

Earth Energy Designer versus GHEtool Cloud

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EED (short for Earth Energy Designer) has historically been the biggest player in Europe when it comes to borefield design software. But with GHEtool Cloud, there is new player in town! In this article, we will go over both tools in more detail and explain to you their strengths and weaknesses.

GHEtool Cloud

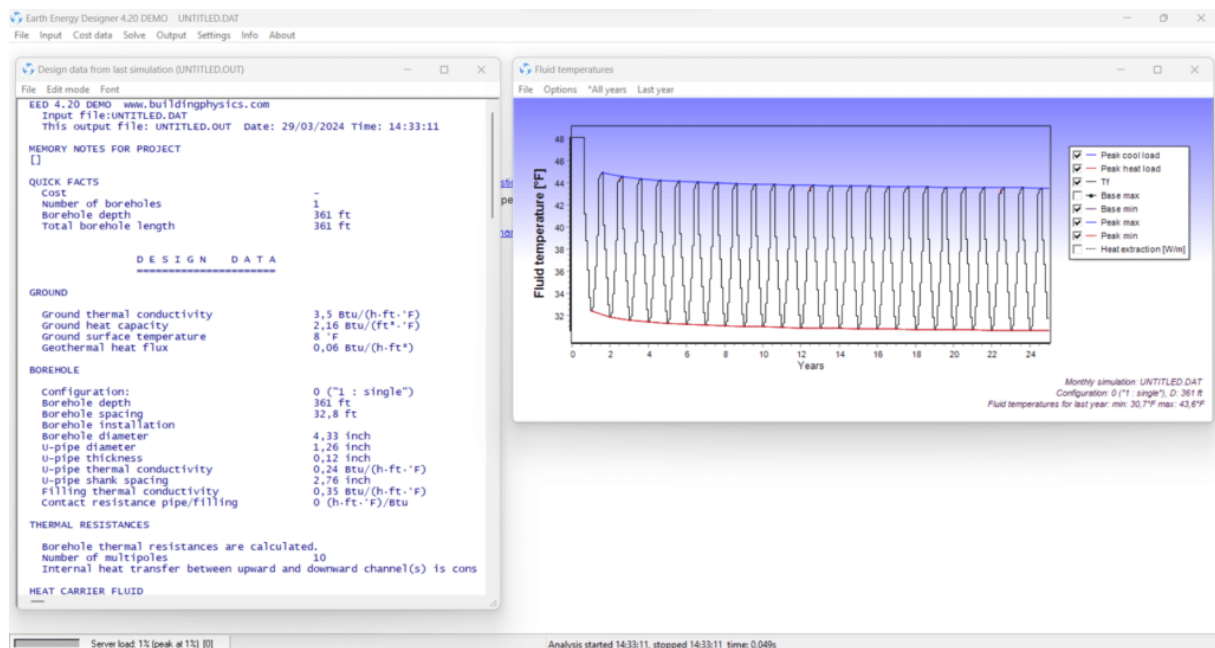
GHEtool (acronym of Ground Heat Exchanger tool) was founded during the master thesis of Wouter Peere at the KU Leuven ([The SySi Team](#)). A year later, in 2021, with the support of [Boydens Engineering](#) (part of Sweco) and the [FH Aachen](#) the open-source code was shown to the public at the International Building Simulation Conference of IBPSA in Bruges (the paper can be found [here](#)). At that time, GHEtool was the first open-source based borefield sizing tool, receiving a recognition from the [Journal Of Open-Source Software](#) in 2022. GHEtool Pro, developed for professional users, was published in 2023. Since November 2024 GHEtool Cloud is the new, official version of GHEtool and is maintained by and available through [Enead – energieadvies](#) (Belgium).



EED (Earth Energy Designer)

In 1994, Hellström and Sanner published a conference paper titled ‘Software for Dimensioning of Deep Boreholes for Heat Extraction,’ emphasizing the necessity of borefield design software over traditional rules of thumb (available on their website [here](#)). This paper stretched the importance of using computer-assisted simulations for borefield sizing. Their software, [Earth Energy Designer](#), marked a milestone in this domain, enabling engineers and drilling firms to utilize computational tools for more precise and efficient borefield designs.

