

Arendalsuka 2019



GEOTERMI!

HVORDAN UTNYTTE NORSK BOREKOMPETANSE INNEN FORNYBAR ENERGI?

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Qmatec Group

people with a passion for quality



Geothermal energy

Geothermal energy is heat stored in the Earth's crust

The energy stored in the Earth's crust corresponds to more than 10 million years of primary energy consumption worldwide

Some advantages:

Basically available everywhere

Constant baseload

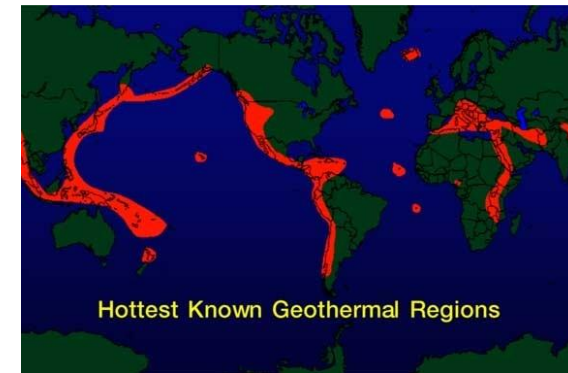
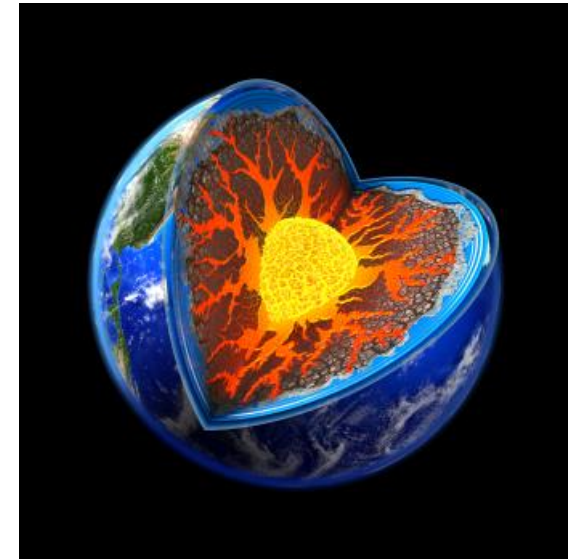
Small geographic footprint

Suitable for energy storage

Worldwide production:

2015: 73.5 TWh of electricity and 163 TWh of heat

Forecast 2050: 1 255 TWh electricity and 2 184 TWh heat (IPCC)



Geothermal energy

Often divided into shallow and deep geothermal energy

More precisely:

Systems for direct use and power generation

Heat pump-based systems

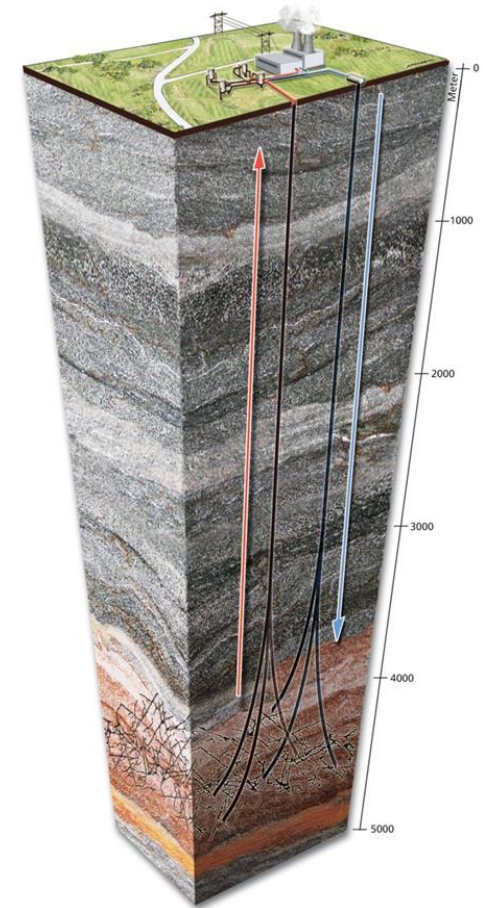
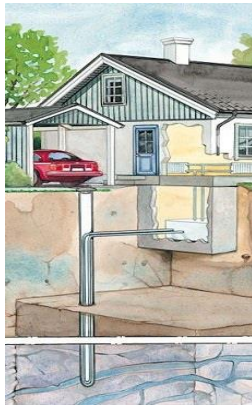


Illustration: Tor Sponga, BT

The Why

Access to affordable, clean, reliable and sustainable energy is the among the most pressing challenges of our society.

