FINN GEOTHERM

The renewable heating experts

Ground and air source heating
for domestic and commercial buildings of all sizes

Thank you for considering a Finn Geotherm heat pump system

Finn Geotherm are one of the longest established renewable heating companies in the UK and are experts in the design and installation of ground and air source heat pump systems. We've already helped hundreds of homeowners and businesses across the country to dramatically reduce their heating bills by switching to a more energy efficient and environmentally friendly heating and hot water system. Whatever the size, style or age of your property, we can help you too. This booklet is intended to provide you with an overview of the superb systems that we use and to give you some idea of the type of system that might be suitable for you. Please remember, however, that any one of our experienced team would be delighted to answer any questions that you have regarding how we can better heat your home or business, reduce your heating bills and help you access generous government incentives.

Call us on 0800 999 3240 or email info@finn-geotherm.co.uk

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LÄMPÖÄSSÄ

Panasonic heating & cooling solutions

Dimplex renewables

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Background Information

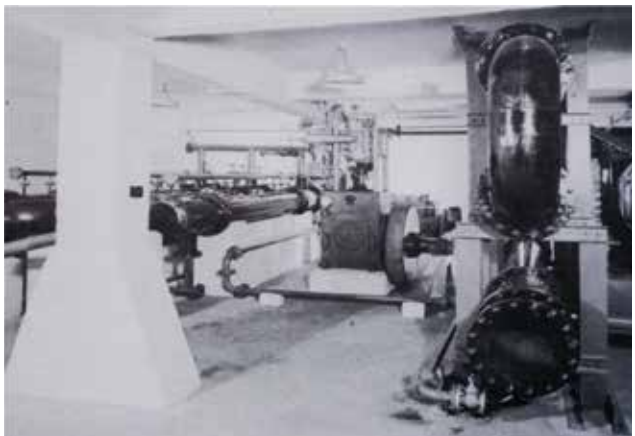
The origins of heat pump technology

Many people still believe that heat pump technology is a recent innovation and, on this basis, are concerned that the systems may be unproven or at an early stage in their evolution. The truth is that heat pump technology has been established for more than 150 years and the first ground source heat pump was brought into use more than 70 years ago.

It was way back in 1948 that J Gordon Cook wrote in *The Spectator* magazine:

"In these days of material progress, when so much lip-service is being paid to science as our guarantee of prosperity, it seems incredible that a device such as the heat pump should have escaped the attention it deserves. Had it not been for a team of enthusiasts determined to carry their theories into practice, we should have been still awaiting evidence of the potentialities of the heat pump in Britain. Now we know that it will work, and the time has come when everything must be done to make the most of the knowledge we have gained."

The following gives a brief overview of the development of this technology to the reliable and efficient heating systems that are built by established companies such as Lämpöässä today.



The Norwich heat pump.

Milestones:

- **1748:** William Cullen demonstrates artificial refrigeration.
- **1834:** Jacob Perkins builds a practical refrigerator with diethyl ether.
- **1852:** Lord Kelvin describes the theory underlying heat pumps.
- **1855–1857:** Peter von Rittinger develops and builds the first heat pump.
- **1945:** John Sumner builds a full scale water source heat pump in Norwich, Norfolk.
- **1983:** Lämpöässä build their first heat pump in Lapua, Finland.

The first heat pump as we know it today was built by Peter von Rittinger in 1856. He recognised the principle of the heat pump while conducting experiments on the use of water vapour's latent heat for the evaporation of salt brine. As a result, in Austria the heat pump was used to dry salt in salt marshes.

The first large scale heat pump in the UK was developed by John Sumner in 1945 on the doorstep of Finn Geotherm in Norwich. The Norwich City Council Electrical Department had built new premises in Norwich at Duke Street, on the bank of the River Wensum. The office was originally intended to be heated by a heat pump, but the wartime austerity prevented resources being available to focus on such an innovative project. After the war, however, John Sumner, who was the City Electrical Engineer for Norwich, "cobbled

together" a system from salvaged parts based on a SO_2 refrigerant. The system is reputed to have achieved a seasonal efficiency ratio of 3.42. The system ran at an average thermal delivery of 147kW and had a peak output of 234kW. The system was designed to circulate water around the building's heat emitter systems at 50-55°C. Despite the efficiency and effectiveness of the system, it was not widely copied in the UK because of the relative cheapness of fossil fuels such as coal and later North Sea oil and gas.

John Sumner also installed a closed loop ground source heat pump (GSHP) for his home in the early 1950s. The ground loop was initially constructed using copper pipe buried at around 1m depth and was filled with circulating antifreeze. Whilst Sumner's heat pumps were totally effective and, for their time, technically brilliant, they received little support in the UK, where abundant coal seemed to provide a cheap and limitless source of energy.

As is so often the case, however, UK technical advances were adopted and developed overseas. In 1948 a large scale heat pump was installed in Oregan in the United States. Following the OPEC oil crisis of the 1970s the development and adoption of heat pumps began to gather pace. Sweden, in particular, was developing new atomic reactors and was looking for efficient means of heating homes with electricity rather than paraffin.

During this period, closed loop polythene systems became the norm, with vertical closed loop systems being developed in Germany, Switzerland and in Finland through the work of companies such as Lämpöässä. By 2008, it is estimated that Switzerland alone had between 30,000 and 44,000 GSHP units. In the United States wide scale adoption had progressed even faster. It is estimated that, by 2008, the US market was installing between 50,000 to 60,000 units per annum with a total of some 750,000 units being in operation by 2008.

Suomen Lämpöpumpputekniikka Oy (known to its friends as Lämpöässä) was established in Lapua on 29th March 1983, based on the craftsmanship of five men and decades of expertise in geothermal heating. The company had its first office at Jorma Saksi's home but later moved to rental premises at the reception hall along Härsiläntie Road. The first year also saw the implementation of a significant assignment, the heating system of Ruha school. Lämpöässä now has some 4,000 units on its service database that are more than 30 years old and are still going strong.

The development of heat pump technology is still continuing with advances in compressor and controls technology in particular enabling systems to be more efficient and easier to control. Heat pump technology is reliable, effective, efficient and is here to stay! In the words of Gordon Cook in 1948: "There can be no doubt that in the heat pump we have a machine that is to play an outstanding part in the industrial future of our country."

In a beautiful close to the historic circle, the Eastern Electricity Building at Duke's Street in Norwich is about to be redeveloped to provide 154 residential units as well as commercial and retail space. One of the central planning conditions of the development is that it should incorporate a water source heat pump. The current specification is for a system with a maximum capacity of around 800kW, with the River Wensum once more being used as the heat source. We think John Sumner would have approved!

Lämpöässä factory, Lapua, Finland

Background Information

Introduction to Finn Geotherm UK Ltd

Finn Geotherm was established in 2006 by David Alston following a two year period of commissioned research on the UK potential for heat pumps by Lämpöässä. Lämpöässä had already been manufacturing heat pumps for their home market in Finland for 23 years and believed the UK climate was ideally suited for heat pump technology. Having gained an engineering degree at Writtle College, and being half Finnish himself, David was ideally placed to help Lämpöässä establish a first foothold in the UK.

