

What is geothermal activity in Tonga?

Geothermal activity in Tonga is associated with subduction related volcanism along the Tongan Trench. A geothermal system occurs on the active volcano on Nuiabo'ou in the Niua islands. Currently only 650 people live on Niua island. Submarine hydrothermal activity is also found on the South Tonga Ridge and Valu Fa Ridge.

Is Tonga a geothermal prospect?

Tonga is a moderate level geothermal prospect, with a history of island-arc volcanism, and evidence of submarine hydrothermal activity. Although not viable for development, submarine hydrothermal activity does point to near surface, high heat flow.

Can geothermal energy be used in Pacific countries?

Geothermal energy sits alongside possible options for electricity generation in Pacific countries. Pacific populations are small by Asian standards: the whole Pacific region has a total population of c. 11 million people.

Which countries have high potential for geothermal resource utilisation?

Two countries have high potential for geothermal resource utilisation (Papua New Guinea and Fiji), three countries have high-moderate potential (Vanuatu, Solomon Islands, and Northern Mariana Islands), and three countries have moderate potential (Samoa, Tonga and New Caledonia).

Does Iceland have a geothermal potential?

Iceland strongly promotes its national experience and learning in geothermal technologies and more could be done in connecting Pacific Island Developing States with Icelandic initiatives. The development of attractive investment and fiscal regimes for geothermal energy will be another component in the realisation of geothermal energy potential.

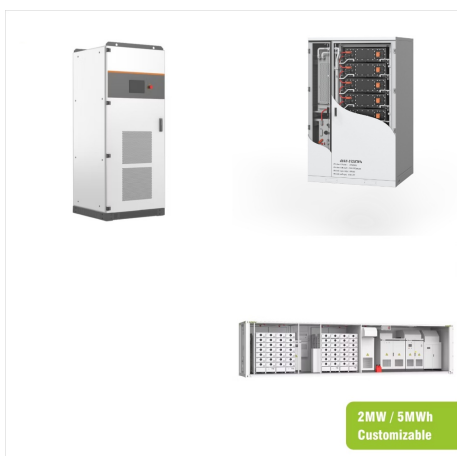
Should Pacific governments collaborate with other countries to develop geothermal energy?

Twinning Pacific Governments with international agencies such as IRENA, or Developing countries such as Kenya, Philippines and Indonesia, who have had proven success in developing geothermal energy would help in the learning curve of governments and increase awareness of possible pathways to geothermal plant development.

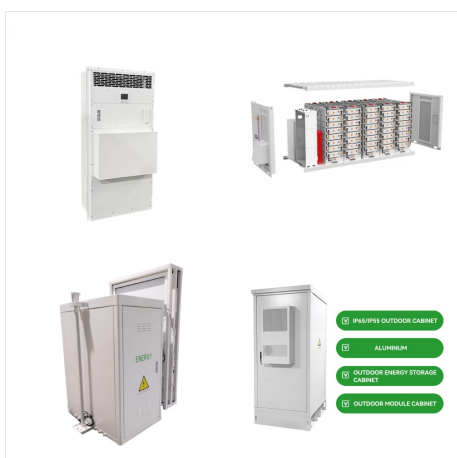
# GEOTHERMAL ENERGY AND TONGA



The partnership with Quaise Energy is a strategic move to further explore deep geothermal energy sources, enhancing the plant's sustainability efforts. This aligns with NGM's 2030 greenhouse gas reduction roadmap targets. The collaboration highlights the potential of deep geothermal energy to decarbonise heavy industrial sectors such as mining.



That means geothermal energy remains highly dependent on regional geological conditions, with the richest resources found along tectonic plate boundaries and in volcanic regions. According to GlobalData's recent Global Power Mix in Transition webinar, geothermal power production will grow, but is likely to remain overshadowed by other



Loesje van Dongen, sector account specialist at Aggreko adds: "Unlike other renewables such as solar and wind, geothermal energy is not weather dependent, making it a sustainable and reliable commodity, and incredibly important for creating a sustainable energy future ??? something we are heavily invested in at Aggreko.

