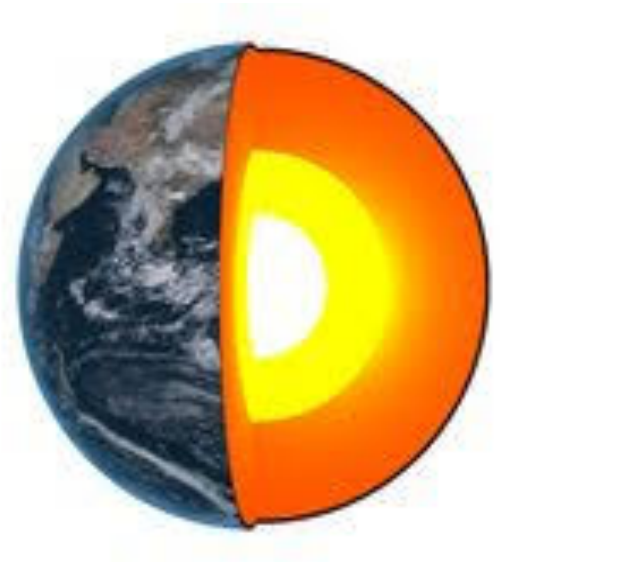
# UDG ENERGY

## Emission free, boundless

*By using state of art drilling techniques*



Our Earth is a giant power factory with a core temperature of approximately 6,000 °C. Our logic solution is simply a responsible method to tap a little bit of this enormous and boundless energy source.

HOW? We drill until we reach 350C, case the entire borehole to create a closed system and place a double walled metal pipe into the cased borehole to enable the circulation of fluid to collect the geo-heat.

CONTENT



## Company overview

UDG Energy is the trade name of InnoGroup BV, a Dutch limited liability company that has started its geothermal energy activities as Start-up Company in 2020.

UDG energy is joint cooperation between Dutch entrepreneurs and Polish entrepreneurs engineers that together represent a vast expertise in geothermal project preparation, engineering, execution and funding.

UDG technique has been demonstrated by a pilot project in Prenzlau Germany, where in 1995 a single closed loop geothermal power plant has been realised producing year in year out 0,5MWh .

The current opportunity is an investment of €15 million being 15% of the total Capex of an 30MW UDG power plant in Szczecin, West Poland (border Germany) with full support of Polish authorities. 85% of Capex is financed through an equity investment by Polish fund NFOSiGW.

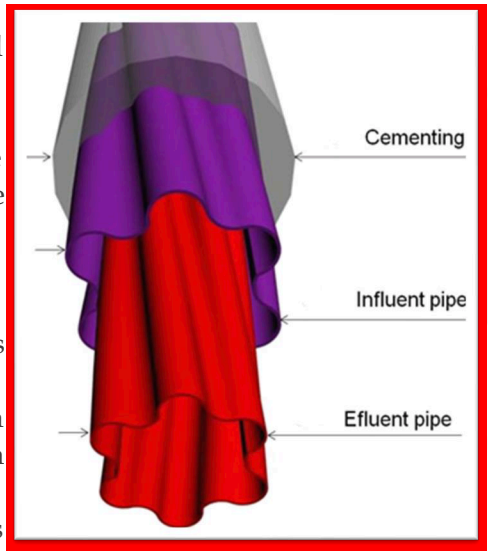
# CLOSED LOOP is the next level answer for geothermal energy

Geothermal experts are unified in the opinion that geothermal energy has much more potential then the current use of geothermal energy generation.

The main reasons why to-date the use of geothermal energy systems is limited are connected to the uncertainty of long-term geothermal heat production when investing in the current EGS systems (see below) in combination with environmental issues such as risks of (small) earthquakes and potential pollution of drinking water.

