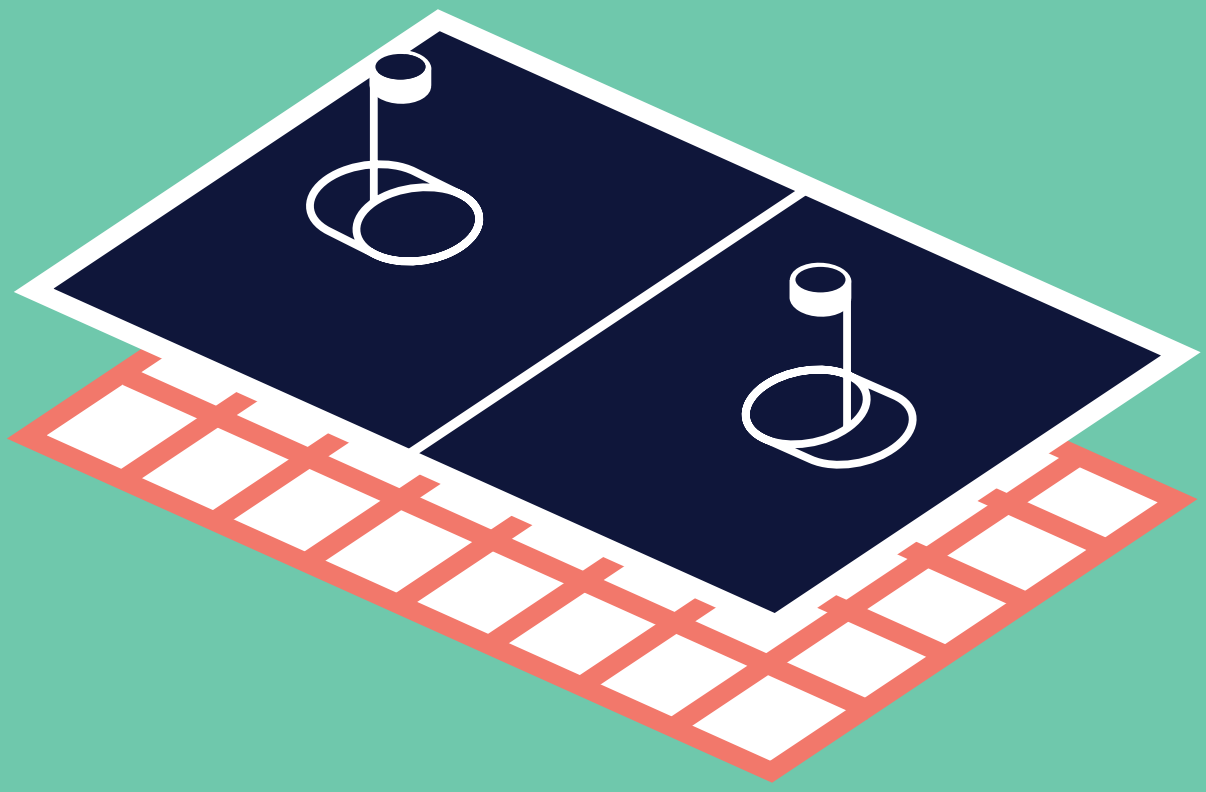
Top 5 FAQ Heat Collector Field



duurzame sportsector

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What is a heat collector field?

A heat collector field is an artificial turf field with a network of pipes installed underneath, allowing heat (or cold) to be extracted from the field. The operational principle of the heat collector field is comparable to a solar water heater. A fluid flows through the network of pipes, which is heated by the warming of the artificial turf field. The heated fluid is then immediately distributed and used by surrounding buildings or stored in the ground in a thermal energy storage (TES) system for later use.

How does it work?
During warm days, the surroundings (and sunlight) heat the artificial turf sports field. The fluid in the pipes beneath the field absorbs this heat. The heat is used directly or stored in an underground thermal energy storage system. In the latter case, the stored heat can be pumped up in the winter. A heat pump uses this heat for heating buildings (e.g. clubhouse, swimming pool, school, or residential area) and for heating tap water. In theory, it is also possible to use the heat to heat the sports field itself. This guarantees the playability of the field in the winter. A pleasant side effect for the athlete is that artificial turf is cooler in the summer because heat is extracted from it.

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What is the energy (heat) yield of a heat collector field?

The energy yield of a collector field depends on a number of factors. Just as with solar panels, weather influences such as the outdoor temperature and the number of hours of sunshine are important factors. In addition, the energy yield is related to the Coefficient of Performance (COP): the ratio between the energy you put in and what you get out (also known as efficiency). The choice of materials/ equipment also influences this and can vary per supplier.