Since then the company has successfully installed around 1000 heat pump systems in a huge range of properties including district housing schemes, commercial offices, listed stately homes, commercial glass (green) houses, leisure centres, schools, a Premier League Football Club and just about every type of domestic residence imaginable. In the past two years alone, we have received national awards for Ground Source Heat Pump Installer of the Year for both commercial and domestic properties, Domestic Air Source Installation of the Year and the Sustainable Project of the Year.

The Finn Geotherm team now includes Leanne Gill, our invaluable Project Manager, experienced heating and hot water engineers, ground workers, sales managers, refrigeration and electrical specialists, quotations managers and two superb apprentices – one of which won an Apprentice of the Year Award in 2015 and is now a fully qualified Energy Assessor.

Every member of the Finn Geotherm team takes tremendous pride in the role they perform for the company, knowing that, in all instances, we are only as good as our most recent installation. Each new project is celebrated and carried through to fruition with the greatest care and attention by our project management team.

"Team FGT" continues to go from strength to strength, having the privilege to be involved in new cutting edge projects each year whilst still taking great pleasure in helping people reduce the heating costs of properties of every type, size and age you can imagine.

In November 2015, George Freeman MP officially opened the company's new extended office facilities and showroom where customers can see the range of products which Finn Geotherm offers.

Why Should You Install a Heat Pump?

Here are five reasons that our customers frequently cite in switching to a heat pump system:

1. Dramatically reduce your heating bills

Our systems will significantly reduce your heating bills, often by more than 50 percent, because a heat pump uses a lot less energy than the average gas or oil boiler to produce the same amount of heat.

2. Future proof your bills

The installation of a heat pump system will allow you to escape from a dependence on oil or gas. We are all aware that global politics and scarcity of supply can make these costs volatile at least. Whilst oil costs are currently relatively low, few doubt that the long term trend of increasing gas and oil prices will return. A heat pump should last over 20 years. Between March 2016 and March 2018 oil prices increased from 30.66 pence to 57.51 pence per litre – that's an average annual increase of 88%. The installation of a heat pump system will stop you being at the mercy of global commodity traders and the politics that influence them.

3. Get paid to switch

The government will send you quarterly payments for seven years for a domestic system or 20 years for a non-domestic as a reward. In most cases this covers the cost of a domestic system in less than five years.

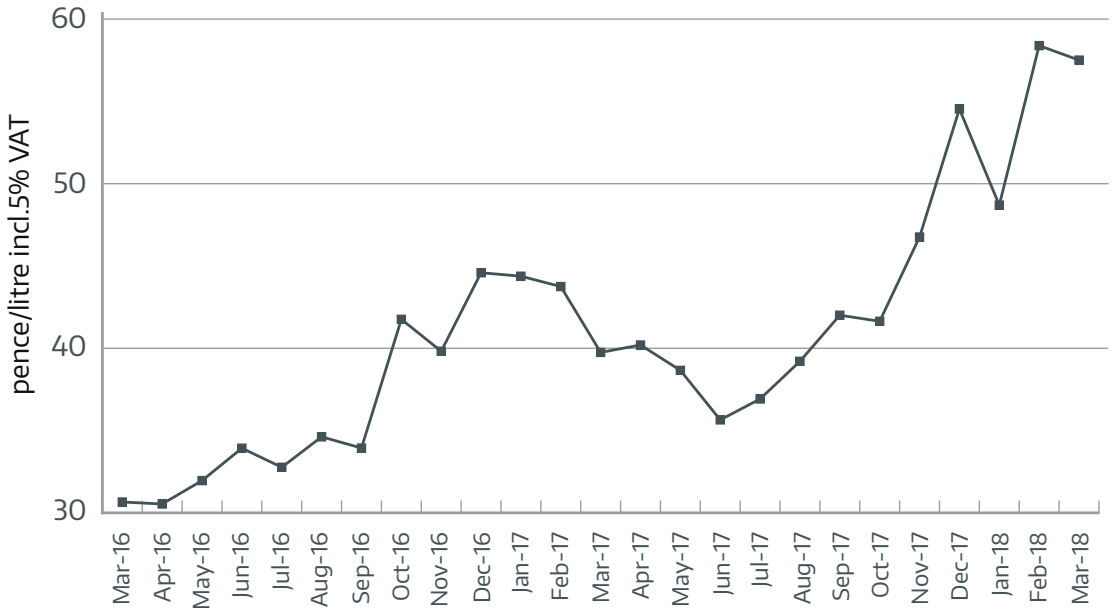
4. Long term reliability

As a heat pump does not involve any form of combustion it should be expected to last much longer than a traditional boiler and will require less maintenance. We would expect an air source heat pump to last between 15 and 20 years. A Lämpöässä ground source system should last more than 30 years – that's at least three times longer than a modern condensing boiler.

5. Protect the environment

Heat pumps generate fewer CO_2 emissions than conventional heating systems. Currently a quarter of the UK's CO_2 emissions come from heating, lighting and running appliances in our homes, 80% of which is attributed to heating and hot water alone.

Domestic Heating Oil Prices



Why Choose Finn Geotherm?

Renewable energy is a growing market, but as many new companies set up in business, it's important to trust your heating system to a company with demonstrable skill and experience. The performance of a heat pump, and ultimately the comfort of your property and the money you will save, is entirely dependent on the quality of the design and installation.

1. We've been around longer than other companies.

We are one of the longest established heat pump installation companies in the UK. As a result, we've had the time to find the best quality systems and have gained years and years of installation experience across virtually every type of property you could think of.

2. Ground and air source heat pumps is all we do.

Whilst most renewable energy companies have diversified across PV, biomass, wind turbines, solar thermal and heat pumps, Finn Geotherm has chosen instead not to be "Jacks of all trades" but instead absolute masters in the field of domestic and commercial heat pump systems. This has not only allowed us to establish a level of expertise far in excess of any of our competitors, but also to maintain a more stable operating base as we have been able to focus our resource requirements purely upon one market.

3. We're experts in our field.

The expertise of our engineering, surveying and administrative professionals is the basis of our success. We are committed to helping our customers understand the choices available to them, creating a design which is perfectly suited to their needs, and carrying out a smooth, efficient installation. In the past two years alone, we have received national awards for Ground Source Heat Pump Installer of the Year for both commercial and domestic properties, Domestic Air Source Installation of the Year and the Sustainable Project of the Year, allowing us to justifiably call ourselves "The Renewable Heating Experts".

4. We'll support you from start to finish.

We only use our own, highly skilled and experienced heating engineers to install and commission our systems and have our own resources to install the required ground collector loops. Each new project is celebrated and carried through to fruition with the greatest care and attention by our project management team.

5. We care about what we do.

We have a real passion for heat pump technology, which is why we've chosen to specialise in this area. Every member of the Finn Geotherm team takes tremendous pride in the role that they perform for the company, knowing that, in all instances, we are only as good as our most recent installation.

Ground or Air Source?

