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SMART GEOTHERMAL

# The Aran Islands Pilot

## Comharchumann Fuinneamh Oileáin Árann Teo. (CFO)

GEOFIT Training on on-the-ground experience with four pilots

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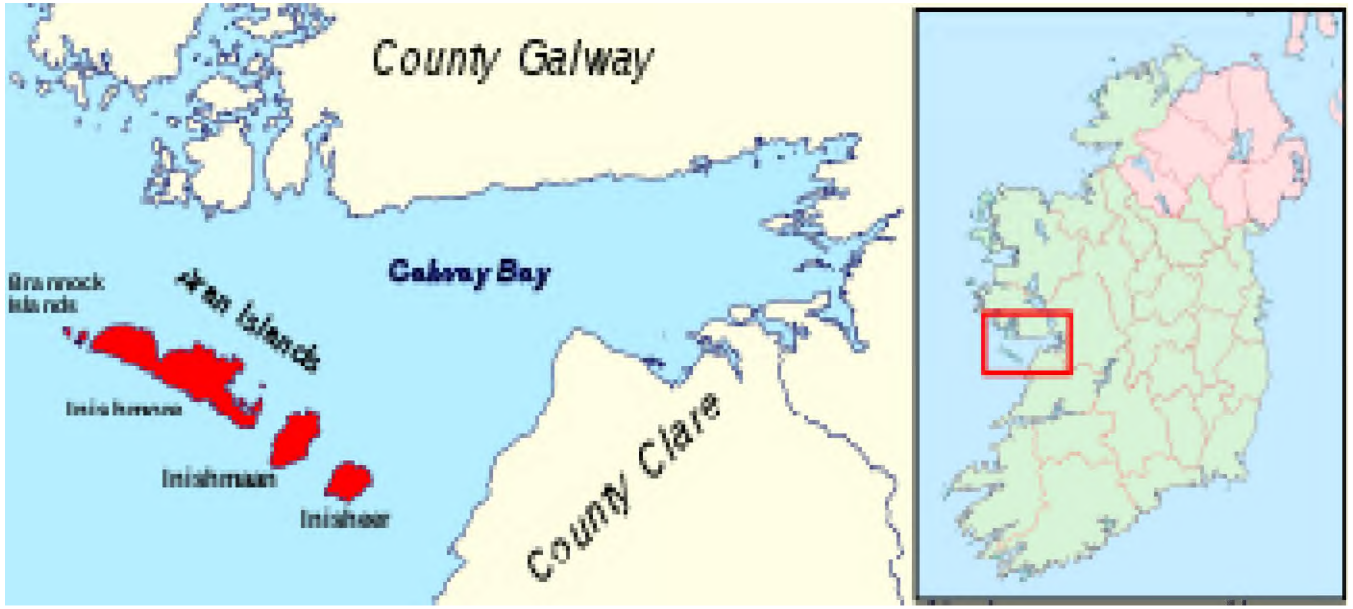
# Aran Islands Demo Site

- The Aran Islands archipelago is home to approx 1,300 inhabitants across 3 islands. The Geofit pilot is located on the eastern side of the largest island, Árainn (Inishmore).
- The islands have a rich and ancient culture and history, with prehistoric fortresses built of limestone on the islands dating back more than 3,000 years as well as many medival ruins.
- The islands are also one of few places in Ireland where Irish or *Gaeilge* is spoken daily.




*Map of Ireland highlighting the Aran Islands.*

# Aran Islands Demo Site

- The past decade or so has seen desire among the island residents to decarbonise the islands by eliminating fossil fuels but also with the intention of generating their own individual and community-owned energy sources.
- The islands have become early adaptors of new technologies, about 50% homes and businesses have undergone significant retrofitting in order to advance the transition locally. This has not come without its difficulties.
- The main challenge in upgrading the building stock on the islands is the high percentage of older buildings requiring upgrade. These are often of solid stone construction, and may have had additional sections added on in later years. Without recent and significant renovation, these buildings are generally poorly insulated, difficult to heat and complicated to renovate. They also often suffer from dampness due to poor ventilation, excess condensation or other causes.