The factors mentioned above mean that only an estimate of the heat yield can be made. A whole collector field (the size of a football pitch) can heat roughly 150 - 300 households, depending on the type of homes and construction method. Assuming that an average household consumes approximately 1,000 m^3 of gas, this means that the yield is equivalent to a saving of 150,000 m^3 to 300,000 m^3 of gas per year. If a household consumes less heat or the efficiency of the heat recovery installation is higher, the potential number of households that can be heated is higher.

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What can a heat collector field be used for and how can it be applied?

The heat generated by a heat collector field can be used to heat homes, schools, sports halls, community centers, swimming pools, etc. It can also be used to heat the tap water in these buildings. Additionally, the generated heat can be used for field heating. The heat output can be used for personal consumption, but given the potential volume, the energy yield is also ideally suited for sharing with the surrounding area. This allows the direct vicinity of the sports facility, such as other buildings on the sports park, to benefit from sustainable energy. In combination with a thermal energy storage (TES) system, a heat collector field can also serve as a heat and cold source for a (very) low-temperature heating network, used to heat other buildings or homes. By sharing the heat, a collector field can contribute to municipalities' objectives to reduce gas consumption in homes and buildings in the neighborhood. Installing a heat collector field beneath an existing artificial turf field results in dual use of space. This can offer a solution for municipalities where the amount of available space (for sports) is under pressure.

To gain insight into the possibilities and operation of a heat collector field, we will briefly explain the technology. The temperature of the fluid flowing through the pipes beneath the field depends on the ambient temperature and solar radiation. Typically, the outgoing temperature in the pipes is between 15°C and 30°C (59°F/86°F). Usually, this is too low to connect directly to buildings, homes, and/or a district heating network (with the exception of a (very) low-temperature heating network). A heat pump (heat exchanger) is required to bring it to the correct temperature.

If the heat cannot be used, or can only be partially used, within the sports facility itself or in the surrounding area, there is a discrepancy between heat supply and heat demand. In that case, thermal energy storage (TES) is required. This allows for an efficient supply temperature to be achieved regardless of the outside temperature. A unique combination is a swimming pool heated with heat from a collector field. Due to the constant heat demand of a swimming pool, the heat generated by the collector field can be used directly to heat the pool throughout the year.

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Which suppliers are there in the Netherlands?

Currently, there are four suppliers providing heat collector fields in the Netherlands. All of them are also based in the Netherlands.

Finovi
Finovi (formerly TopGrass), in collaboration with SuperSub, has been working on the development of the heat collector field since 2018. At that time, a request was first made to develop a system capable of cooling artificial turf fields. When it became apparent that a significant amount of heat could be harvested using this method, and the energy transition was receiving full attention, the innovation shifted towards the development of a heat collector field system. The project at Korfball Club Rust Roest in Eindhoven is currently our largest operational project, where the heat is actually extracted and utilised. The collector field at Football Club ZVC'22 in Zaanstad, with more than 8,500 m² of collectors, will be connected in 2026 and prepared for the new swimming pool.

Portfolio Finovi
- Pilot: Hockey Club AMVJ, Amstelveen
- Realisation: Korfball Club Rust Roest, Eindhoven
- Realisation: Football Club ZVC'22, Zaanstad

Sallandse United

Since 2019, Sallandse United has been developing the heat collector field. In 2020, a Start-up-in-Residence program was launched in collaboration with the Municipality of Zwolle and the Province of Overijssel. In 2022, Sallandse United realised the first football collector field in the Netherlands at football club Be Quick in Zwolle. This involved a pilot project in which various practical measurements were conducted in collaboration with SuperSub and Unica. These included sports-technical properties, heat output, playability, cooling, and maintenance. In 2024, a thermal network calculation model was developed in collaboration with Saxion University of Applied Sciences, allowing for better prediction of yields.

Portfolio Sallandse United

- Realisation: Football Club Be Quick, Zwolle

Aendless Energy

Aendless Energy, part of the Roelofs Group, was founded in 2021 with the vision that outdoor spaces can serve as a source of energy. The principle of the artificial grass collector field is based on the technology of asphalt collectors (solar collectors in asphalt paving). Due to heat generation, large surface areas, and a favorable location in relation to consumers, artificial grass sports fields can be a very interesting heat source, allowing for dual use of space. Additionally, it offers further benefits for the owner, sports club, and users, such as a more comfortable sports pitch, sustainable energy, and social added value.

Portfolio Aendless Energy

- Pilot: Sportpark Marslanden, Zwolle
- Realisation: Football Club SV DONK, Gouda

Domo Sports Grass (Thermolayer)

The development of the Thermolayer was initiated by Domo Sports Grass in collaboration with Sports Pitch Systems. A heat collector field was developed in response to market demand for sustainable sports infrastructure and stimulus from sources including the Amsterdam-Haarlem Scale-up tender process. The guiding principles are the sustainability of the entire system, higher heat output, circular materials, and readiness for large-scale rollout.