# GEOTHERMAL ENERGY AND TONGA



Ocean Thermal Energy Conversion: for Pacific Atoll Countries with limited geothermal energy potential  
In contrast to the situation of high-island volcanic Pacific Island states, countries such



An introduction to geothermal energy, types of geothermal power plants, direct use applications, geothermal economics and environmental impacts. Renewables 2023 Global Status Report - Geothermal Power and Heat. REN21. 2023. (4 pages) Annual source for current geothermal energy market and industry trends, installed capacity, and direct use



Geothermal energy ??? the thermal energy derived from the heat contained in the Earth, which is recognised as essentially limitless, its use being only restricted by technology and the associated costs. Zambia covers the southern part of Lochinvar National Park and traditional lands sparsely occupied by the pastoralist Tonga ethnic group to

# GEOTHERMAL ENERGY AND TONGA



According to the International Renewable Energy Agency (IRENA), geothermal energy has grown steadily from around 10GW worldwide in 2010 to 13.3GW in 2018. Free Report Delve into the renewable energy prospects for Morocco. In its new low greenhouse gas (GHG) emission strategy to 2050, submitted to the United Nations (UN), the Ministry of Energy



"The use of geothermal energy contributes to the strategic objectives of the European Union by decreasing energy dependence and fossil fuel imports," the draft document states. High energy prices and the loss of Russian gas since the 2022 Ukraine invasion have driven EU countries to expand use of renewable energy sources.



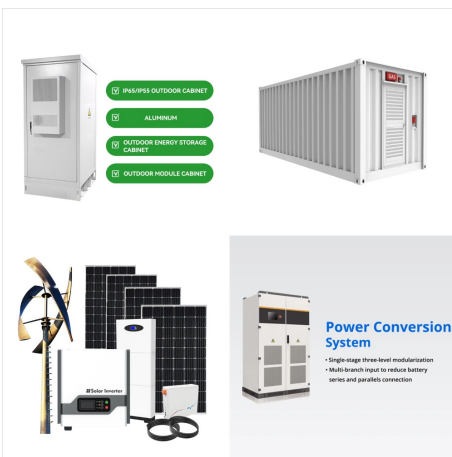
The proposed Bitcoin mining operations would use the geothermal energy of the volcanoes to generate power. "It takes two megawatts of electricity to service 5,000 people. So 40,000 megawatts



# GEOTHERMAL ENERGY AND TONGA



Geothermal energy is heat energy stored beneath the earth's surface. It can be extracted as a source of renewable heat and power. Energy is extracted by drilling wells and circulating a fluid or brine through an underground reservoir and then using it at the surface as direct heat or using it to produce electricity. Potential applications for

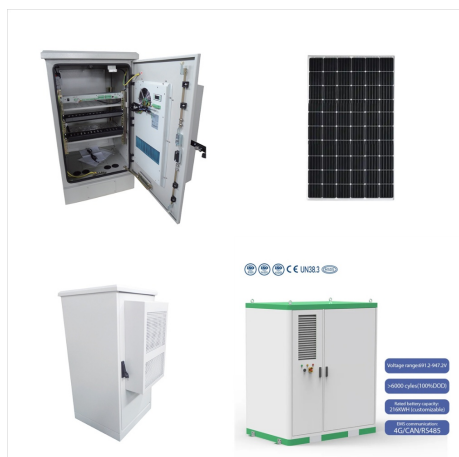


Tonga, an enchanting kingdom, is taking significant steps towards adopting renewable energy. With a distinct advantage in its clean technology energy market, Tonga aims to reduce its reliance on fossil fuels and achieve greater ???



By harnessing its abundant solar, wind, and geothermal resources, Tonga can reduce its dependence on imported fossil fuels, lower its carbon footprint, and enhance its energy security. Furthermore, Tonga's successful implementation ???