Whether you choose to install a ground or an air source heat pump system you can be confident that your property will be perfectly warm all year round, you will have ample hot water and your heating bills will be significantly less than they would have been if you'd have generated the same amount of heat with a traditional boiler. We will guarantee all of these things. There are, however, factors which will determine which is likely to be the best system for you.

What space do you have outside the property?

Is the garden, grounds or car park suitable for a ground source heat pump collector loop to be buried underground? You will need a reasonable amount of space for this and it will need to be accessible for small digging machinery, such as a trencher and a mini-digger. You will also need to be prepared to have part of your garden or grounds disrupted as we install the trenches. The area will, however, be able to return to its former glory within a few months of the collector loop's installation.

As an indication, the collector loop of a ground source heat pump will require about 2.5 times the occupied area of a property. So, if your property is about 200m^2, you would need an area of about 500m^2 for the collector loop to be installed. Whilst this might sound like a lot, remember it need only be an area which is 25m long and 20m wide. Once the collector loop has been installed you can use the area in the same way that you did before.

We can also install a ground source system using deep bore holes. Whilst this will require far less space, it does add quite a lot to the project cost and would therefore only normally be recommended if other alternatives were not possible and you had reasonable flexibility in your budget.

By contrast, an air source system will only need enough space outside for the heat pump with a little additional space around it to allow the air to circulate.

How big is your property?

In theory, air source heat pumps can be specified to heat a property of almost any size. Practically, however, you would generally not want to use an air source system for premises requiring more than 30kW to heat it – that might be a property which has an occupied area of 500m^2. Whatever size building you have, be it a neat country cottage or a large commercial office, our experienced surveyors will be able to advise you on the most suitable system.

What budget constraints do you have?

Whilst both ground and air source systems work superbly well, there is no question that a ground source system will be slightly more efficient and will therefore cost less to run and will last longer. The requirement to install a ground collector matrix does make a ground source system more expensive than an air source. The Renewable Heat Incentive (see page 27) will allow you to recoup your investment on an air or ground source system in about four to six years. If you are not able to access funds to meet the cost of the ground source however, the air source will require less capital and will still provide you with a very efficient heating system.

Ground Source Heat Pumps

How they work

A ground source heat pump consists of four elements

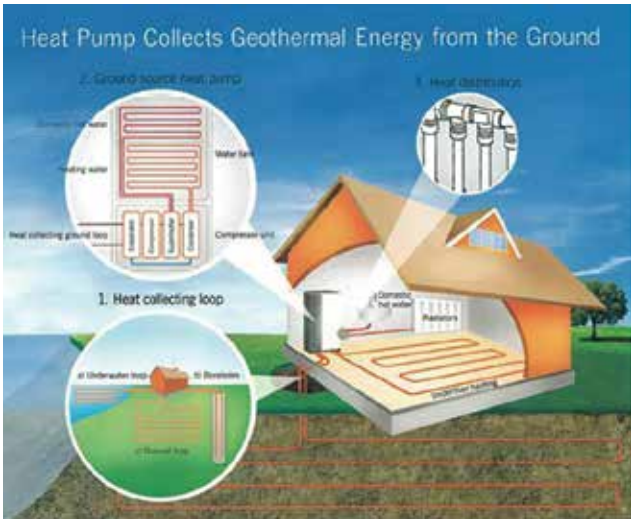
1. The collector loop
2. The heat exchangers
3. The compressor
4. The thermal store

1. The collector loop is placed under the ground in a parallel array similar to an underfloor heating system, or via a vertical bore. A mixture of water and antifreeze is pumped through this. As the liquid flows through the underground pipes, it picks up the temperature of the earth around it, typically returning to the heat pump at about 6°C. This temperature remains fairly constant throughout the year, which is why ground source heat pumps provide such an efficient means of heating, even during very cold winter conditions.

2. Once back at the heat pump, the liquid is passed against heat exchangers. On the other side of the heat exchangers is a refrigerant. This refrigerant boils at -24°C, so 6°C is plenty to make it boil rigorously.

3. The now gaseous refrigerant is squashed back down using a compressor. Whenever you squash a gas you force it to release energy (try this by sticking your finger over the end of a bicycle pump as you push the piston down).

4. The released energy is passed into a thermal store – which is a large body of stored water, causing the water to get hotter. The cycle of collector loop, heat exchange, compression and energy release continues until the water in the thermal store hits the temperature required to heat your radiators and hot water. The cycle then stops until the temperature of the thermal store falls and needs recharging again.



Studies show that approximately 70% of the energy produced from a heat pump comes from under ground. Lämpöässä systems maximise this, as they are monovalent – i.e. they use the heat pump (rather than a separate immersion heater) to provide all of the hot tap water and radiator heat. A well installed Lämpöässä heat pump will typically generate 4kW of heat for every 1kW of electricity that it uses. The ratio of heat to electricity is called the Coefficient of Performance, or COP. The COP is the standard measure that is used to describe the efficiency of a heat pump.

Key benefits:

- Can be used for heating and hot water production
- Provides good levels of efficiency all year round
- Designed to be low maintenance
- Nothing visible from the outside of the property

A typical ground source heat pump could save you between £395 and £2,000 a year, depending on which existing heating system you are replacing.

[Source: The Energy Saving Trust]

Our Range of Systems – Ground Source

Our range of ground source heat pumps are from Lämpöässä, the leading manufacturer of heat pumps in Finland. We are the UK's only approved installer of these models, which boast industry leading reliability and efficiency.

Lämpöässä models of heat pumps have always been the systems that other companies have tried to replicate. This state of the art Scandinavian equipment has been tried and tested in the harsh Finnish winters for over 35 years, where temperatures can drop to -45ºC.

A well installed Lämpöässä heat pump will typically generate 4kW of heat for every 1kW of electricity that it uses. The ratio of heat to electricity is called the Coefficient of Performance, or COP. The COP is the standard measure that is used to describe the efficiency of a heat pump.

Lämpöässä Vsi series

	Vsi 8	Vsi 10	Vsi 12	Vsi 14
Output (kW)	9.52	10.96	11.44	15.64
Water Tank (Litres)	260	260	260	260
Dimensions (cm) (W x D x H)	59.5 x 68 x 183	59.5 x 68 x 183	59.5 x 68 x 183	59.5 x 68 x 183
Weight (kg)	334	338	340	340
Fuse	3 x 20A / 1 x 40A	3 x 20A	3 x 20A / 1 x 40A	3 x 20A / 1 x 40A
Electrical Connection	230V 1 Phase	400V 3 Phase	400V 3 Phase / 230V 1 Phase	400V 3 Phase
Heatable Area* (m^2)	140 - 240	160 - 270	170 - 290	220 - 390
COP	4.78	4.51	4.79	4.54

** Estimated figure. An assessment of the heat loss of your home should be made in each case.*

The Lämpöässä Vsi ground source heat pump systems provide the ultimate in compact and efficient heat pump design. With a footprint of only 59.5cm in width and 68cm depth, the system is no bigger than an upright fridge freezer. They are also almost silent so they can be placed virtually anywhere – for instance a utility room. It incorporates a 260 litre thermal store and is available in up to 14kW, enabling it to deliver all of the heating and hot water required for a moderately sized home or office space up to 280m^2.

