

Geothermal Energy Use, Country Update for Ireland

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ABSTRACT

The exploitation of shallow geothermal resources in Ireland using ground source heat pumps for heating and cooling applications continues to increase at an estimated rate of circa 4% per annum. The number of heat pump units installed in Ireland accounts for a total of 225 MW_{th} installed capacity with a small increase in uptake since the last report at EGC 2022. The increase in growth rate is attributed to the setting of new targets for the deployments of heat pumps for heating and cooling and recent dedicated policy developments to support the deployment of renewables to substitute fossil fuel-based technologies. The ground source heat pump (GSHP) market in Ireland is estimated to represent about 4% of heat pump deployments in 2024, in line with the European average. The domestic heat pump market remains dominated by air source heat pumps (ASHP). The number of GSHP deployments has increased through mostly larger-scale open and closed loop systems, where both heating and cooling applications are required. The increase in deployments is dominant in the public sector and commercial buildings and associated with deep retrofit or new-build projects.

Extensive research aimed at furthering the understanding of shallow and deep geothermal resources in different geological settings in Ireland is being undertaken and supported by Irish research organisations. This work includes Geological Survey Ireland's ongoing development of the National Geothermal Database that includes relevant subsurface data to support the development of the geothermal sector in Ireland. Geological Survey Ireland has continued a programme of deep geothermal data collection with the completion of three deep exploration coreholes since 2022 in Dublin (Tallaght), Tullamore and Cork city.

Geothermal researchers based in Ireland continue to benefit from direct involvement in several pan-European research networks including the Geological Survey for Europe (GSEU). The recent launch of the € 20 million cross-border GEMINI project (Geothermal Energy Momentum on the Island of Ireland), funded by the Special EU Programmes Body, is a major step forward for the development of geothermal energy in Ireland. The project will carry out significant deep geothermal exploration and will implement large shallow geothermal systems across multiple sites in Ireland and Northern Ireland.

With the publication of the Policy Statement on Geothermal Energy for a Circular Economy (DECC 2023) Ireland is now firmly on track for dedicated legislation and regulations for the use of geothermal energy. The policy statement has raised significant awareness on the potential for utilisation of geothermal energy resources and work is ongoing to prepare a geothermal bill and a new regulatory framework for geothermal energy resources.

1. INTRODUCTION

Irish geothermal resources remain under-utilised at present; growth of the shallow geothermal heat pump market has been slow and there are currently no deep geothermal plants in development in Ireland. Over the past number of years geothermal energy has been gaining recognition in the policy and planning arenas as a potential solution to the decarbonisation of the heat sector, through the use of shallow geothermal or ground source heat pumps or via deep direct use (hydrothermal) methods. These technologies and their application in heating and cooling projects remain the focus of much of the geothermal research and exploration that is occurring in Ireland, including some prominent geothermal demonstrator projects that have lately received funding.

The demand for heat energy was marginally the largest source of energy use in 2023, accounting for 34% of primary energy usage and 38% of all energy-related

emissions (SEAI 2024). Ireland's heat sector remains dominated by fossil fuels at 90% in 2023. Oil (44% of total heat) remains the largest fuel-type for the delivery of heat, followed closely by natural gas (40% of total heat). Ireland's renewable energy share of heat (RES-H) in 2023 was 8%, an increase from 5% in 2013. Despite the increase in RES-H, Ireland still holds the unenviable position of being last in the EU, far below the EU average of 26.2% (Eurostat 2025). Ireland's heat-related emissions have fallen for three years in a row and are now 16% lower than those in 2020. The heat captured by ambient source heat pumps (representing GSHPs and other types of ambient HPs combined) accounted for 29% of all renewable heat energy in 2023, up from 24% in 2022 (SEAI 2024).

There is a strong imperative to decarbonise Ireland's heat sector to help meet binding national and EU energy targets. Ireland's Integrated National Energy and Climate Plan 2021-2030 (updated 2024) sets a target for Ireland of a 43% share of renewable energy in total energy consumption by 2030. This will contribute to the legally binding EU target renewable share of 42.5% as per the Renewable Energy Directive 2023/2413/EU (RED III). Ireland's Climate Action Plans are updated annually and set out a list of policies and measures to achieve the 43% target (including measures to increase the uptake of geothermal energy). In recent years, energy security has become an important driver for increased interest in geothermal solutions. The National Energy Security Package (2023) sets out a range of actions to prioritise a renewable-led energy system and the NECP (2024) commits to supporting efforts to increase indigenous renewable sources in the energy mix, including geothermal energy.

The recent National Heat Study (SEAI 2022) highlights that existing policy measures are insufficient to meet our 2030 target of a 51% reduction in emissions. The report identified that a combination of district heating and heat pumps in homes, businesses and industry will play a vital role in fast decarbonisation. Through new building regulations, 90% of new build homes are now using renewable heat. The study sets out the need for rapid deployment of district heating in Ireland and recognises geothermal energy as a significant potential source for these networks, whilst also highlighting the following: *“Further work aimed at the complete characterisation of the suitability of the geothermal resource across Ireland will allow a better understanding of its potential for district heating at various locations”*.

The deployment of district heating at scale is a key Government objective under the Climate Action Plan (2025). The general scheme of a new proposed Heat Bill has been approved by Government and this legislation will support the development and expansion of district heating networks. A new Heat Policy Statement will be published for public consultation and the terms and conditions for the Support Scheme for Renewable Heat are being updated to accommodate funding support for large scale district heating projects.