# GEOTHERMAL ENERGY AND TONGA



3 Renewable energy 3.1 Geothermal energy In 2002, a grant was applied for from the USGIC (United States Geothermal Industries Corporation) for an exploratory project in the field of geothermal energy on the South Pacific Islands, which was named PIRGADI (Pacific Island Regional Geothermal



Steam turbines are the heart of geothermal power plant operations, playing a pivotal role in converting geothermal energy into electricity. They harness the high-pressure steam produced from the Earth's heat to drive the turbine blades, which in turn rotate the generator to produce power. The efficiency and reliability of steam turbines



Types of Geothermal Energy Systems. This energy system is an alternative to that source using high electrical energies. This system is efficient, environmentally friendly, easy to use, and affordable. It uses almost half less energy than other conventional heating or cooling systems. Though there are several options to choose from in these

# GEOHERMAL ENERGY AND TONGA



The geothermal energy industry is expanding quickly. The geothermal energy industry is relatively young, expanding with new technologies, research and development, and an influx of new projects. These enhancements to the industry are making geothermal energy more accessible, efficient, and applicable to a wider variety of use cases.



There are many active submarine volcanoes within 50 km of Tongatapu, but because of their undersea location they are not an energy source that can be harnessed using current geothermal technologies. Summary Tonga is a ???



2 ? Geothermal Energy ??? Science, Society and Technology focuses on fundamental and applied research needed to deploy technologies for developing and integrating geothermal energy as one key element in the future energy portfolio ntributions include geological, geophysical, and geochemical studies, exploration of geothermal fields, reservoir characterization and ???

# GEOTHERMAL ENERGY AND TONGA



This desktop study provides an overview of the geothermal potential of selected Pacific islands and territories. It has been based on an initial literature review of 20 Pacific countries and then a subsequent more detailed review of five Pacific countries, Papua New Guinea, Vanuatu, Samoa, Tonga and the Northern Mariana Islands.



2 ? The estimated energy that can be recovered and utilized on the surface is  $4.5 \times 10^6$  exajoules, or about  $1.4 \times 10^6$  terawatt-years, which equates to roughly three times the world's annual consumption of all types of energy. Although geothermal energy is plentiful, geothermal power is not. The amount of usable energy from geothermal sources



2 ? (Reuters) - Geothermal energy startups are on the upswing with Big Tech companies looking to feed their power-intensive AI data centers, but long-term investments remain uncertain as oil majors double down on natural gas. Meta and Alphabet's Google are among the tech companies partnering with startups proposing to produce geothermal electricity, to???



# GEOTHERMAL ENERGY AND TONGA



2 ? Geothermal energy is an energy source that is stored in the form of heat beneath the earth's surface, which is clean, renewable, sustainable, carbon free, continuous, uninterrupted and environment-friendly. It is the only renewable energy available 24x7 to the mankind not requiring storage and unaffected by day-night or seasonality variance.

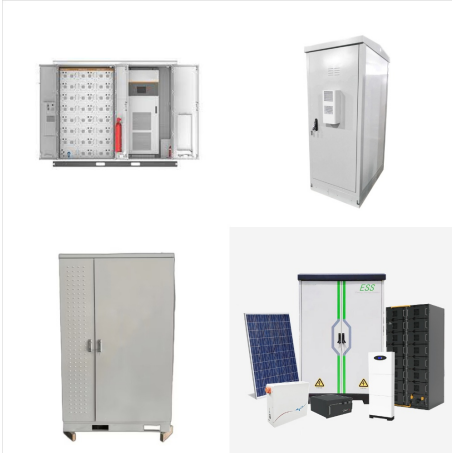


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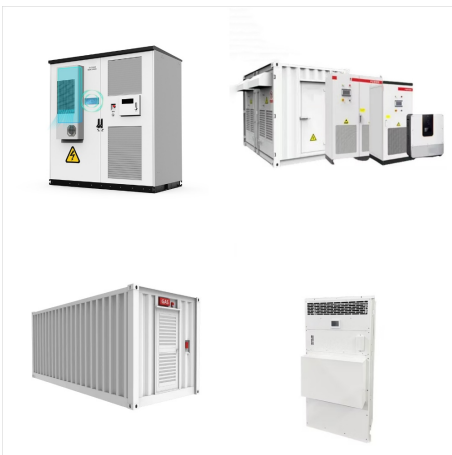


UAE Pacific Partnership Fund - The UAE-Pacific Partnership Fund disbursed USD 50 million in grants for renewable energy generation projects in Pacific islands: Fiji, Kiribati, Samoa, Tonga, Tuvalu and Vanuatu. All six forms of renewable energy (solar, wind, hydro, geothermal, bioenergy/waste-to-energy, and ocean) were eligible.