Our Range of Systems – Ground Source

Lämpöässä Vmi series

	Vmi 9	Vmi 11	Vmi 14	Vmi 17
Output (kW)	9.52	11.95	14.16	16.97
Water Tank (Litres)	480	480	480	480
Dimensions (cm) (W x D x H)	102 x 70 x 183	102 x 70 x 183	102 x 70 x 183	102 x 70 x 183
Weight (kg)	426	440	450	458
Fuse	3 x 20A	3 x 20A 1 x 40A	3 x 20A 1 x 40A	3 x 20A
Electrical Connection	400V 3 Phase	400V 3 Phase / 230V 1 Phase	400V 3 Phase / 230V 1 Phase	400V 3 Phase
Heatable Area* (m^2)	140 - 240	171 - 300	200 - 350	240 - 420
COP	4.19	4.17	4.44	4.24

** Estimated figure. An assessment of the heat loss of your home should be made in each case.*

The Vmi system is the latest incarnation of Lämpöässä's market leading ground source heat pump system. Incorporating a 480 litre thermal store, and with outputs from 9kW to 17kW, the Lämpöässä Vmi is ideal as a means of providing all of the hot water and heating for your home or office.

The Lämpöässä Vmi is an ideal solution for larger heated areas and when there is an increased requirement for hot water. Lämpöässä Vmi allows heating, cooling and the production of domestic hot water in a convenient, efficient and ecological manner all year round. The large 480 litre thermal store guarantees that there is enough hot domestic water and maximises the efficiency of the heat pump compressor – allowing it to use less electricity and to last longer. The Vmi also incorporates the latest touch screen control system, capable of being linked to your mobile device.

The Lämpöässä V models of heat pump have always been the systems that other companies sought to replicate. The Vmi model now once more places Lämpöässä significantly ahead of any other system available.

Lämpöässä systems come complete with web access connectivity, which means that you can control your heating and hot water remotely from wherever you are, via PC, tablet or smart phone, for total convenience. With up to three independently controllable heating circuits, you can set your Lämpöässä system to deliver exactly the level of heat that you want in different areas of your property to ensure absolute comfort, all year round.

Our Range of Systems – Ground Source

Lämpöässä Esi and Emi series

	Esi 11	Esi 14	Emi 17	Emi 22	Emi 28	Emi 43
Output (kW)	11.95	15.64	17.00	22.42	29.52	46.19
Dimensions (cm) (W x D x H)	59.5 x 68 x 145	59.5 x 68 x 145	92 x 68 x 145	92 x 68 x 145	92 x 68 x 145	92 x 68 x 145
Weight (kg)	192	202	395	395	395	420
Fuse	3 x 20A / 1 x 32A	3 x 20A / 1 x 40A	3 x 25A	3 x 25A	3 x 25A	3 x 50A
Electrical Connection	400V 3 Phase / 230V 1 Phase	400V 3 Phase / 230V 1 Phase	400V 3 Phase	400V 3 Phase	400V 3 Phase	400V 3 Phase
Heatable Area* (m^2)	170 - 300	220 - 390	240 - 430	320 - 560	420 - 740	660 - 1550
COP	4.17	4.54	4.46	4.49	4.56	4.5

** Estimated figure. An assessment of the heat loss of your home should be made in each case.*

Using the same high efficiency heat exchanger and compressor systems as the revolutionary Vmi family, the Esi and Emi systems boast industry beating COPs of up to 4.56. As all Lämpöässä systems are monovalent, this efficiency level is possible for your entire heating and hot water needs.

The Lämpöässä Esi and Emi models are designed to provide a compact heat pump capable of being linked to a variety of thermal stores to suit varying hot water requirements. Both models are also capable of being connected in tandem with other Esi/Emi systems or with Vmi models in order to meet the heating requirements of larger domestic properties.

Both the Esi and Emi systems utilise the efficient touch screen Assa control which is simple to operate but still has the ability to be controlled using a mobile device.

Our Range of Systems – Ground Source

Lämpöässä Commercial series

	T120	Eli 60	Eli 90
Output (kW)	117.36	64.93	78.05
Dimensions (cm) (W x D x H)	130 x 90 x 180	130 x 90 x 180	130 x 90 x 180
Weight (kg)	1020	619	735
Fuse	3 x 125A	3 x 50A	3 x 63A
Electrical Connection	400V 3 Phase	400V 3 Phase	400V 3 Phase
Heatable Area* (m^2)	1680 - 2930	930 - 1620	1120 - 1950
COP	3.77	3.74	4.03

** Estimated figure. An assessment of the heat loss of your home should be made in each case.*

The Lämpöässä range of Eli and T ground source heat pumps offer us the flexibility to meet the needs of larger sized domestic installations and very significant commercial projects. With heat pump sizes from 60 to 120kW, these systems are able to be linked with thermal stores to provide heating and hot water for any building from a medium sized domestic residence to a large college or hospital.

The Eli range are the latest editions to the Lämpöässä stable, providing commercial level output at industry beating efficiency levels. Lämpöässä Eli 60 and Eli 90 heat pumps can be linked together to provide outputs of up to 400kW, whilst still maintaining a COP in excess of 4.0.

The T120 is the largest unit of Lämpöässä's ground source heat pump range, providing the vehicle to heat the largest spaces from multiple domestic residences within a district heating scheme to large commercial or industrial buildings. One single T120 is designed to meet the needs of a very large home or commercial or industrial building up to 2400m^2. It is ideal to be linked to a 5000litre Lämpöässä superheat thermal store.

Linked together 5 x T120 can provide up to 600kW, capable of heating up to 12,000m^2 allowing us to deliver all of the hot water and heating required for a large school, hospital, office block, industrial building or the largest of domestic housing schemes or apartments. Typically, we would expect to install approximately 6000m^2 of collector loop (80m x 50m) to feed a single T120 within a ground area. When installed as multiple units however, the systems would most frequently be linked to a bore hole collector loop system.

Our Range of Systems - Thermal Stores

How they work

A thermal store contains water which is heated by a heat pump or other means. Its role however is to store heat, rather than to deliver hot tap water – although it does this as well.

A traditional hot water tank is heated by a coil or immersion heater within it. The hot water then flows from the tank, to be replaced by cold mains water. The water has to be kept at a temperature in excess of 60°C, in order to ensure that there is no risk of Legionella developing. This is inefficient from an energy perspective a) as the water is hotter than you would want to bathe and so has to be cooled down by adding cold water and b) it takes proportionally more energy to heat water from 55 to 60°C than it does from say 50 to 55°C.

A thermal store works the opposite way around. The water within the tank is heated directly by the hot gas from the heat pump. This water is then pumped around the heating system to warm the property. The thermal store produces hot tap water by heating water within a coiled copper pipe which passes through the thermal store, thus generating domestic hot water on demand. As no hot water is stored, it is not necessary to heat it to 60°C.

Lämpöässä heat pumps employ superheat technology, which uses the compressed gas at its hottest to heat a low flow of water, which is deposited directly into the upper part of the thermal store. The remainder of the hot gas energy is extracted via a second stage to heat the lower section of the thermal store at a lower temperature. This system allows Lämpöässä heat pumps to generate all domestic hot water without the need for an immersion heater. This is called a monovalent system and allows the heat pump to maintain a consistently high COP for both heating and hot water generation.