To further support the decarbonisation of the heat sector, Government has agreed to the introduction of the Renewable Heat Obligation (RHO), with scheme parameters now being finalised for approval. The RHO will obligate suppliers over a certain threshold to ensure a proportion of the energy they supply is renewable.

The continued implementation of the Government's Policy Statement on Geothermal Energy for a Circular Economy (DECC 2023; see section 3) supports the sustainable use of Ireland's geothermal energy through the development of a regulatory framework and a strategy to help decarbonise the heating and cooling of buildings and industrial processes and to reduce peak loads on the electricity grid during winter. The legislation and strategy will align with policy on district heating.

2. GEOTHERMAL RESOURCES IN IRELAND

Ireland is characterised by Precambrian to Lower Palaeozoic crystalline basement formations overlain for most of the central part of Ireland by Upper Palaeozoic formations of Upper Devonian and Lower Carboniferous age and comprising shales, limestones and sandstone lithologies. Karstification of the Lower Carboniferous lithologies is extensive and for the most part buried due to a relatively thick Quaternary aged overburden cover (Holland and Sanders 2009).

The structural geological conditions in Ireland are controlled by the Caledonian and Variscan orogenies. These events controlled the development and trend of the main fault structures of the Irish landmass. Cenozoic faulting, related to Alpine tectonics, has also been shown to be present in Ireland (Cooper 2012). There are 42 recorded occurrences of thermal springs and warm shallow groundwater across Ireland and these locations are mainly associated with regional fault structures and the presence of Lower Carboniferous aged lithologies.

Extensive research since the 1980s has recorded temperatures of between 13 °C and 25 °C at the thermal springs. The springs appear to be related to the deep karstification of vertical or subvertical transmissive structures in limestone bedrock and exhibit non-linear discharge patterns characteristic of karst hydrogeology. Hydrochemical and isotopic studies have demonstrated that there is evidence of deep circulation of groundwater (Aldwell and Burdon 1986, Blake et al. 2016), however the precise locations of these deep circulation pathways in the subsurface remain enigmatic.

2.1 National geothermal maps

Irish shallow geothermal energy resources are relatively well understood and have been mapped by Geological Survey Ireland in a suite of geothermal suitability maps for open and closed loop systems (e.g., Figures 1 and 2). Shallow geothermal energy resources are ubiquitous in Ireland and analysis of Geological Survey Ireland's maps shows that up to 94% of Ireland's land mass has a 'suitable' or 'highly suitable'

rating for at least one type of geothermal collector (SEAI 2022). These shallow resources are favoured by a climate that is dominated by warm and mild maritime conditions. Relatively consistent, year-round soil temperatures and frequent rainfall keeping moisture in the ground maintains the soil as an excellent conductor, allowing heat to move towards a thermal collector system. These conditions are the reason the Irish subsurface is particularly suited to the installation of shallow closed loop systems (Figure 1). The presence of gravel aquifers throughout Ireland, particularly in Cork, Dublin and Athlone, favours the use of open loop systems more commonly exploited for larger installations requiring heating and cooling (Figure 2).

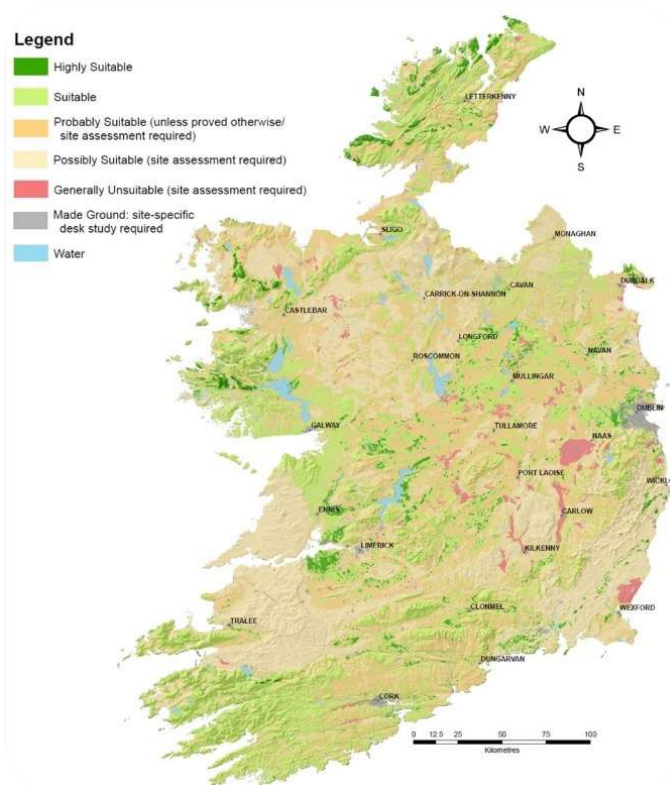


Figure 1: Vertical Closed Loop Collector Suitability Map (www.gsi.ie).

Geological Survey Ireland (GSI) is responsible for developing, hosting, and maintaining the National Geothermal Database (NGD), which forms a critical component of national geothermal policy. Expansion of the NGD is required to reduce geological uncertainty, allow estimation of national geothermal resources and promote awareness of the benefits of geothermal energy. New NGD products for 2025 include maps of measured and modelled temperatures, thermal conductivity and heat flow density, and a new 3D geothermal model of the Irish Midlands (Figure 3). In addition, new maps that quantify the geothermal resources are available in the form of shallow geothermal energy density maps (Figure 4) and deep geothermal energy Heat in Place maps. NGD products are available on at www.gsi.ie.

