

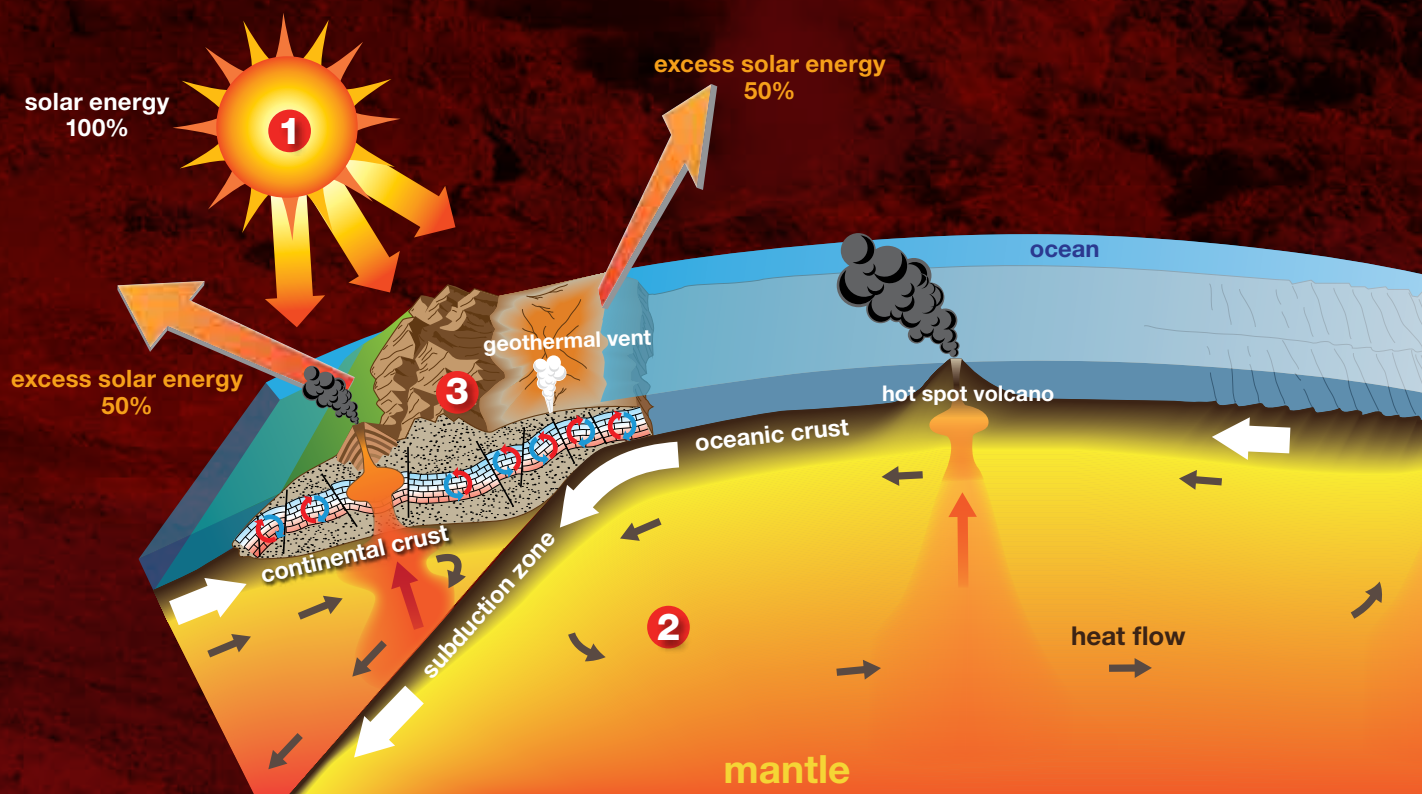
Geothermal: the Earth's Energy



GEOHERMAL ENERGY IS HEAT ENERGY STORED IN THE EARTH. IT IS A RENEWABLE, EARTH-FRIENDLY RESOURCE THAT IS ACCESSIBLE NATIONWIDE.

Renewable heat

1. **From the sun:** About half of the solar energy that reaches the Earth's surface is absorbed and stored by the land and the oceans.
2. **From the Earth's core:** Heat is generated deep within the earth. Away from areas of volcanic or geothermal activity, this heat moves slowly and continually to the surface. The ground temperature increases by about 30°C for every 1000 metres depth.
3. **From volcanic systems:** Localised areas of higher heat flow occur with volcanic and geothermal activity, where tectonic plates move apart or collide, or in hot spots under mid ocean volcanic islands. Faults and fractures act as channels for heat to flow to the surface.



EARTH ENERGY: ACCESSIBLE, RELIABLE, RENEWABLE

Māori legend says that geothermal fields in the North Island were created when Te Pupu and Te Hoata, goddesses of fire, emerged from the Earth's core in search of Ngātoroirangi who had been stranded freezing on Mt Tongariro. Wherever they surfaced, they left geysers, hot springs and mud pools, leaving the path of geothermal activity that remains today.

Nationwide resources

New Zealand has an abundance of geothermal resources throughout the country.

Nationwide, the stored heat in rocks, soils, groundwater and surface water can be harnessed by geothermal heat pumps for space heating and cooling.

In geothermally active regions, the heat in geothermal fluids can be used for generating electricity, as well as for direct heat applications ranging from bathing, space heating and greenhouse through to manufacturing and industrial processes.

ADVANTAGES

- Earth-friendly - Lower greenhouse gas emissions compared to fossil fuel alternatives. Modest land requirements, and can coexist with other land uses.
- Reliable – Renewable resource, independent of weather and climate.
- Independent – Indigenous resource provides certainty, and avoids the economic effects of changing fuel prices.
- Abundant – Accessible energy throughout New Zealand.
- Low operating cost – Generally the running costs are lower than for other energy sources.

DISADVANTAGES

- High upfront capital cost
- May require resource consent

New Zealand requires reliable, renewable energy sources into the future. The Government is supporting GNS Science in fostering increased use of renewable resources. By 2025, the Government's Energy Strategy aims for direct use of geothermal energy to account for more than 12 PJ/year.

For more information visit our website:

www.gns.cri.nz/earthenergy

or contact us:

Wairakei Research Centre

114 Karetoto Road,
Wairakei 3377
Private Bag 2000,
Taupo 3352
New Zealand
Phone: +64 7 374 8211
Email: earthenergy@gns.cri.nz