Remote & isolated communities suffer most as they are not connected to power grids and often rely on polluting & expensive diesel generators.



Solutions

Geothermal energy is an ideal solution as it offers a very low levelized energy cost, can supply continuous baseload power, or adjust production rapidly to balance the variable supply from other sources.

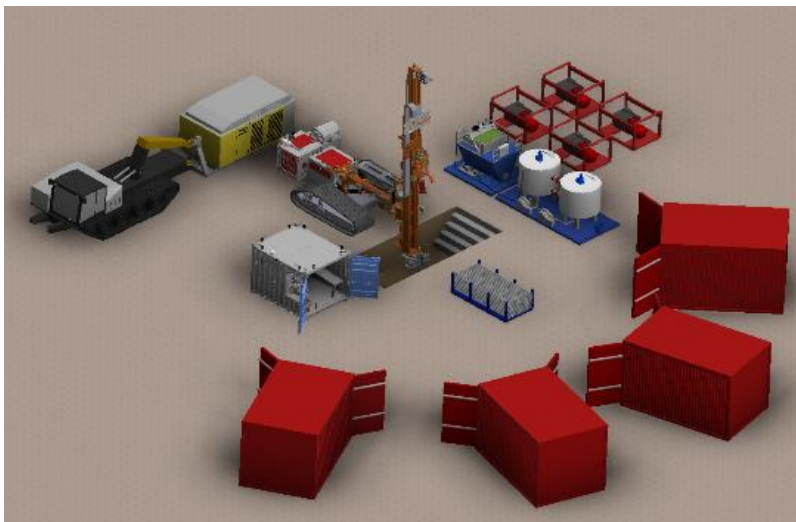


How

Lack of custom dedicated drilling solution has been a major hinderance for the development & realization of global geothermal energy potential.

Qmatec, together wit North Tech Energy, have designed GEOTHERM SWS, an integrated drilling system dedicated to geothermal exploration and development of small scale geothermal plants.

Focus on easy access to remote areas with minimal infrastructure & logistic; Drilling depts. exceeding 3000 using an advanced control system for simple & efficient operation reducing the need for extra personnel; 4G/internet enabled data logging system for remote monitoring to track the state of the drilling operation; and, a dual purpose closed circulation system to handle both mudding & cementing operations.



From Large Hole to Small Hole

Proving a reservoir requires 3 wells of which at least two have to be tested for 28 days.