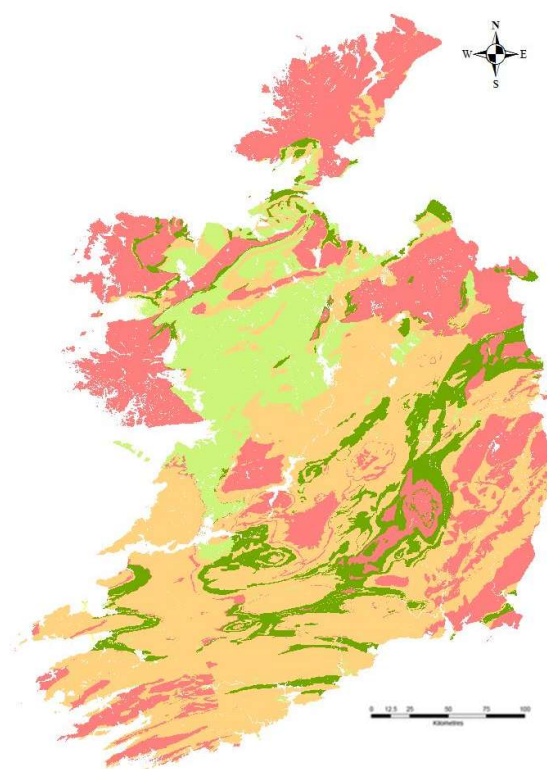


Figure 2: Open Loop Collector Suitability Map (www.gsi.ie).

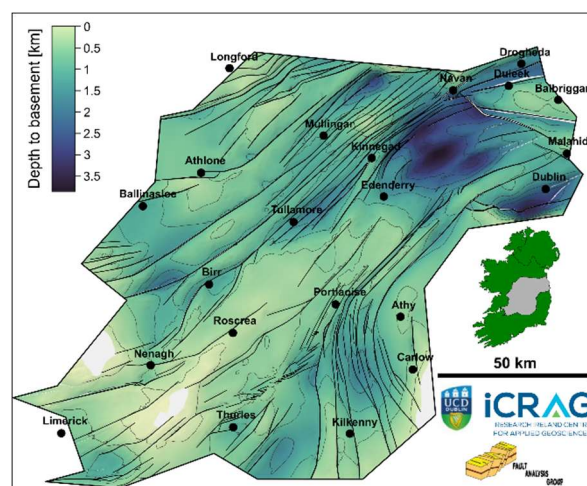


Figure 3. Map of depth to basement from a new 3-D model of the Irish Midlands. (Credit: UCD/iCRAG, Geoserv, GSI).

3. LEGISLATIVE AND REGULATORY FRAMEWORK

The Department of Climate, Energy and the Environment (DCEE; formerly DECC) and Geological Survey Ireland are committed to overcoming existing barriers, encouraging the uptake of geothermal energy and the development of the Irish geothermal sector. An Assessment of Geothermal Energy for District Heating in Ireland (GSI 2020) highlighted the lack of legislation governing the use and ownership of geothermal energy in Ireland. Geothermal Energy in Ireland - A Roadmap for a Policy and Regulatory Framework (DECC 2020)

was published shortly after this assessment and was followed by the Policy Statement on Geothermal Energy for a Circular Economy (DECC 2023). The policy statement was finalised with the help of a Geothermal Energy Advisory Group and sets out the approach to regulation of shallow and deep geothermal systems and the scope of a strategy to promote the use

of geothermal resources. DCEE will further develop a regulatory framework for geothermal energy in 2025. The Climate Action Plan (2025) sets out as an action the publication of a general scheme of a bill to provide the legislative basis for the regulation of geothermal energy. The scheme is expected in early 2026.