A photo of cottages in the same village during the late 19th century and an aerial view of the pilot site location.

# Pre intervention Work

- Energy baseline period from October 2019 – September 2020
- In order to record a baseline of energy usage within the home before the Geofit solution was installed it was necessary to install a heat meter on the existing oil boiler alongside an oil meter to monitor the amount of fuel being used.
- It was also necessary to install a meter to record the total electricity consumption of the house. This installation was carried out in September 2019 after suitable equipment had been identified and purchased and an experienced installer hired to carry out the works. A gateway was also installed to collect this information and send it to iLECOs chosen platform.
- Weather data was also recorded as well as indoor thermal comfort conditions.
- Other work included gathering data on the typology of the dwelling, envelope construction, floor area, existing heat distribution system, insulation standard and more to develop a strategy to get the dwelling ready to apply the geofit solution.

*Some of the pre intervention monitoring equipment used.*

# System Design

- Pre intervention data was analyzed by iLeco and other partners. This included total electricity consumption, oil consumption and heat output from the existing boiler as well as weather and comfort data which was also collected.
- Building simulations were carried out by KTH and Uponor. This helped to define an operation strategy, technology selection etc.
- Project design and integration was carried out by Eurotech group.
- All works were coordinated locally by CFOAT with technical input and assistance from the project partners.

# The GEOFIT solution

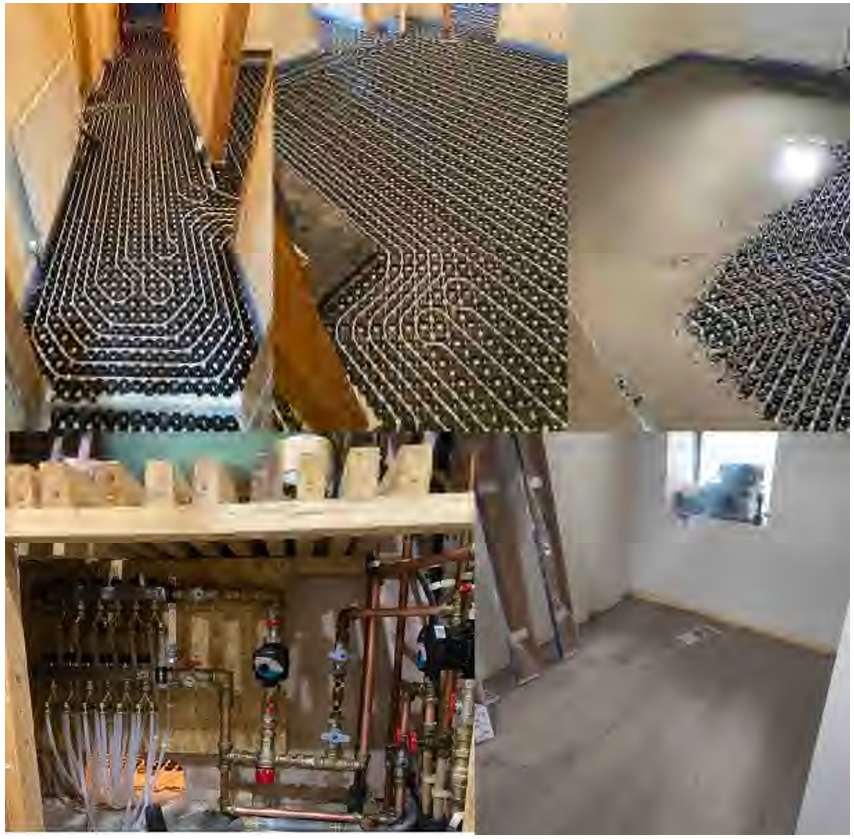
In order to apply the Geofit solution we firstly had to address the envelope which had a severe lack of insulation in order to ensure an efficient and satisfactory heating system within the home.

- An external thermal insulation composite system was chosen as the most suitable method of insulating the stone walls. This system on the house is built up in layers.
- The attic was also fitted with fiberglass insulation.


An example of what external insulation consists of, and on the right, the house once the insulation was complete.