All basic Lämpöässä tanks are designed to provide 45 litres of water per minute (an average shower requires 8 litres per minute). The coil within the thermal store can however be upgraded to provide up to 60 or even 80 litres per minute for applications where a lot of hot water is required.

Our Range of Systems - Thermal Stores

Lämpöässä Superheat series

Thermal Store Capacity (litres)	Diameter (cm)	Height (cm)	Weight (kg)
450	66.5	182	225
500	81	155	170
700	81	205	200
1000	105	210	250
1500	125	215	300
2000	140	220	350
2500	150	225	380
3000	160	230	420
4000	180	245	500
5000	200	250	620

Akvaterm, the leading European manufacturer of accumulator and cold water tanks, supply a wide range of thermal stores to Lämpöässä for use with their Esi, Emi and Eli heat pump systems. Designed to cover all requirements from modest homes to large stately houses, or commercial premises, the Lämpöässä range of thermal stores, coupled with the appropriate Lämpöässä ground source heat pump, can provide sufficient heat and hot water for any requirement.

Using Lämpöässä's patented superheat technology, all of the thermal stores are capable of providing the entire hot water supply for a building, as well as heating, without the need for an electric or other backup system. This enables Lämpöässä to maintain its superb level of efficiency for all applications, thus reducing your costs and maximising your returns under the RHI.

Lämpöässä's thermal stores are also available in a wide range of sizes and shapes to enable installation into a variety of spaces. If entry space into the building is tight, the external insulation can also be temporarily removed, reducing the space required. We are also able to specify differing hot water coil sizes allowing you to increase hot water generation from the standard of 45 litres per minute to 60, 80 or 120 litres per minute. Finn Geotherm will always be pleased to advise you of the best thermal store and coil combination to allow your Lämpöässä heat pump to best meet your requirements.

Air Source Heat Pumps

How they work

An air source heat pump works in much the same way as a ground source, but extracts background heat from the ambient air temperature, instead of from the earth.

Air is pulled over a series of fine coils by a finely balanced fan unit. The coils contain a liquid refrigerant which absorbs the heat from the air. The refrigerant boils at -24°C – so even if the outside air is -10°C, it is still "warm" enough to make the refrigerant boil.

The gaseous refrigerant is squashed using a compressor. Squashing the vaporised refrigerant forces it to get hot – up to 100°C.

This "hot gas" is then used to heat water, via a heat exchanger. The water is part of a tank contained in a thermal store.

The air source heat pump continues to work in this way until the water in the thermal store hits the temperature required to heat your radiators and hot water. The fan unit will then switch off until the temperature of the thermal store falls and needs recharging again.

The efficiency of an air source heat pump varies as the outside temperature changes. The Panasonic Aquarea air source heat pump can however still provide enough heat and hot water even down to -15°C outside. During the summer months, it might produce 5kW of heat (for hot water) for every 1kW of electricity. During the coldest winter periods, when it is very cold outside, this efficiency might drop to 2:1. Overall, however, we would expect that the system would achieve an average of about 3.5 times as much energy out as you put in. This means that it has an average COP (otherwise known as a Seasonal Performance Factor or SPF) of 3.5.

Key benefits:

- No requirement for ground works in order to be installed
- Minimal space required
- Can be used for heating and hot water production
- Provides good levels of efficiency all year round
- Lasts twice as long as a conventional boiler
- Designed to be low maintenance
- Ideal for properties of small to medium size

An average performing air source heat pump in an average four-bedroom detached home could save between £545 to £880 a year if replacing oil and between £550 and £1,060 a year if replacing electric heating.

[Source: The Energy Saving Trust]

Our Range of Systems – Air Source

Panasonic Aquarea

With more than 30 years' experience, Panasonic is world leader in designing and manufacturing heating and cooling systems. We are delighted to be a PRO partner installer for Panasonic heat pump systems.

Panasonic's Aquarea air source heat pump series generate the perfect temperature heating and produce hot water, in an easy, cost effective and environmentally friendly way.

The highly efficient Aquarea range is suitable for both new installations and retrofitting in properties of all sizes. The systems can supply heating through both radiators and underfloor heating, as well as delivering your domestic hot water.

Major energy savings can be achieved with an Aquarea heat pump thanks to their incredible efficiency, even at temperatures as low as -20°C. Panasonic units come with a seven year guarantee for added piece of mind.

Complementing the Aquarea heat pump range are Panasonic's Aquarea UK cylinders. Manufactured in the UK, the cylinders are not only very efficient themselves, but they have been designed to maximise the efficiency of the Aquarea heat pump range.

	WH-MDC05H3E5	WH-MDC07H3E5	WH-MDC09H3E5	WH-MDC12H6E5	WH-MDC16H6E5	WH-MXC09H3E5	WH-MXC12H6E5	WH-MXC16H9E8
Output (kW)	4.2	5.9	6.1	9.3	10	9	12	
Dimensions (cm) (W x D x H)	120 x 32 x 87	120 x 32 x 87	128 x 32 x 87	128 x 32 x 141	128 x 32 x 141	128 x 32 x 141	128 x 32 x 141	128 x 32 x 141
Weight (kg)	112	112	112	147	147	148	148	168
Fuse	32A	32A	32A					
Electrical Connection	230V 1 Phase	230V 1 Phase	230V 1 Phase	230V 1 Phase	230V 1 Phase	230V 1 Phase	230V 1 Phase	400V 3 Phase
Heatable Area* (m^2)	90-130m2	90-130	70-100	130-180	180-250	160-230	230-280	28-350
COP	3.32	3.3	3.1	3.37	3.25	3.45	3.36	2.05

**Estimated figure. As assessment of the heat loss of your home should be made in each case.*

Our Range of Systems – Air Source

Dimplex Commercial series

	LA TU 25	LA TU 40	LA TU 60
Output (kW)	19.60	30.00	50.00
Dimensions (cm) (W x D x H)	160 x 95 x 194	173.5 x 95 x 210	190 x 100 x 230
Weight (kg)	510	585	915
Fuse	3 x 25A	3 x 25A	3 x 50A
Electrical Connection	400V 3 Phase	400V 3 Phase	400V 3 Phase
Heatable Area* (m^2)	280 - 490	430 - 750	720 - 1250
COP	3.70	3.81	3.36

** Estimated figure. An assessment of the heat loss of your home should be made in each case.*

The Dimplex LA TU range of air source heat pumps allows us to provide high levels of renewable heat and hot water for large properties when ground source is not an option.

These extremely efficient air source heat pumps provide high COPs, even at low ambient air temperatures, thanks to a higher performance evaporator. Designed for outdoor installation, the LA TU range operates in temperatures ranging from 35°C to -25°C and can provide variable heating water flow temperatures from 35°C to 65°C.

The heat pump's two compressors provide higher capacity output and two performance capability. Plus, its intelligent load switching between compressors maximises compressor life. LA TUs are efficient, low noise running products which use an electronically controlled low speed axial flow fan and insulated decoupled compressor housing.