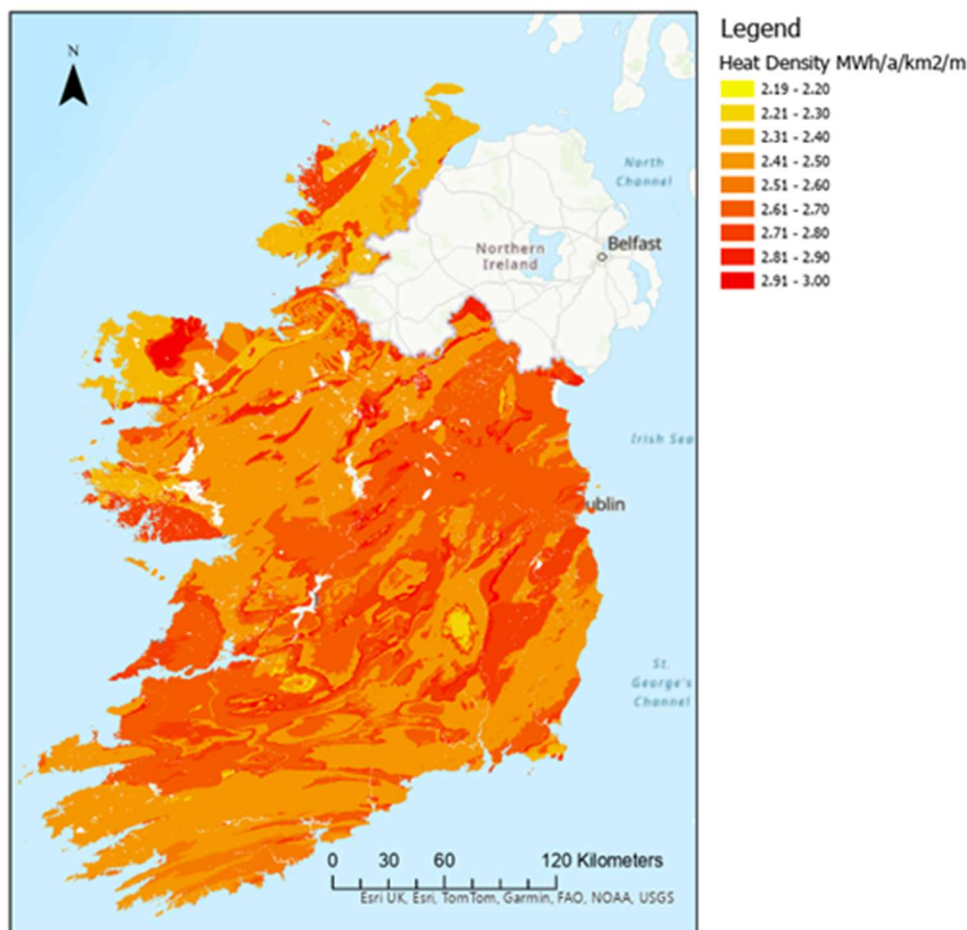


Figure 4: Heat energy density map for a shallow closed-loop scenario at the commercial scale. (Credit: Geoserv, GSI).

4. SHALLOW GEOTHERMAL ENERGY UTILISATION

Shallow geothermal energy utilisation in Ireland had a very high growth rate until 2009 but has failed to maintain momentum in recent years. The total estimated installed capacity for ground source heat pumps in 2024 is 225 MW_{th}, with a 293 GWh of thermal energy produced for heating and 11.92 GWh for cooling.

The lack of a dedicated database for reporting the number of installations and characteristics of shallow geothermal energy systems in Ireland has made it difficult to determine the market conditions in terms of the contribution of ground source heat pumps to renewable heating and cooling at a national level. The heat captured by ambient source heat pumps (representing GSHPs and other types of ambient HPs combined) accounted for 29% of all renewable heat energy in 2023 (Figure 5).

Information on large-scale commercial systems operating in Ireland is available through the Geothermal Association of Ireland (Table 1), however, many installations (particularly new ones) remain poorly or not documented at all. The anticipated new regulatory framework for the deployment of GSHPs will help to improve future data collection and statistics related to GSHP installations thereby allowing the geothermal sector contribution to be accurately compared to other renewable technologies.

The shallow geothermal energy market in Ireland remains dominated by the installations in the residential sector (ca. 85%) with a lower uptake in the commercial and industrial processes sector (14% and 4% respectively). Systems of intermediate capacity between 10 kW_{th} and 24 kW_{th} are the most widespread.

Large scale (60 to 250 kW_{th}) shallow geothermal systems are dominated by open-loop collectors with an increased number of large-scale closed-loop collectors

being developed as part of major space heating and cooling refurbishment projects. Some examples of these include the Electricity Supply Board (ESB) headquarters in Dublin and the redevelopment of the historical Rubrics Building in Trinity College Dublin. The ESB headquarters geothermal system comprises 32

closed loop boreholes located below the building and delivers 250 kW_{th} of heating and cooling. The Trinity College system delivers 188 kW_{th} of heating and domestic hot water to the Rubrics building through an array of 21 closed loop boreholes located in the centre of the campus.

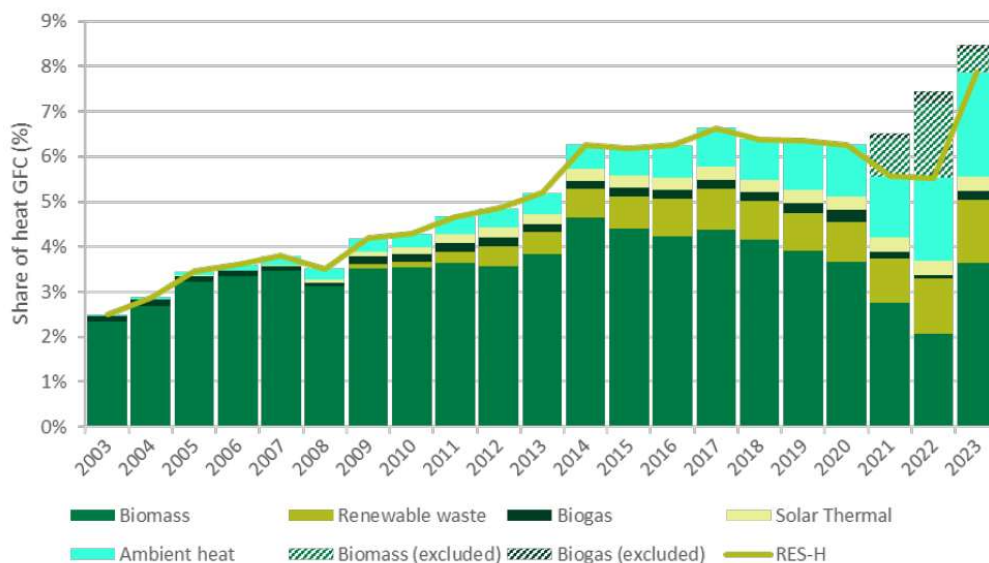


Figure 5: Gross final consumption of heat from renewable sources (RES-H) in Ireland (SEAI 2024).