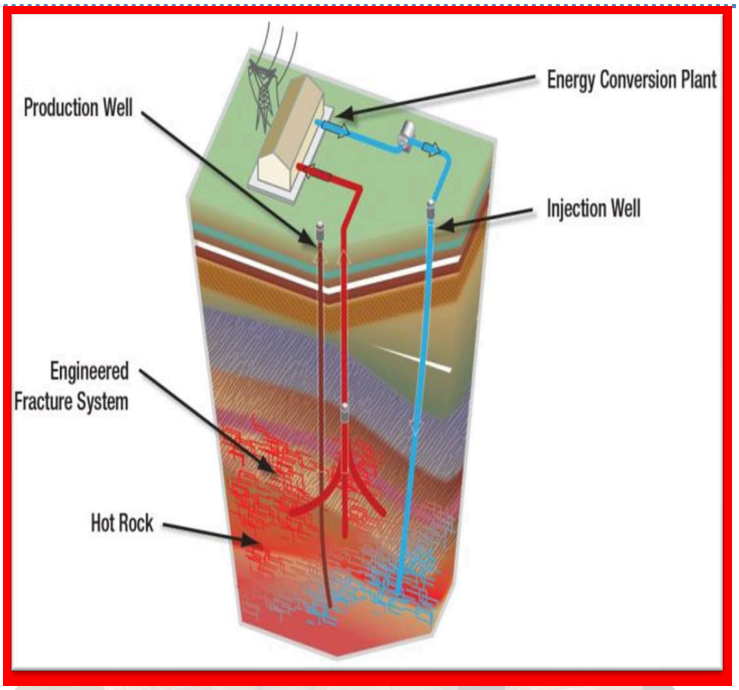
In other words geothermal energy is too much connected to a negative perception.

Our CLOSED LOOP system based on latest drilling techniques has all the advantages of geothermal energy production but none of the disadvantages, simply because the closed loop systems are fully computer controlled and do not need direct exchange contact with the underground layers. All that is required are tightly cased boreholes to approximately 10 Km depths whereby within the system through metal double walled production tubes a process fluid is heated and circulated back to the surface endlessly to extract approximately 350C geo heat that is used in conventional steam turbines to produce electricity.




*Inside UDG production tube*

# Enhanced geothermal systems (EGS)




*Schedule of EGS system*

As illustrated in the picture, EGS is composed of two main wells, one to inject cold water into an artificial underground reservoir, and a recovery well to extract the hot water. These *artificial reservoirs* are created by fracturing the crystalline rock formation in order to create permeability between the two wells.

As the temperature of the resource can reach ca. 140C, these power plants also provide district-heating capability. This ensures a higher resource utilization rate, but also requires that the plant be built in populated areas.

The EGS plants have depletion problems as well as environmental issues.