# The GEOFIT solution

In order to ensure maximum distribution of heat within the home Uponors Minitec system was installed. Minitec is an easy to install wet screed based system with a total build height of only 15mm. As well as being ultra- thin, it also has one of the best reaction times for an underfloor heating system. Whats more, due to the pipes being close to the surface you can run this system at a much cooler temperature and still get great outputs- ideal for heat pumps.



Various stages of the minitec system installation

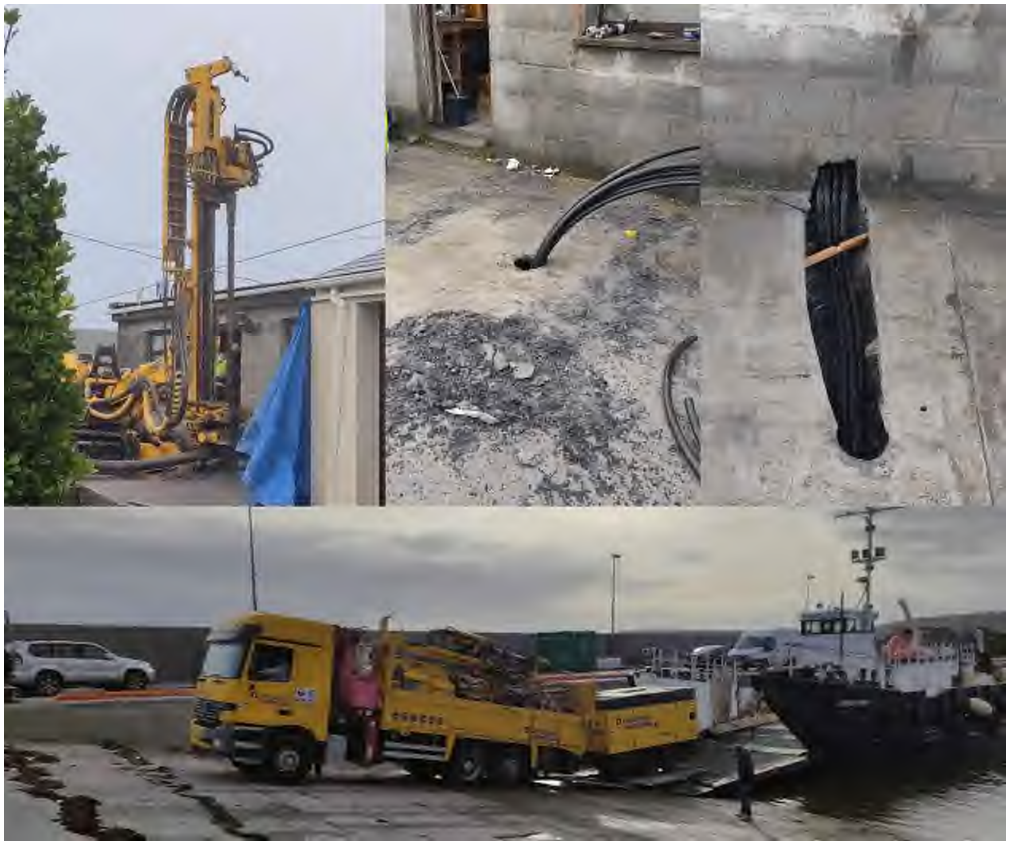
# The GEOFIT solution

- An OCHSNER TERRA 8 HPLB | Grundmodell 6kW heatpump was installed to meet the heating and DHW demand of the occupants of the house based on their previous consumption, which we recorded during the pre intervention monitoring, and ideal thermal requirements.
- This, together with the underfloor system, was installed by Eurotech group who are based in Co. Monaghan in Ireland.


The heatpump installation in the plant room at the pilot site.

# The GEOFIT solution

A single borehole of 138m was drilled directly outside the plantroom entrance allowing as short a distance as possible from the borehole to the heatpump itself. This was carried out by our partners Catalna de Perforaciones.



# The outcome

- Improved thermal comfort levels within the home.
- More efficient retention of heating within the home due to the upgraded envelope.
- A significantly reduced carbon footprint for the dwelling.
- An expected saving on annual heating bills – monitoring of post intervention is still underway.

# Thank you for your attention

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