5. DEEP GEOTHERMAL ENERGY EXPLORATION

There are no deep geothermal systems in operation in Ireland at present however interest in the deployment of deep geothermal energy resources on the island of Ireland has gathered renewed momentum in recent years. There is a need for accessible demonstrator projects to de-mystify and raise awareness of the technology and its benefits and this is being addressed through initiatives such as the GEMINI project (section 6.1). Geological Survey Ireland is committed to drilling a series of deep (1 km) scientific observation boreholes (coreholes of NQ diameter) to collect high quality data and facilitate resource estimation. Temperature profiles and a full suite of downhole geophysical logs are collected at each hole. Two deep holes were drilled in Dublin in 2022 and 2023, one in the Midlands (Offaly) in 2024, and two deep boreholes in the south (Cork) and east (Carlow) of the country will be completed by the end of 2025. Bottom-hole temperatures ranging from 22.5 to 38 °C have been recorded. The data collected is available through the National Geothermal Database (www.gsi.ie).

5.1 Grangegorman Geothermal Exploration

A staged geothermal exploration programme is in progress at the Grangegorman campus of the Technological University of Dublin.

Following completion by Geological Survey Ireland of a 1 km borehole in 2022, which proved a temperature of 38 °C, funding was sought and approved for an urban seismic survey and a production-scale exploration well (target depth of 2 km). The seismic survey is funded by

Geological Survey Ireland and DCEE, with support from Dublin City Council, and will take place in late 2025. The drilling is mainly funded through the island-wide GEMINI project (see section 6.2). Drilling operations are expected to commence in late 2027 and will be managed by TU Dublin with assistance from the Grangegorman Development Agency. This project will provide valuable information on the geological, economic, regulatory and societal aspects of geothermal energy. It will be a highly visible demonstration of the potential of deep geothermal energy in Ireland. Should favourable subsurface conditions be found, a full deep geothermal system will be developed to decarbonise the campus district heating network and displace 5 GWh of natural gas.

6. GEOTHERMAL RESEARCH

Geothermal energy is an established research topic in Irish publicly funded research programmes, such as the regular research calls run by GSI and SEAI. Irish institutions and companies are participating in national and EU-funded research projects to advance our knowledge of geothermal energy. The topics of these projects range from basic (geothermal parameter collection and analysis) to resource estimation, to technological improvements. For more information please visit the [Geological Survey Ireland](http://www.gsi.ie) and [SEAI](http://www.seai.ie) websites.

The National Geothermal Database (NGD) project (2021-2025) was devised to address the significant data and knowledge gaps around Irish geothermal resources. The NGD is a public repository for existing geothermal data and new information generated by researchers in

government, academia and industry. The NGD is currently in its delivery phase, with a new suite of maps and data products released in 2025. The NGD project aims to foster ease of access to quality data to increase understanding of Ireland's geothermal resources, and aid in policy and decision making. Geological Survey Ireland is participating in the Sustainable Geoenergy Work Package of the Geological Service for Europe (GSEU) project.

6.1 The GEMINI project

The recently launched GEMINI project (November 2024), is a major 20 million Euro cross-border initiative aimed to advance geothermal energy across the island of Ireland. The GEMINI project will help reduce GHG emissions associated with heat production, a goal central to EU, UK and Irish strategies to meet 2050 emissions targets. The project is led by Codema, Dublin's Energy Agency, and is supported by the PEACEPLUS programme managed by the Special EU Programmes Body (SEUPB) and endorsed by the Department of Climate, Energy and the Environment, Ireland and the Department for the Economy, Northern Ireland. GEMINI is featured in the current national Climate Action Plan (2025).

GEMINI will revolve around a number of key practical demonstrations of geothermal energy in large-scale heating and cooling systems in public sector buildings such as swimming pools, housing projects, utilities offices and a university campus. Three shallow (less than 500 metres) geothermal energy systems will be installed in Sligo and Belfast. These will provide near-zero emissions heating and cooling to public buildings and help to address fuel poverty. A deep (2 km) geothermal borehole will be drilled at the Technological University Dublin campus at Grangegorman, Dublin to demonstrate the feasibility of large-scale geothermal heat networks in Ireland. Additional investigations for deep geothermal resources will be undertaken in the Antrim area in Northern Ireland.

An important part of the GEMINI programme comprises a series of activities aimed at the long-term sustainability and development of the geothermal energy sector on the island of Ireland. This will include education, skills and training programmes, research (social science, and science and technology), data and toolkits for planners, public engagement programmes, design of business models, and information to support geothermal policy across the whole island of Ireland.

7. FINANCIAL SUPPORT

Existing financial support measures for GSHPs remain available through the Sustainable Energy Authority of Ireland for both domestic and non-domestic applications. The Heat Pump System grant provides homeowners with € 6,500 towards the cost of a heat pump system (irrespective of the type) subject to adequate energy efficiency upgrades being implemented that reduce heat loss in the building fabric below 2 W/K/m².

The Support Scheme for Renewable Heat supports the adoption of renewable heating systems by commercial, industrial, agricultural, district heating, public sector and other non-domestic heat users not covered by the emissions trading system. The grant-based scheme provides funding of up to 30% of eligible costs to air source, ground source and water source heat pumps based on the buildings and heat using processes adhering to verified energy efficiency criteria, Building Regulations, Construction Products Regulations, EN Standards, efficiency, technology standards and air quality standards in relation to emissions. Under the same scheme an operational support tariff for high efficiency biomass CHP and biogas heating systems for a period of 15 years is offered.

The Renewable Electricity Support Scheme (RESS) makes provision for a renewable electricity (RES-E) ambition of up to a maximum of 55% by 2030. This is to be achieved through a series of auctions throughout the scheme that began in 2019 and that will promote increasing technology diversity by broadening the renewable electricity technology mix. Deep geothermal energy could be considered as a future technology under this scheme when more data on available deep resources is established.