Portfolio Domo Sports Grass

- Pilot: Dronten

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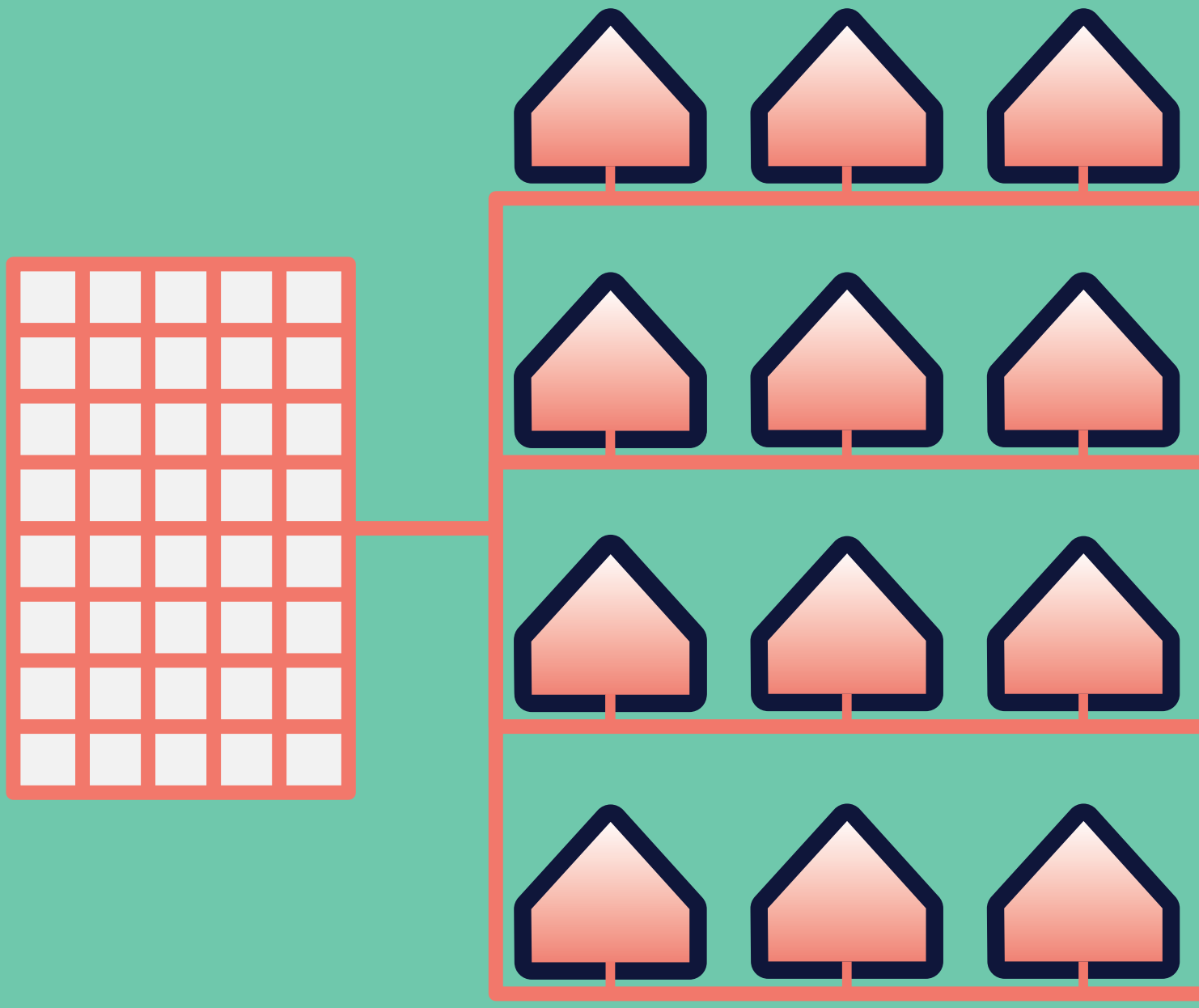
Which factors determine a positive business case?

The best time to install a heat collector field is at the 'natural' moment when the artificial turf field needs to be replaced entirely or when a natural grass field is converted into an artificial turf field. This avoids costs and the destruction of materials that have not yet been fully depreciated. Other factors that may influence the business case include:

- **The operating agreement, i.e. the ability to sell the heat output (to the surrounding area)**
- **The distance from the collector field to the heat consumer (length of distribution pipeline)**
- **The required installations, for example, whether a thermal energy storage (TES) system is needed or whether the heat collector field can be directly connected to a heat consumer, such as a swimming pool**
- **The possibility of connecting to existing infrastructure, for example, an existing district heating network or TES system**
- **Limitation of heat loss**

In larger projects, investments frequently take place in phases. For instance, the heat collector field may have already been installed but not yet connected to a heat consumer. A thermal energy storage (TES) system can also be installed even if it is temporarily out of balance. A (TES) system is in balance when it adds heat and extracts cold, and vice versa.



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