega** has reported that the **Corbetti Geothermal project**, near Shashemene town, south of Addis Ababa in **Ethiopia**, is finally to begin now that Corbetti Geothermal and the Ethiopian government have resolved their differences on the implementation of the project.

**Reykjavik Geothermal** split the 1000 MW geothermal development project into two phases— the **500 MW Corbetti project** and the **500 MW Tulu Moye and Abaya project**.

Corbetti Geothermal, the Ethiopian Ministry of Water, Irrigation and Electricity and the Ethiopian Ministry of Finance and Economic Cooperation will sign the final agreement that will allow Africa’s largest geothermal project to commence.
Funds Provided for Wellhead Generator at Aluto Langano Geothermal Power Plant

Shinichi Saida, Ambassador of Japan to Ethiopia, and Admasu Nebebe, Ethiopia’s State Minister for Finance and Economic Cooperation, have signed an Exchange of Notes for three Grant Assistance Projects including funds for the installation of a geothermal wellhead generator at the Aluto Langano project, reports APA-Addis Ababa.

Kenya Update

Langson Energy, Inc. (LEI), a U.S. energy equipment manufacturer based in Newport Beach, California & Carson City, Nevada, has been selected by Kenya Electricity Generating Limited (KenGen) to conduct a green technology feasibility study for a wellhead generator at the Olkaria Geothermal Power Plant.

KenGen has been searching for a specialized genset that can be installed upstream as a topping unit capable of accepting high geothermal wellhead pressures to capture the waste energy and generate additional electricity.

This study will evaluate the technical, commercial, financial, and environmental viability of utilizing Langson Energy’s 5 MW Total Flow Generator to make more efficient use of the geothermal resource at Olkaria.

Kenya Power has energized the Suswa-Isinya-Rabai transmission line allowing for the supply of geothermal power to the Coast region and its environs.

The 400kV line, which has initially been charged at 220kV, will transmit power from geothermal plants in Olkaria to the Coast region.

Geothermally generated electricity will replace supply from diesel generators bringing lower power costs for customers on the coast.

The Daily Nation reports that Geothermal Development Company (GDC) has made significant progress in phase one of the 300 MW Baringo-Silage geothermal project in Baringo County.

George Kinyanjui, the GDC general manager in charge of drilling and infrastructure, said the firm had already opened the road network to the area, with work on more than 120 kilometers already completed. “We’re installing steam fields, three in each of the project areas,” Mr Kinyanjui said.

GDC claims that the Bogoria-Silage Geothermal block could generate more than 3,000 MW once the entire work is completed.

GDC has identified Silale, Paka, Korossi/ Chepchuk and areas around lakes Baringo and Bogoria as potential sites for geothermal energy development.

EUROPE

Assessment of the Geothermal Potential of the Gran Canaria Island

The Gran Canaria is the third-largest of the seven islands of the Canarias, or Canary Islands, an archipelago located in the Atlantic Ocean off the coast of northwestern Africa. Even though it is not the largest, Gran Canaria accounts for almost half of the population. The islands are part of Spain, to be more precise they constitute the “Comunidad Autónoma de Canarias.”

Scientists of the Instituto Volcanológico de Canarias (Involcan; www.involcan.org/) have begun exploration studies to evaluate the geothermal resources on Gran Canaria island. The project consists of geophysical and geochemical studies that include field and laboratory work.

The ultimate goal of the studies is to determine if Gran Canaria’s geothermal resources could be developed to generate electricity and/or be used in direct applications. If this is confirmed, geothermal energy would have a great impact on the local economy. It would give the island a renewable, emission-free source of energy, which could be on line throughout the year. In addition, it would contribute to the reduction in electricity generation costs, improving the security of supply, as well as ensure the protection of the environment.

Please note that geothermal exploration studies are also being conducted and planned on other islands of the Canarias archipelago; i.e., on Tenerife and Lanzarote.
Blue Lagoon Geothermal Tourist Resort Now Not for Sale

In the July/August GRC Bulletin we reported that HS Orka was looking into the possible sale of the iconic Blue Lagoon geothermal spa in Iceland. However, Alterra Power Corp. has announced that its subsidiary has now ended the process regarding the potential sale of HS Orka’s 30% ownership interest in the tourist resort.

During the sales process, several viable offers were received and HS Orka entered into an exclusivity agreement with a preferred bidder who valued the stake in excess of EUR 90 million.

Although Alterra was prepared to sell under this preferred offer, Alterra’s partner at HS Orka, Jarðvarmi slhf, whose consent was required, decided against selling the stake at this time. HS Orka said it may revisit the process at a later date.

Funding Provided for Scottish Commercial Deep Geothermal District Heating Project

The UK Government is set to invest GBP 3.5 million in an ambitious regeneration program in Kilmarnock in Scotland. The HALO project will see the first commercial deep geothermal heat pump installed in the UK in nearly thirty years, providing green energy at below-market prices to nearby homes and businesses.

Crowd-Funding Used to Raise Funds for British Geothermal Energy Project

In the July/August GRC Bulletin we reported that the United Downs Deep Geothermal Power Project in south-west England would restart in early 2018 after receiving funds from Cornwall Council and the European Regional Development Fund.

However, in order to start commercial scale production as soon as possible, project lead Geothermal Engineering Limited (GEL) has initiated a novel fund-raising scheme.

The company has launched an 18-month secured construction bond on crowd-funding website Abundance. An initial offering asked for investments of just GBP 5 million or more to raise a minimum investment target of GBP 3.8 million. In total GBP 4.2 million was raised.