Multiple units can also be connected in parallel using a master heat pump controller making the LA TU range very flexible for the complete range of installations.

Heat Recovery Systems

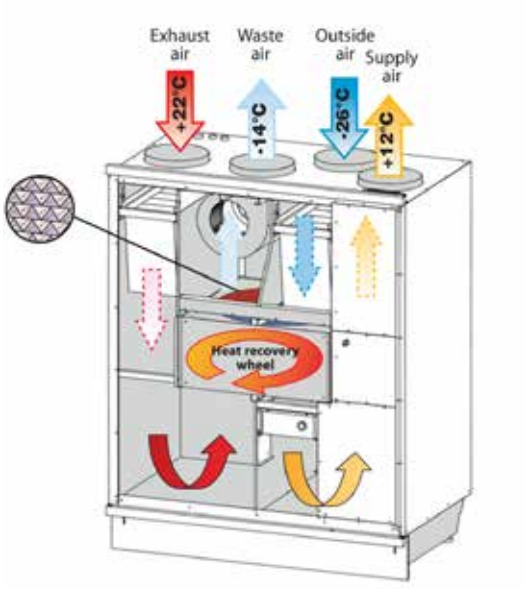
How they work

As buildings increase their levels of insulation and ventilation is reduced, the need to maintain a flow of fresh air without creating draughts becomes more important.

Heat recovery systems are designed to take the heat out of warmed stale air, and then use this heat to preheat incoming fresh air. This allows modern properties to avoid stuffiness, without having to open windows, thus wasting energy.

Systems can also have the option of cooling incoming air during warmer summer months. Ideally this will include a link to a ground source heat pump, so that the excess heat during the summer is passed, via the ground source heat pump collector loop, into the earth. The ground around the collector loop is then steadily warmed up. As the heat transfer rate in earth is very slow, the heat is built up to be harvested again during the winter, when the building needs to be warmed. This system is called a thermal bank.

Lämpöässä and Enervent systems are perfectly designed to work with each other to do this. Lämpöässä are the leading manufacturer of ground source heat pumps in Finland. Enervent are the market leaders in heat recovery. Together they provide the best of both worlds, allowing you to benefit from optimum system efficiency. Finn Geotherm is the only company in the UK that is authorised to supply and install Lämpöässä and Enervent systems.



By reducing the air change factor in a well insulated property an appropriately selected and installed heat recovery system could reduce annual heating costs by a third, whilst also providing year round clean, fresh air and controlling humidity.

enervent
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Our Range of Systems – Heat Recovery

Enervent Pingvin

General technical information	
Maximum air-flow amount with duct pressure of 125 Pa	+87/-95 l/s
Apartment volume (basic ventilation)	0-526 m^3
Fans (supply and extract air)	119 w
Duct size	Ø 160 mm
Weight	50 kg
Standard filters	F5/F5
Alternative filters	F7/F5
Overheating protector	Yes
Sound level in supply air duct at fan speeds 20, 40, 60, 80 and 100%	
LWA, dB(A)	29, 35, 43, 49, 51
LPA, dB(A), 10m^2: sound absorption	25, 31, 39, 48, 47

The Enervent Pingvin air handling unit has been in production since 1995. It is the best selling single-family house unit with a rotating heat exchanger in Finland.

Wall or ceiling mounting

The Pingvin is dimensioned to fit in standard cabinets. The modern design of the unit makes it easy to place the unit on top of a cabinet in your utility room. Pingvin can also be mounted to the ceiling with a separate ceiling mount plate.

Enervent's CLICK ceiling mounting system provides the following advantages:

- Much faster assembly on site
- The ventilation unit body construction is the same for wall or ceiling mounted models – no risk of misunderstandings when ordering
- Ducts are not directly connected to the unit frame
- Air leaks in duct connections are removed
- The thermal bridge is cut
- Reduced sound transmission from the unit frame to the ducts

All Enervent ventilation units are ready to be installed. Many of the steps in the installation do require special tools and expertise, so Ensto recommends leaving the installation work to an HVAC specialist. Finn Geotherm are experienced in installing and balancing Enervent systems. If the unit is to be installed as part of a new build, we would normally provide your builder with the required air flow ducting and schematic to install as the internal build progresses. We would, however, be fully responsible for the installation of the heat recovery unit, its connection to the ducting and the commissioning and balancing of the system and all vents.

Our Range of Systems – Heat Recovery

Enervent Pelican

General technical information	
Maximum air-flow amount with duct pressure of 125 Pa	+170/-180 l/s
Apartment volume (basic ventilation)	0-996 m^3
Fans (supply and extract air)	170 w
Duct size	Ø 200 mm
Weight	125 kg
Standard filters	F5/F5
Alternative filters	F7/F7
Overheating protector	Yes
Sound level in supply air duct at fan speeds 20, 40, 60,80 and 100%	
LWA, dB(A)	-, 31, 42, 48, 52
LPA, dB(A), 10m^2: sound absorption	-, 27, 38, 44, 48

Pelican is the older brother of the popular Pingvin series. It was designed to conform with the strictest building codes without compromising energy efficiency. The Pelican is best suited for larger single-family houses.

The appearance of the Enervent Pelican is as stylish as the Pingvin. Even though the Pelican is most often installed in a confined technical space, the good looks makes it possible to install the unit in a spacious utility room. The Enervent Pelican is dimensioned so that the heating and cooling coils fit in the unit itself. Efficient fine bag filters take care of providing a clean and healthy supply air.

Ensto Enervent offers modular silencers to the Pelican and Pegasos ventilation units. Modular silencers are a quick, easy and neat way to take care of the silencing of a ventilation unit. The ready to mount silencer module just needs to be lifted on the unit and the work is done. The benefits of the ready modules are the neat exterior and the uniform finish, easy installation and optimal noise reduction.

As with Pingvin, the Pelican comes ready to be installed. We would recommend that your builder installs the required air flow ducting to our schematic as the internal build progresses. We would, however, be fully responsible for the installation of the heat recovery unit, its connection to the ducting and the commissioning and balancing of the system and all vents.

Our Range of Systems – Heat Recovery

Enervent LTR Range

	Air Flow Max (exhaust/supply air flow)	House Air Volume
LTR-2	-70 / +75 L/S	0-388m³
LTR-3	-110 / +110 L/S	0-609m³
LTR-4	-150 / +75 L/S	0-831m³
LTR-6	-190 / +190 L/S	0-1052m³
LTR-7	-390 / +390 L/S	0-2160m³

The Enervent LTR range of heat recovery units are especially suitable for renovation sites where it is difficult to find space for vertically mounted air handling units.

The horizontal LTR models are designed to be installed in a roof space. Units of the LTR range have particularly efficient urethane insulation, so they can be installed in a cold space, such as an attic, with extra insulation. All of the LTR range are equipped with Enervent's energy efficient rotating heat exchanger.

The unit is manufactured of galvanised sheet metal. The LTR-3 has the same qualities as the Pingvin but is unpainted. It is equipped with efficient direct current fans and with F4/5 level panel filters. F7 class bag filters and an electric after heater are optional.