Three Large Holes

Cost from US\$20 to 30 million, without knowing if there is a reservoir

Risk: \$20 to 30 Million

Three Small Holes

Cost from US\$7 to 9 million, without knowing if there is a reservoir

Risk: \$ 7 to 9 Million



Risk reducing - scaleable

Traditional Risk profile

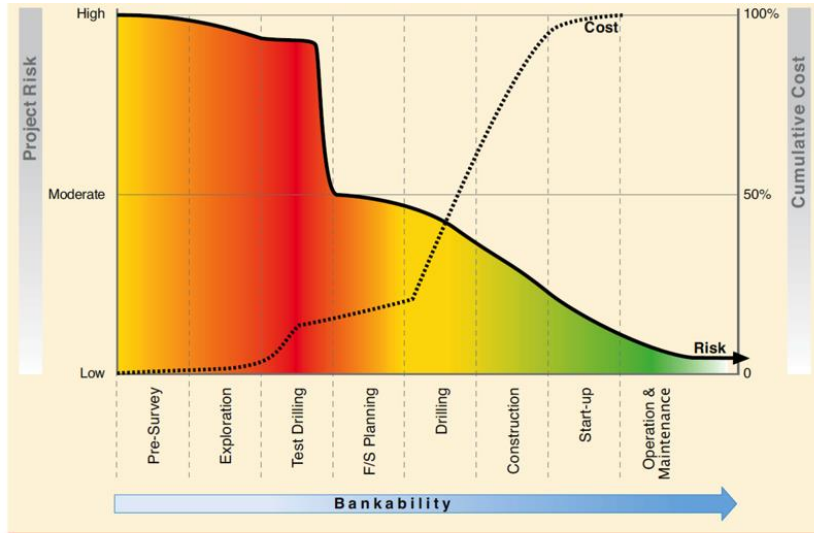


Figure 4.1: Typical risk profile for a geothermal project vs. time (ESMAP World Bank Geothermal Handbook 2012).

**Approx 70 %
lower
Exploration
Costs.**

Small Hole Drilling Risk Profile

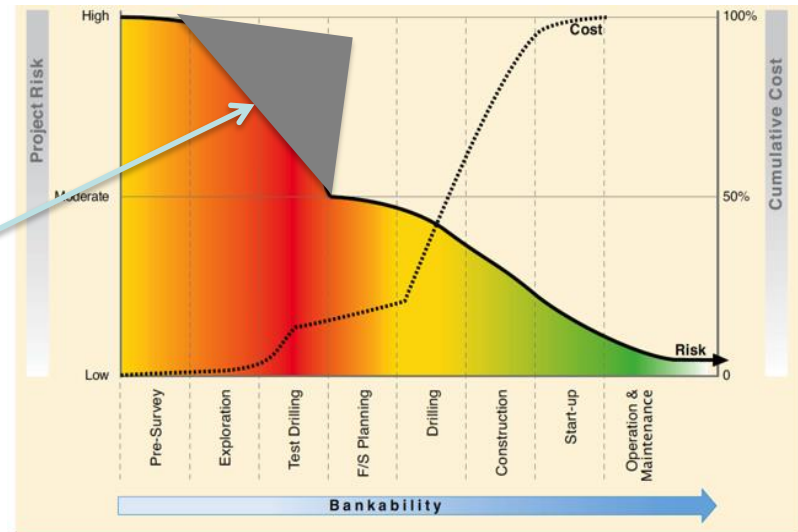


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Enviromental - Infrastructure



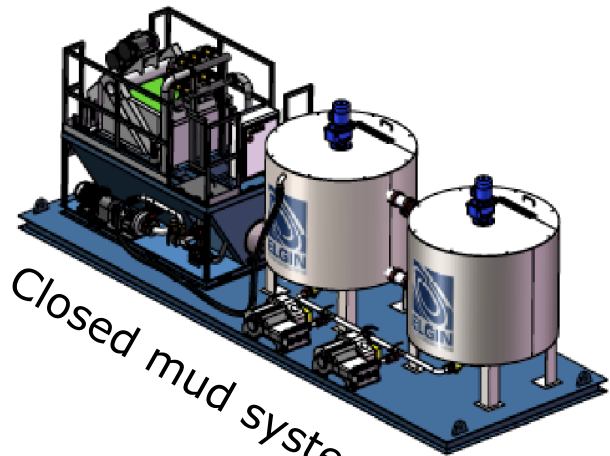
Clearing the area to built well pad for traditional rig



Geotherm SWS footprint...



Enviromental - details



Closed mud system.



Open pit

THE SOLUTION IS UNDER OUR FEET:

As noted by UCSUSA the amount of heat energy within 10,000 meters of Earth's surface contains **50,000 times** more energy than all the oil and natural gas resources combined.

While this enormous reservoir of energy is available at depth around the globe, it can be tapped most efficiently for electricity production at geologically active zones of Earth's crust, close to the tectonic continental boundaries.

Many developed & developing countries (Iceland, Italy, Turkey, USA, Mexico, New Zealand, Indonesia, Philippines, Kenya, Ethiopia and more) are located on/around these zones. Geothermal energy is the most reliable renewable energy source, **guaranteed 24 hours per day & 365 days per year**

Takk for oppmerksomheten!

Geotherm SWS