# GEOTHERMAL ENERGY AND TONGA



The BLM's recent geothermal lease sale, the largest in more than 15 years, underscores the momentum behind geothermal energy development. The proposed permitting changes aim at accelerating the discovery of new geothermal resources, particularly in states such as Nevada, which has considerable untapped geothermal potential.



The Minister further reiterated that a key challenge to achieving Tonga's energy and mitigation targets is having the local expertise to plan, design, implement, monitor and maintain these renewable energy and energy efficiency systems. While Tonga can choose to rely on foreign expertise, COVID 19 has taught us to prepare for events where

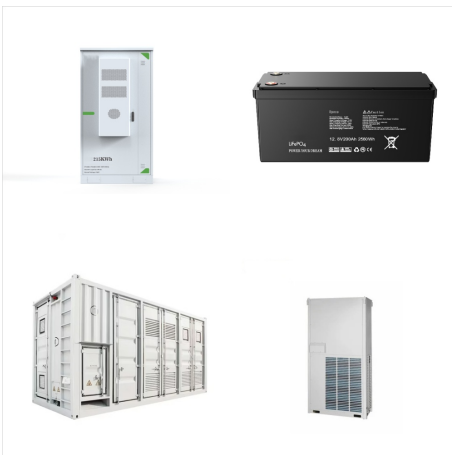


Geothermal energy development for electric power generation will make up approximately 1,200 megawatts of this new capacity. Future geothermal developments will be located in Java, Sumatera, and Sulawesi. Geothermal activity in Tonga is associated with subduction related volcanism along the Tongan Trench. A geothermal system occurs on the

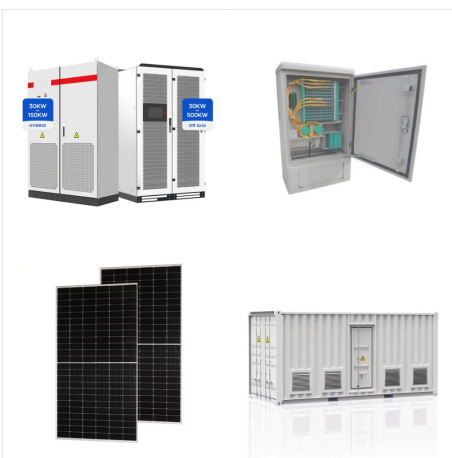
# GEOTHERMAL ENERGY AND TONGA



Geothermal energy in the Philippines is an essential part of the country's renewable energy landscape. Its location along the Pacific Ring of Fire gives it access to a large quantity of geothermal resources, like 24 active volcanoes and numerous geothermal fields. As a result, it is one of the world's top geothermal power producers and

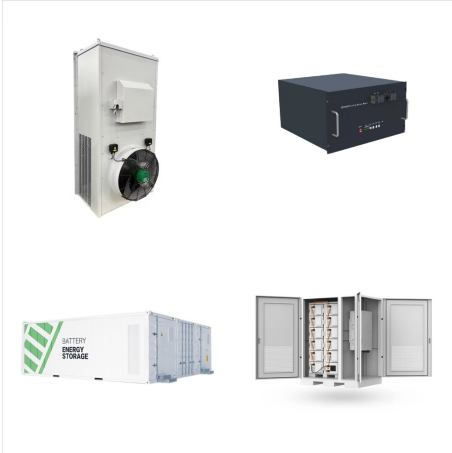


Detailed examination of the geothermal potential of Papua New Guinea, Vanuatu, Samoa, Tonga and the Northern Mariana Islands has shown that: ???  
Papua New Guinea is an excellent ???



Empower the MLSNR with the responsibility of regulating the renewable energy industry in Tonga except for electricity produced from renewable energy sources which will be regulated under the provisions of the Tonga Electric Power Board Act.---Establish an incorporated solar energy committee for each island district. Geothermal Energy

# GEOTHERMAL ENERGY AND TONGA



Geothermal energy storage is a form of energy storage that harnesses the earth's natural heat to produce and store energy [56]. It is regarded as one of the renewable energy alternatives that possess the potential to serve as a replacement for fossil fuels in the here and now as well as in the future [26]. Furthermore, the emissions associated