The Enervent LTR-6 and a Lämpöässä ground source heat pump suit each other well. LTR-6 units can be fitted with cooling and heating coils which get their capacities from the heat pump. An efficient heat recovery system will enable you to save on your heating bill, whatever your main heating source is.

The LTR systems are available with both Enervent control system options: the cost-effective EC control and the more versatile EDA control system. Designed for the Enervent Family series, the EDA control system is one of the most versatile controls on the market. This ensures that the air handling can be fitted exactly to suit your needs.

Other Products and Services

Finn Geotherm are unashamedly specialists in only focussing on heat pump and heat recovery systems. We do recognise however that in some instances our clients prefer to know that their "safe pair of hands" is responsible for all aspects of their heating system. We are therefore able to provide both a design specification service and also installation service for building radiators and also underfloor heating and screed installation.

Radiator specification and installation

Heat pump systems are at their most efficient when providing steady state heat at a lower flow temperature than a conventional fossil fuelled boiler system. Running your heating at this constant lower temperature will not only save you money but will also be kinder for the fabric of your property, resulting in lower condensation and (especially in older houses) reduced building maintenance, as the plaster works are not subjected to large fluctuations in internal temperature.

Heating the building in this way will however require a larger output for your heat emitters. This can be achieved by upgrading some of your radiators with conventional radiators that have a larger surface area e.g. changing a double panel radiator (K2) to a treble panel (K3). As Finn Geotherm buys hundreds of thousands of pounds of plumbing supplies each year, we are able to achieve very significant discounts on the materials that we buy. This includes radiators from highly respected manufacturers such as Stelrad, and we are very happy to pass these discounts on to you. Our highly experienced quotations management team will also identify exactly which radiators will meet the heat requirements of each room of your home, taking full account of necessary space and aesthetic constraints. Alternatively you may wish to opt for more modern and technically advanced low temperature radiators such as Jaga or Dimplex Smart Rads. Finn Geotherm are able to source these at very competitive prices and are happy to advise you which radiators are best to meet your requirements.

Once you have decided which radiators you would prefer, we are also happy to install them for you, using our own highly skilled heating engineers, as part of your overall heat pump installation.

Underfloor heating and screed specification and installation

Underfloor heating is an ideal (but not compulsory) accompaniment to a heat pump system. Finn Geotherm partner with The Intelligent Heating Company (our own "safe pair of hands") to install our clients' underfloor heating and screed. We know that IHC will handle each project that we give to them with the same degree of care that we would use, so that in turn, you can know that this important aspect of your heating system will also be installed without compromise.

The Installation Process

Here at Finn Geotherm, we pride ourselves on delivering the best heating and hot water solutions and excellent customer service. Our objective is to ensure that every part of your experience with us is easy and enjoyable.

Our team of experts will guide you through each step of the installation process, which typically looks like this:

Renewable Heat Incentives

The Renewable Heat Incentive (RHI) is a government initiative designed to reward homeowners and businesses for choosing to switch to a more environmentally friendly form of heating. These incentives are available in two schemes – domestic and non-domestic (commercial), which each offer a different tariff depending on whether you have installed a ground or air source heat pump. The ground source RHI payments are typically higher, based on the higher cost of installation.

The amount that you are paid under the RHI is based upon the heat loss of your property as assessed within an Energy Performance Certificate (EPC). The actual amount of heat that you use each year is not taken note of. The EPC must have been undertaken within six months of your application for the RHI.

The RHI rate is reviewed on a quarterly basis. If you are interested in the latest rates, please call us and we will happily provide all the details.

For an illustration of how much you might receive under the RHI, please see our Frequently Asked Questions on the next page.

When the RHI is combined with the lower heating costs required by a heat pump, the payback period for an installation is usually in the region or four to six years.

As the renewable heating experts, we've been helping hundreds of customers claim their RHI. Ask us if you need any further information or assistance with the application process.

Domestic RHI
The domestic RHI is payable for seven years. It is index linked and tax-free. Simply sign up to the scheme once your installation is finished and you will receive quarterly payments straight into your bank account while you sit back and enjoy a warm home.

Non-domestic (commercial) RHI
This scheme is available for renewable heating installations by industrial, commercial, public sector and not-for-profit organisations. It includes small businesses, hospitals and schools, as well as district heating schemes such as where one boiler serves multiple homes. The non-domestic RHI is payable every quarter for 20 years.

Current indications are that both the domestic and non-domestic RHI will only be available from the government until March 2021. We would like as many people as possible to benefit from this superb incentive, whilst reducing their heating costs and improving our environment so, as the saying goes "Get it while it's hot".

RHI
Renewable Heat Incentive

Frequently Asked Questions

The following are the most common questions that people ask when we are at various exhibitions and during the process of assessing which heat pump is best for them. If there are other questions that you have that are not covered here or elsewhere in this booklet (or if you need more explanation on areas that are covered) please don't hesitate to call us. We would be very pleased to speak to you about anything.

How much will I receive from the RHI?

This depends on how much heat your property needs, which in turn will depend on how big the building is and how much insulation you have. As an example however, a typical 180m^2, four bedroom house previously using 2,880 litres of oil per year, might receive £3,870 per year if they had a ground source heat pump or £2,829 per year if they had an air source. That's £24,465 over seven years for the ground source or £9,506 for the air source. The RHI is also tax free and index linked – so the amount you get paid will increase each year with inflation.

How can I work out how big a system I need?

We will undertake a free survey for you that will allow us to give you an estimate of the heat pump you require and how much it is likely to cost. If you want to get a quick idea now, however, you can try two approaches:

1. Look at the number of litres of oil you have used on average over the past couple of years. Multiply this number by 10, then divide by 2,400. So, if you used 3,000 litres of oil, that would be 12.5 i.e. you might need a 12.5kW heat pump. The heat pump size may well be less if you have an old boiler, as this is likely to be less efficient.

2. Measure the number of square metres of floor space (upstairs and downstairs), then multiply this by 60 if you have a fairly modern or well insulated property or 75 if it is older or less well insulated. So, if the building was 180m^2 across two floors, that would be 10,800 for the new property and 13,500 for the older one. Both numbers need to be divided by 1000 to get the kW figure, so 10,800 becomes 10.8kW and 13,500 becomes 13.5kW.

How much will a heat pump cost?

Again, this depends on how much heat you use. Using the above (based on an average four bedroom house), it might cost £9,000 for an air source or £17,000 for a ground source. This might sound like a lot of money, but remember the combination of your heating savings and the RHI will usually allow you to get your money back in five years or less. That represents a 20% return on investment.

Continued...

Frequently Asked Questions

Will the heat pump keep me warm enough all year round?

Yes! We will ensure that the system that we design for you is sized to meet the entire heat loss of your property and to deliver all of the hot water that you require. The heat pump itself will work perfectly well even in the middle of winter, when it's well below freezing outside. Our ground source systems are designed and made in Finland, where the outside temperature in winter can drop to -45°C, so they take the UK winter in their stride.

Will the system work with my existing radiators or underfloor heating system?