Geological Survey Ireland, SEAI, Taighde Éireann and international funding consortia (e.g., GEOTHERMICA ERA-NET and the Clean Energy Transition Partnership) continue to fund geothermal energy research in Ireland. Topics range from improving our understanding of subsurface resources, to geological modelling, reducing risk, developing novel drilling techniques, and more efficient heating/cooling technologies. Research around social acceptance and public policy is also key to including all stakeholders and strengthening the sector overall. The EU Horizon and Innovation funds create an excellent opportunity for more geothermal projects within Ireland.

8. OUTREACH ACTIVITIES

Formed in 1998, the Geothermal Association of Ireland (GAI) has been active in supporting the development of the geothermal sector across the island of Ireland. The GAI is affiliated to the European Geothermal Energy Council (EGEC) and the International Geothermal Association (IGA). Recent activities include a regular and well-attended geothermal webinar series hosted in conjunction with the Geological Survey of Northern Ireland, Geological Survey Ireland and Queens University Belfast. The webinars are pitched to provide information to a wide range of stakeholders from policy makers to members of the public. Past topics have included technology developments, market growth and case studies of geothermal technologies for heating, cooling, and power production.

In October 2024 GAI co-hosted the EGEC Geothermal Heat Pump Days three-day event in Dublin. Participants gained valuable insights into the latest advances, innovations, and best practices for the future of geothermal heat pumps. Discussions were facilitated

around the opportunities and challenges facing the geothermal heat pump sector in Ireland and in Europe.

In 2022 Geological Survey Ireland initiated an annual National Geothermal Energy Summit event that has rapidly grown since then. The aim of this event is to bring together a diverse range of professionals, energy users and decision makers to identify barriers and opportunities and find a way forward for the geothermal sector in Ireland. The growth of this event is testament to the increasing public awareness of geothermal energy and the potential benefits of this national resource.

In 2023, Geological Survey Ireland founded the Dublin City Geothermal Working Group with the aim of sharing knowledge between public sector organisations invested in the development of geothermal decarbonising solutions in the city. The format of the Dublin group has been replicated in Cork, Ireland's second largest city, with the formation of the Cork Geothermal Working Group in May 2025.

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Table 1: Shallow Geothermal Energy Systems in Ireland in 2024
(H: horizontal loops, V: vertical BHE, W: water source).

Locality	Typical Heat Pump Rating or Capacity (kW)	Number of Units	Type	COP	Heating Equivalent Full Load (h/y)	Energy Produced (GWh/yr)	Cooling Energy (GWh/yr)	Remarks
Domestic Installations Nation-wide (Aver. Installed Capacity)	10.4	20098	all	3.5	1800	268.74		
Dolmen Centre. Co. Donegal	45	1	H	3.5	1363	0.04		
Tralee Motor Tax Office. Co Kerry	120	1	H	3.5	1922	0.16	0.07	
SHARE Hostel. Cork	120	1	W	3.5	1363	0.12		
UCC Glucksman Gallery. Cork	200	1	W	3.65	1922	0.28	0.11	
Fexco HQ. Killorglin. Co Kerry	310	1	W	3.65	1922	0.43	0.17	
Glenstal Abbey. Co Limerick	150	1	W	3.5	1363	0.15		
Musgrave HQ. Cork	160	1	V	3.65	1922	0.22	0.09	3200 m BHE total
Killarney International Hotel. Co Kerry	60	1	W	3.5	1363	0.06		
Cork Co Council Environmental Labs	90	1	W	3.5	1363	0.09		
Cliffs of Moher Visitor Centre. Co. Clare	160	1	H	3.5	1363	0.16		
Killorglin Town Centre. Co Kerry	160	1	W	3.65	1922	0.22	0.09	
Fermoy Leisure Centre. Co Cork	160	1	W	3.5	2725	0.31		
Tory Top Road Library. Cork	80	1	W	3.5	1363	0.08		
Coraville. Blackrock. Cork	36	1	W	3.5	1363	0.04		
Castleisland. Co Kerry	135	1	W	3.5	1363	0.13		
ESB Administration Offices. Cork	250	1	W	3.65	1922	0.35	0.14	
Cork County Library. Cork	450	1	W	4	560	0.19	0.25	
Swedish Ambassador's Residence. Dublin	21	1	V	3.5	1363	0.02		
Cowper Care. Kiltarnan. Dublin	100	1	V	3.5	1363	0.10		
Cowper Care. Rathmines. Dublin	66	1	V	3.5	1363	0.06		
Cowper Care. Dublin	86	1	V	3.5	1363	0.08		
Vista Health Care. Naas. Co Kildare	400	1	W	3.65	1922	0.56	0.23	
UCC Western Gateway IT Building. Cork	1000	1	W	3.65	1922	1.40	0.56	
Athlone City Centre Retail Complex. Westmeath	2786	1	W	3.65	1922	3.89	1.56	
Lifetime Lab. Cork	70	1	W	3.5	1363	0.07		
Bagenalstown Swimming Pool. Co. Carlow	18	1	W	3.5	1363	0.02		
Croi Anu Creative Centre. Co. Kildare	8	1	H	3.5	1363	0.01		

Typical source temperatures (with exceptions): Horizontal systems 8-10 °C, Vertical systems 9-13 °C, Water systems 10-15 °C

Table 1 (continued): Shallow Geothermal Energy Systems in Ireland in 2024
(H: horizontal loops, V: vertical BHE, W: water source).