A second offer for investments of GBP 95,000 or over is still open until 2 October. The crowd-funding effort hopes to reach a GBP 5,265,000 investment target across both offers. More information can be found on the Abundance website at www.abundanceinvestment.com/projects/united-downs-geothermal-2.

Three Kilometer Deep Geothermal Wells to Heat New Dutch Greenhouse Project

The largest organic vegetable producer in the Netherlands has been bought out, sparking an expansion that will include the use of deep geothermal resources, reports Fresh Fruit Portal.

AC Hartman has 72 hectares of horticultural land in the northern Dutch village of Sexbierum which will be expanded to 110 hectares over the next few years making it one of the Netherlands’ largest glasshouse horticultural companies.

As part of the new project, AC Hartman’s greenhouses will be heated with geothermal energy. A three kilometer deep well will tap the geothermal resource to heat the greenhouses, with the cooled water pumped back into the ground via another well.

According to Friesland Clean Energy Fund CEO Michel Hendriks, “The ground in the Province of Friesland is highly suitable for geothermal energy. The transition from natural gas to terrestrial heat will eventually lead to a sharp reduction in the province’s use of fossil fuels, thus making an important contribution to meeting its sustainability targets.”

New Dutch Football (Soccer!) Stadium to be Powered by Geothermal Energy

According to StadiumDB.com, the first large stadium powered by geothermal energy will be built by 2020.
Located in the city of Leeuwarden in Friesland, in the north of the Netherlands, SC Cambuur’s proposed new stadium, designed by Widdershoven Architecten, will be the very first major geothermal stadium in the Netherlands and the first one to be energy-neutral.

Geothermal Energy Could Power the Largest Port in Europe

The Port of Rotterdam Authority is examining options to use geothermal energy to help meet an increasingly strong energy demand in the Dutch city.

Some 4 to 8 km below the surface of the Netherlands lies a series of rock layers known as the Dinantian. These strata offer good prospects for the extraction of geothermal energy thanks to the combination of their depth (a relatively high temperature) and their composition (permeability). Preliminary research has indicated that the most promising sites in the port area for undertaking such a project are the Maasvlakte and the western section of Europoort. Here the Dinantian is situated some 5 km below the surface.

The study into the utilization of geothermal energy in the western port area is part of the Green Deal Ultra Deep Geothermal Energy, signed on 19 June 2017. In this covenant, seven private consortia and the Dutch Ministry of Economic Affairs have agreed to explore opportunities to utilize geothermal energy deep below the Earth’s surface at a variety of locations throughout the Netherlands.

Construction Contract Signed for Croatian Geothermal Power Plant

Croatian company Djuro Djakovic has announced it has signed a 71.1 million kuna (USD 10.9 million/EUR 9.6 million) deal with local energy and construction company Geo-En for the construction of a geothermal power plant near the country’s central city of Bjelovar, reports SeeNews. Djuro Djakovic will build the 10 MW Velika 1 Geothermal power plant, commission it and connect it to the grid, as well as construct the supporting wells and pipelines.

Invitation to Tender for Concessions for Exploration of Geothermal Energy in Hungary

Gábor Zeli, President of the Mining and Geological Survey of Hungary, has announced the 5th bid round for hydrocarbon and geothermal exploration and production in the Magyar republic. The Minister of National Development of Hungary has published invitations to tender for
concessions for the exploration, development and exploitation of hydrocarbons, as well as the exploration and exploitation of geothermal energy in the area of Gádoros, in the Southern Great Plain region of south-east Hungary.

Bids must be submitted in person on September 25. More information can be found in the "Concessions" section of the Hungarian Office for Mining and Geology (MBFH) website at www.mbfh.hu.

Seven Companies Show Interest in Greek Geothermal Power Project

PPC Renewables, headquartered in Athens suburb Attica, has completed a shortlist of possible strategic partners for a geothermal power plant project in Greece.

Seven Expressions of Interest were submitted, indicating a strong interest in this project - one of the few high-potential untapped geothermal power plant projects in Europe.

The interested parties that submitted Expression of Interest are:

- Storengy
- KS Orka
- Enel Green Power Hellas
- Terna Energy - Terna Aioliki Xerovouniuno
- Helector S.A.
- Zorlu Energy - Turboden

PPC Renewables will announce the next stage of selection shortly.

SCIENCE & TECHNOLOGY

Major Update for Leapfrog Geothermal Modeling Software

ARANZ Geo, developer of 3D geological modeling software Leapfrog®, has released Leapfrog Geothermal 3.3, including increased functionality for the geothermal industry, including time based visualization of geophysical data and connectivity to Leapfrog’s model management platform, Leapfrog Central.
The GRC Bulletin - A New Era

After 45 years of printed publication the voice of the Geothermal Resources Council - the GRC Bulletin - is transitioning to the newest technology.

As of this issue, the magazine is also available as a PDF file online.

In addition to a reduction in the cost of printing and mailing this innovation will give our members and subscribers better access to the essential news and information from the global geothermal community.

With the January/February 2018 issue, the Bulletin will only be available online.

The online GRC Bulletin is now available - for members only* - on the GRC Library website at www.geothermal-library.org.

*Please Note: The GRC Bulletin is a member benefit. To retain this value we can only offer the online version from the members only area of the GRC Library. To access the magazine online you will need to have a Member ID and password. Contact the GRC Librarian, Brian Schmidt at bschmidt@geothermal.org If you need help in this process or have any questions.