# UDG Energy Extraction

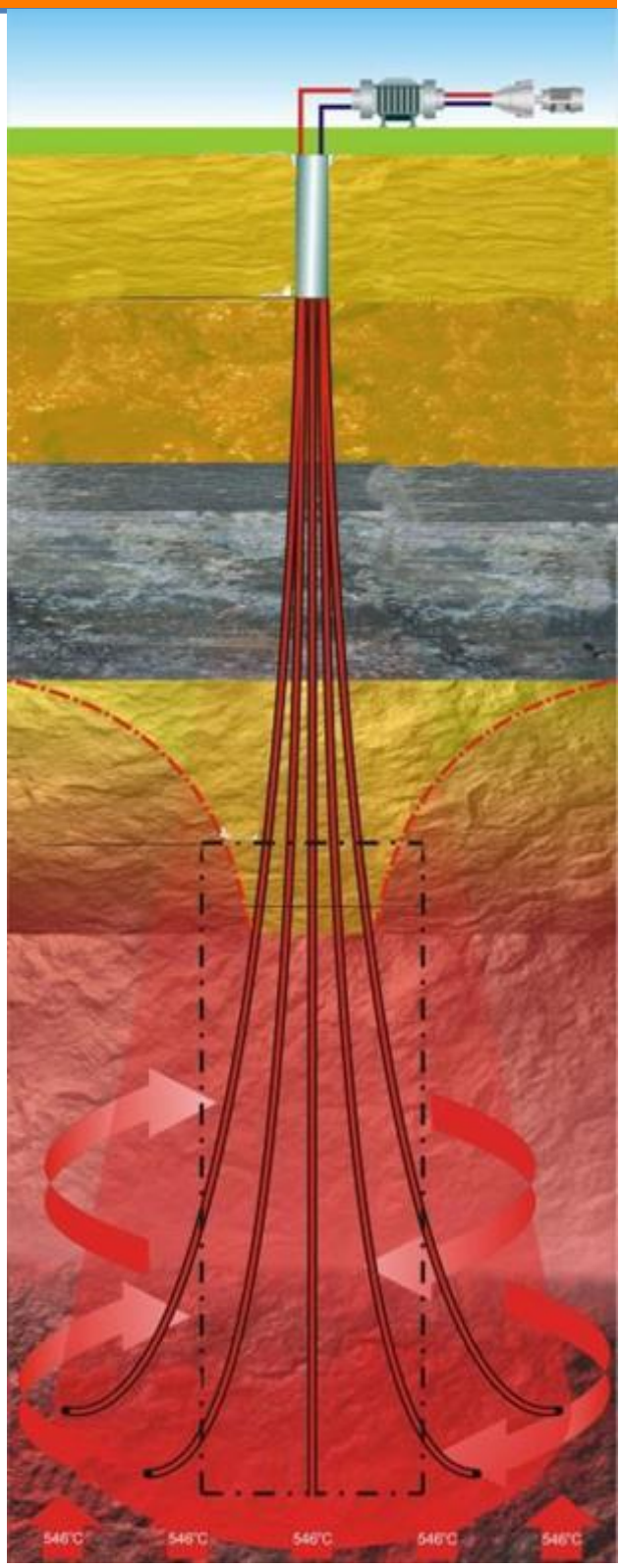
## Heat & Power

Usage of our state of art high capacity UDG drilling rigs, drilling at depths of 8.000 – 10.000 meters is envisaged. Given this deep drilling capability, the geothermal resource is available almost everywhere on land in the world, and therefore saves the usually high costs and uncertainties of geological exploration. These rigs are also very efficient and drill up much faster than conventional drilling rigs, reducing the overall construction cost of the power plant.

The UDG Energy Extraction design makes use of 2 closed loop systems whereby closed loop system 1 collects the earth heat at 350C and brings it to the surface where heat exchangers deliver the heat to closed loop system 2.
Closed loop system 2 engages standard steam turbines and pumps for the production of electricity and or heat to be used directly for industrial use and or district heating.

The UDG Energy system is designed for non-stop use 24/7/365 and the economic lifetime of a UDG Energy factory can be as high as 50 years or longer. (of course typical maintenance required). Very sustainable.

By using at least 6 production wells UDG Energy ensures a steady and plenty supply of geothermal heat, fully dispatchable.




*Schedule of UDGE plant.*

## UDG Business plan

An detailed business plan explaining the UDG technique and flow models is available after signing a engagement letter. The current financial projection is under the current high O&G prices as well as the rising CO2 emission pricing very lucrative.
An interesting item is also the possibility to obtain insurance for the technical feasibility of the project.

## Flow modelling & back up

UDG Poland has undertaken extensive flow modelling using ANSYS fluent software. The complete UDG plant design has been supported by the Polish Military University of Technology, Polish Academy of Science and the Polish Technical University in Lodz who will also provide technical back up if and when required.

## UDG project Szczecin 30 MW

UDG project in Szczecin has the full support of the Polish energy transition fund NFOSiGW who values this project as promising option to exchange in the near future coal energy power plants for emission free UDG energy plants. So after successful completion of the Szczecin UDG factory further and larger UDG power plants in Poland of 100MW each are a realistic possibility.

## Funding opportunity and Returns

The current funding opportunity of private equity for the UDG 30 MW power plant will put the investor in a unique private public joint venture with the Polish semi state fund. Against private equity financing of 15% of the project the investor will receive (after repayment of NFOSiGW fund) 29,4% of the shares in the Polish project company. Top technology as our UDG Closed Loop Energy is expensive and bears risks. Given the current energy pricing, the ROI period for the full project budget of €100 million is economically viable.

## Market and market interest

Without extensive market research, but based on the current experience of the Management, the market for emission free and dispatchable energy , whereby the components heat and electricity can be delivered is huge. At this moment we have serious interest from Luxemburg, Belgium, Netherlands, Indonesia, Peru and others. Especially the element that UDG can provide for base load energy independent from O&G 24/7/365 is very appealing at this moment.

## Management

**Tomasz Szymczak CEO**
Tomasz is  a specialist in project management and driving force behind the technical completion of the UDG energy project. He developed several innovative projects and has an extensive experience in entrepreneurial management. His latest success is the start-up of Sulrock, an innovative new material for e.g. train sleepers and storage of radioactive material. Tomasz' motto is: not completing UDG is not an option!

**Frans van Rijn Co CEO**
Frans is a trained tax and corporate lawyer who used his talents to build with his partners one of the largest trust companies in the world: Vistra.com. After selling his shares in 2012, Frans has initiated as angel investor various mining projects in Turkey and Africa.
Frans is responsible for the legal and financial organisation of UDG Energy. Frans ' motto is: Think deeper! Tap the boundless possibilities of UDG Energy!

## Reference:

*FVR/Executive Summary UDG Energy April 2022*