As the flow temperature from a heat pump is a bit lower than a conventional boiler, it is possible that some of your radiators may need to be slightly increased in size. We will tell you if this is the case when we provide you with a quotation for your system. If you have underfloor heating it should be fine as this is typically designed for a flow temperature which is lower than radiators. Even if you do need a few new radiators, they are not very expensive, so you should still get all of your money back well within the RHI period. Also remember, even when the RHI payments have stopped, you will still benefit from a big reduction in your heating bills.

How does a heat pump work?

The simple answer is that it's like a fridge in reverse. The heat pump takes energy from the ground or air around you and, using a system of heat exchangers and compressors with a refrigerant, multiplies this up to heat which is enough to provide hot water for your heating system and also all of the hot water for your taps.

How long will a heat pump last?

You should expect that a good quality air source system should last 15-20 years. A ground source system should last in excess of 30 years. This compares to a modern condensing boiler which is only likely to last between seven and 10 years.

How much maintenance does a heat pump need?

Very little, because the system doesn't involve combustion. We do however recommend that your system is checked by us each year to make sure that it's still running as efficiently as it should.

Why should I use Finn Geotherm for my system?

Established in 2006, we are one of the longest established heat pump companies in the UK. We pride ourselves on being the renewable heating experts – our only business is, and has only ever been, heat pumps so we're good at what we do! We only use equipment that we know is reliable and efficient. We also have experience in a huge range of properties of all shapes, sizes and ages for both domestic and commercial use, and have won numerous awards as a business and for our heat pump installations.

First district heating scheme for Flagship

Finn Geotherm has installed the first district heating scheme in the East of England for housing provider Flagship Group.

The ground source heat pump is delivering domestic heating and hot water for 30 flats at Orchard Close in Watton, South Norfolk. It will cut Flagship customers' heating bills by two thirds, creating annual savings of hundreds of pounds.

The project was undertaken as part of Flagship's Wellbeing Plan for continual improvement in energy use and carbon emissions. The scheme was needed to replace existing electric economy 7 storage heaters, which were inefficient and expensive to run.

Finn Geotherm specified two Lämpöässä Eli 60 60kW ground source heat pumps linked to a 2000 litre thermal store, with all equipment located within an external plant room. Facilities management company Aaron Services installed the radiators and accompanying equipment.

The system runs off a central heat pump, with each flat having its own hot water radiator circuit and hot water tank. A separate heat meter is installed in every flat so the tenant is charged for the heat they use. Separate Ofgem heat meters in the plant room facilitate the required RHI meter readings.

By operating twin heat pumps with a thermal store, the system will continually deliver heating and hot water even during maintenance. The external plant room enables servicing to be done without disturbing tenants.

Each stage of the installation was undertaken with utmost care and created minimal disruption for tenants. Groundworks saw individual block paving stones and grass turf lifted and meticulously re-laid after works were completed. No flat was without heating or hot water during the project.

Matt Smith, Contracts Manager at Flagship, said: "I can't speak highly enough of the heat pump system and the service we received from Finn Geotherm."

The flats can now be fully heated without big bills, delivering associated benefits such as positive impact on health by reduction in damp and improved air quality.

Key benefits:

- Single plant room district heating scheme
- Significant reduction in energy usage, emissions and costs
- Improved delivery of heating and hot water
- Client receives 20 years' non-domestic RHI income
- Massive reduction in maintenance
- Life expectancy more than three times that of conventional boiler

Landmark installation delivers heating and passive cooling

Finn Geotherm's landmark installation for leading European agricultural plant breeder RAGT Seeds delivers both heating and passive cooling with significant energy savings.

RAGT's initial brief was to reduce heating costs for six glasshouses used for developing new crops. LPG had previously been used to heat the glasshouses which, with a U value of around six, meant the boiler was in constant use in winter, leading to issues with fuel supply and heat distribution as the system couldn't keep up with the heat being generated. RAGT needed a new system to work with its existing grow tubes.

Finn Geotherm installed three Lämpöässä T120 ground source heat pumps linked to three Akvanti 2400 litre thermal stores with a network of 21,000 metres of collector loop. Controlled using Trend building management, the 350kW ground source heat pump totally replaces RAGT's previous LPG system.

During specification, Finn Geotherm identified an opportunity to utilise the new system to deliver air circulation and cooling. This would ensure a constant temperature for crops to thrive in during the summer. The cooling system had to be carefully developed to ensure it did not impact negatively on the Renewable Heat Incentive (RHI).

Finn Geotherm devised a bespoke passive cooling system to circulate air at ambient ground temperature from the ground loop. Cool air is circulated through 24 Jaga AVS fan coil units using a control system which activates if the temperature increases by 1°C from target. Air circulation from the cooling system has made a significant impact too, providing a 'gentle summer breeze.' Along with the better regulated temperature, RAGT is also now enjoying enhanced plant growth and expects to reduce chemical inputs.

Steve Brown, Operations and Production Manager, RAGT Seeds, said: "The ground source heat pump system is delivering everything we hoped at a lower energy cost than expected. The quality of workmanship was exceptional with obvious care and pride being put into every aspect of the installation. We fully expect the system to make a huge contribution to our energy efficiency and to improve our glasshouse productivity, as well as dramatically reducing our emissions and enabling a reduced use of chemical fungicides."

Key benefits:

- Bespoke system delivering heating and passive cooling
- Revolutionised RAGT's glasshouse operations
- Highly efficient
- Low running costs
- Government payments through RHI

Coastal windmill is now always warm

26.01.17 NATIONAL AGRI HEAT PUMP AWARDS WINNER

A picturesque 18th Century windmill on the North Norfolk Coast is enjoying energy efficient, low maintenance heating and hot water thanks to Finn Geotherm.

Used as a family home, the windmill's structure - including a bedroom five storeys up in the mill tower - and remote coastal location provided many heating challenges. The existing oil boiler system was unable to deliver adequate heat throughout. The owner wanted a new super-efficient, almost autonomous heating and hot water system that would enable her to enjoy her home without the hassle of having to monitor oil levels and arrange deliveries.

Finn Geotherm specified and installed one Lampoassa Vmi17 ground source heat pump and one Lampoassa Esi17 in tandem, carefully balanced to meet the heat loss of the house. 2,000 metres of ground loop were installed in a series of 1.2 metre deep parallel trenches in an adjacent meadow to avoid disturbing the stunning grounds of the mill.

New radiators were installed in some rooms and an uprated heating circulation pump ensures the bespoke ground source system provides adequate heating flow around the entire house, including all the way up to the fifth-floor bedroom.

Homeowner Mrs M, said of the installation "I am pleased to confirm that my ground source heat pump system is keeping my home warm and providing all the hot water I need. Finn Geotherm ensured the installation of my system was completed neatly with as little disruption as possible. I am delighted with my system and, of course, with the lower heating bills and RHI payments that it permits."

Key benefits:

- Simple to use – system 'looks after itself'
- House is consistently warm throughout
- Completely replaces ineffective oil boiler
- Future-proof, sustainable system
- Government payments through RHI

FINN GEOTHERM

The renewable heating experts

Ground Source Heat Pumps

Air Source Heat Pumps

Heat Recovery

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