Locality	Typical Heat Pump Rating or Capacity (kW)	Number of Units	Type	COP	Heating Equivalent Full Load (h/y)	Energy Produced (GWh/yr)	Cooling Energy (GWh/yr)	Remarks
Rathmore Community Childcare. Co. Kerry	12	1	V	3.5	1363	0.01		
Treacys Hotel Co. Wexford	450	1	V	3.65	1922	0.63	0.25	
Fairy Bush Childcare Centre. Co Roscommon	23.5	1	V	3.5	1363	0.02		
Tinnypark Nursing Home. Co. Kilkenny	32	1	H	3.5	1363	0.03		
Goretti Quinn Creche. Co. Kildare	12	1	V	3.5	1363	0.01		
CloCeardlann na gCnoc. Co. Donegal	18.3	1	H	3.5	1363	0.02		
St John's National School. Co. Mayo	14.2	1	H	3.5	1363	0.01		
Dunmore House Hotel. Co. Cork	18	1	W	3.5	1363	0.02		
Comhaltas Cosanta Gaeltachts Chuil Aodha. Cork	16	1	V	3.5	1363	0.02		
David Cuddy. Rathbranagh. Co. Limerick	11.5	1	V	3.5	1363	0.01		
Skeaghanore Farm Fresh Duck. Co. Cork	12	1	V	3.5	1363	0.01		
Kanturk Sheltered Housing. Co. Cork	8.3	1	V	3.5	1363	0.01		
Comhlacht Forbartha an Tearmainn. Co. Donegal	33.6	1	V	3.5	1363	0.03		
Feohanagh Special Needs Housing. Co Limerick	17	1	V	3.5	1363	0.02		
CLS Rosmuc. Co. Galway	19.8	1	H	3.5	1363	0.02		
Vicarious Golf. Co. Wicklow	13	1	H	3.5	1363	0.01		
Inis Oirr Health Centre. Co. Galway	12	1	H	3.5	1363	0.01		
Children's and Adults Respite Centres. Co. Galway	21	1	V	3.5	1363	0.02		
Kilcurry Community Development. Co. Louth	17	1	V	3.5	1363	0.02		
Ardara Community Childcare. Co. Donegal	22.1	1	W	3.5	1363	0.02		
Seawright Swimming School Co. Cork	31	1	W	3.5	1363	0.03		
Cope Foundation. Bandon. Co. Cork	30	1	V	3.5	1363	0.03		
Parklands Apartment Development. Co. Wicklow	40	1	V	3.5	1363	0.04		
Ballyconnell Central National School. Co. Cavan	12	1	V	3.5	1363	0.01		
James B Joyce & Co. Co. Galway	18.3	1	V	3.5	1363	0.02		
Poor Clare Monastery. Co. Louth	18	1	W	3.5	1363	0.02		

Typical source temperatures (with exceptions): Horizontal systems 8-10 °C, Vertical systems 9-13 °C, Water systems 10-15 °C

Table 1 (continued): Shallow Geothermal Energy Systems in Ireland in 2024
(H: horizontal loops, V: vertical BHE, W: water source).

Locality	Typical Heat Pump Rating or Capacity (kW)	Number of Units	Type	COP	Heating Equivalent Full Load (h/y)	Energy Produced (GWh/yr)	Cooling Energy (GWh/yr)	Remarks
Tralee Community Nursing Unit. Co. Kerry	100	1	V	3.5	1363	0.10		
Brook Lodge Hotel. Co Wicklow	134	1	H	3.5	1363	0.13		
Hudson Bay Hotel. Athlone. Co. Westmeath	132	1	W	3.5	1363	0.13		
Hotel Europe. Killarney. Co. Kerry	110	1	W	3.5	1363	0.11		
Rathass Housing Estate. Tralee. Co. Kerry	70	1	H	3.5	1363	0.07		
Whites Hotel. Wexford	21	1	H	3.5	1363	0.02		
Belinter Hotel. Navan. Co. Meath	306	1	H	3.65	1922	0.43	0.17	
Bellview Woods Childcare. Killarney. Kerry	30	1	H	3.65	1922	0.04	0.02	
D&G Electronics Ltd. Castleisland. Co Kerry	21	1	H	3.5	1363	0.02		
Oilgate Nursing Home	100	1	V	3.5	1363	0.10		
Youghal Town Hall. Co Cork	21	1	V	3.5	1363	0.02		
Borris Nursing Home	74	1	W	3.8	3276	0.18		
Moyross Estate. Co. Limerick	140	1	V	4.1	1872	0.20		2800 m BHE total
Kilboy House. Tipperary	120	1	V	4.1	1872	0.17		2400 m BHE total
Vistakon Ireland. Limerick	890	1	W	5	4800	3.42	6.59	
IKEA. Dublin	2000	1	V	3.5	1800	2.57		18000 m BHE tot.
Wonder Years Childcare Rossbrack. Manorcunningham Co. Donegal	43.6	1	H	4	1872	0.06		
Ballyroan Library. South Dublin	60	1	V	4.1	1872	0.08		
Cowper Care. Kiltarnan. Co Dublin	80	1	V	3.5	1872	0.11		
Mallow Swimming Pool. Co. Cork	100	1	W	3.5	4250	0.30		
Offaly Co. Council Offices. Tullamore. Co. Offaly	105	1	W	3	1872	0.13		
Kelly's Showroom. Mountcharles. Co Donegal	38	1	V					
Lisdoonan Community Residential Scheme. Co. Monaghan	124	4	H					H & ASHP
UL Limerick Presidents House (estimated)	20	1	V	3	1800	0.02		
The Danes - Ashford Co. Wicklow (estimated)	45	2	V	3.5	1800	0.12		
NUI Galway (estimated)	24	1	V	3	1800	0.03		
Mount St. Anne's Retreat and Conference Centre (est.)	80	1	V	3	1800	0.10		
Mount Juliet - Apartments (estimate)	125	1	V	3	1800	0.15		2500 m BHE total

Typical source temperatures (with exceptions): Horizontal systems 8-10 °C, Vertical systems 9-13 °C, Water systems 10-15 °C

Table 1 (continued): Shallow Geothermal Energy Systems in Ireland in 2024
(H: horizontal loops, V: vertical BHE, W: water source).