Currently, Earth Energy Designer is maintained by and available through [Blocon](#) (Sweden).



Comparison between GHTool Cloud and Earth Energy Designer

Although both tools offer the capability to design borefields, there are significant differences to consider when choosing between them.

Summary

Option	EED	GHTool
Inputs		
Multiple scenarios	–	X
Monthly load resolution	X	X
Hourly load resolution	X	X
Load monthly load	–	X
Preconfigured borefields	X	X
Change spacing in length and width direction	–	X
Dense borefield configuration	–	X
Buried depth	–	X

Custom borefield configuration	limited	x
Tilted boreholes	–	x
Different ground layers	–	x
Separatus heat exchanger	–	x
% of antifreeze	–	x
Active and passive cooling	–	x
Methods		
Calculate temperature profile	x	x
Calculate required depth	x	x
Calculate borehole positions	x	Expected Q2 2025
Calculate borehole thermal resistance	no transient regime	x
Combine active and passive cooling	–	x
Optimise geothermal energy potential	–	x
Optimise geothermal power	–	x
Pressure drop calculation	–	x
Pump energy consumption	–	x
Calculate average SEER	–	x
Reporting capabilities		
Export borehole thermal resistance	x	x
Export all input parameters	x	x
Export temperature profile	–	x
Introduction and conclusion	–	x
Set title and subtitle	–	x
Customize colour scheme	–	x
Reporting format	txt-file	pdf-file

Detailed explanation

- In practice, borefield design typically involves iterative processes, including making changes and comparing different design options. GHTool Cloud is based on such scenario analyses, allowing users to easily duplicate calculations, make adjustments, and observe the effects without altering the original scenario. In contrast, EED either overwrites previous calculations or necessitates working with multiple files, making the comparing process more cumbersome.
- As projects grow increasingly complex, borefield designs deviate further from simple rectangular configurations. GHTool Cloud offers unparalleled flexibility in borehole positioning, allowing users to input borefields with highly customized configurations directly via coordinates. In contrast, while Earth Energy Designer accommodates irregular borefield configurations, these are ultimately reduced to predefined regular options.
- Beyond borefield sizing, GHTool Cloud provides additional functionalities and assists in sizing hybrid systems. With its innovative ‘optimize load profile’ feature, users can estimate the percentage of a building load that can be met geothermally, thereby enhancing the economic feasibility of geothermal borehole projects. EED, on the other hand, is limited to borefield sizing functionalities.

- Both GHETool Cloud and EED can work with monthly and hourly load profiles for calculations. W.r.t. monthly load data, both tools can work with both absolute and relative load inputs. The difference here is that with GHETool Cloud, you have the option to import monthly loads from a *.csv file, where EED does not have this option. When using hourly data, GHETool Cloud allows a direct import of a CSV file, whereas EED necessitates conversion to a specific *.txt file format before import.
- A crucial design criterion is the fluid regime within the borehole, whether laminar or turbulent. However, in practise, the fluid is neither laminar nor turbulent, but something in between. This fluid regime is called ‘transition’, which is not modelled within EED and can result in underestimations of borehole thermal resistance. GHETool Cloud takes this third regime into account and hence calculates the fluid regime more accurately, solving the issue of underestimating the thermal resistance. (See also [this article](#) in our knowledge base for more information.)
- Clients often demand sizing reports or calculation data for a particular project. GHETool Cloud streamlines this process by automatically exporting calculations into a ready-to-go PDF report ([example report](#)), saving both time and effort. In contrast, EED provides an exhaustive list of calculated parameters which can be used for manual reporting.
- Trial periods and demos play an important role in software selection. GHETool Cloud offers a full, unrestricted 14-day trial, while the EED demo version is limited, restricting functionalities such as loading/saving calculations, altering ground properties, and working with hourly data.
- Since GHETool Cloud is 100% online, it can work all operating systems: Windows, Mac OS and Linux. You can even look up your geothermal calculations on your smartphone!



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<https://ghetool.eu>