Locality	Typical Heat Pump Rating or Capacity (kW)	Number of Units	Type	COP	Heating Equivalent Full Load (h/y)	Energy Produced (GWh/yr)	Cooling Energy (GWh/yr)	Remarks
Mount Juliet - Walled Garden Lodges (estimate)	30	1	V	3	1800	0.04		
Wexford Nursing Home (estimate)	75	1	V	3.5	1800	0.10		
ESB HQ	250	1	V					4650 m BHE. comm. 2020
School of Management. Queens University. Belfast	280	2	V	3.2	2400	0.92		4800 m BHE. comm. 2022
Rubrics. Trinity College Dublin	188	3	V	3.8		0.49		3675 m BHE. comm. 2022
Cherry Orchard Primary Health Care	105	2	V	3	2000	0.28		1800 m BHE. comm. 2015
Martinstown	325	2	H	3.2	2450	1.09	0.89	9600 m BHE. comm. 2015
Sligo Sports Centre	420	1	V	3.4		0.60		9600 m BHE total
Cavan General Hospital ED	533	4	V	3.7		0.42	0.37	9350 m BHE total
Cavan General Hospital ED	200	2	W	4.5		0.47	0.37	220 m BHE total
3 Henrietta St	120	3	V	3.2	1800	0.45		900 m BHE total
TUD ??								
Solas Chroi Spa & Health Centre. Brandon House Hotel (estimate)	50	1	V	3	1800	0.06		
Coolemore House & Gate Lodge Thomastown. Col. Kilkenny (estimate)	40	1	V	3	1800	0.05		
Offaly Co. Council Offices. Tullamore. Co. Offaly	105	1	W	3	1872	0.13		
TOTAL	225055.3	20209				292.97	11.92	

Typical source temperatures (with exceptions): Horizontal systems 8-10 °C, Vertical systems 9-13 °C, Water systems 10-15 °C

Tables A-G

Table E1: Shallow geothermal energy, geothermal pumps (GSHP)

	Geothermal Heat Pumps (GSHP), total			New (additional) GSHP in the year 2024 *		
	Number	Capacity (MW _{th})	Production (GWh _{th} /yr)	Number	Capacity (MW _{th})	Share in new constr. (%)
In operation end of 2024	20128	224.4	291.94	783	7.4	unknown
Of which networks *						
Projected total by 2028	23400	260	340			

* Distribution networks from shallow geothermal sources supplying low-temperature water to heat pumps in individual buildings (“cold” DH, Geothermal DH 5.0 etc.)

Table F: Investment and Employment in geothermal energy

	in 2024		Expected in 2028	
	Expenditures * (million €)	Personnel ** (number)	Expenditures * (million €)	Personnel ** (number)
Geothermal electric power	-	-	-	-
Geothermal direct uses				
Shallow geothermal	20.3 (est.)	250 (est.)	60.9 (est.)	750 (est.)
total				

* Expenditures in installation, operation and maintenance, decommissioning

** Personnel, only direct jobs: Direct jobs – associated with core activities of the geothermal industry – include “jobs created in the manufacturing, delivery, construction, installation, project management and operation and maintenance of the different components of the technology, or power plant, under consideration”. For instance, in the geothermal sector, employment created to manufacture or operate turbines is measured as direct jobs.

Table G: Incentives, Information, Education

	Geothermal electricity	Deep Geothermal for heating and cooling	Shallow geothermal
Financial Incentives – R&D		Yes ¹	Yes ¹
Financial Incentives – Investment			Yes ²
Financial Incentives – Operation/Production			
Information activities – promotion for the public		Yes ³	Yes ³
Information activities – geological information		Yes ⁴	Yes ⁴
Education/Training – Academic		Yes ⁵	Yes ⁵
Education/Training – Vocational			Yes ⁶
Key for financial incentives:			
DIS Direct investment support	FIT Feed-in tariff	-A Add to FIT or FIP on case the amount is determined by auctioning	
LIL Low-interest loans	FIP Feed-in premium		
RC Risk coverage	REQ Renewable Energy Quota		
TC Tax credits	O Other (please explain)		

¹ Geological Survey Ireland & SEAI RD&D programme

² Heat Pump System Grant - € 6500 towards improved controls when a heat pump is installed;
Support Scheme for Renewable Heat – 50% grant funding for non-domestic applications

³ Geological Survey Ireland Geothermal Page – Gemini project; Geothermal Working groups – Dublin/ Cork

⁴ Geological Survey Ireland conferences and dissemination events;
Geothermal Association of Ireland Monthly webinar series & Geothermal Heat Pump Days

⁵ Undergraduate Courses on geothermal energy as an optional course in Engineering and sustainable energy

⁶ Training and Certification for HP installers only – Carlow IT drilling course in collaboration with Geoscience Ireland and Geological Survey Ireland