Energy for generations

ESB Response to:

Geothermal Energy for a Circular Economy - Draft Policy Statement

25/02/2022

About ESB

ESB was established in 1927 as a statutory body under the Electricity (Supply) Act 1927. As a strong, diversified, vertically integrated utility, ESB operates across the electricity market, from generation through transmission and distribution, to supply of customers, with an expanding presence in Great Britain's generation and supply markets. As at 31 December 2020, ESB Group employed over 7,900 people.

ESB's 2040 strategy - Driven to Make a Difference: Net Zero by 2040 – sets out a path to achieve net zero by 2040, with three strategic objectives, aligned with Sustainable Development Goals 7, 9 and 13, as follows:

1. Decarbonised electricity - Develop and connect renewables to decarbonise the electricity system by 2040
2. Resilient infrastructure - Provide resilient infrastructure for a reliable low carbon electricity system
3. Empowered customers - Empower, enable and support customers and communities to achieve net zero

Introduction

ESB welcomes the opportunity to respond to the 'Geothermal Energy for a Circular Economy draft Policy Statement'. Right across ESB, we are focussed on the transition to a low carbon energy future and therefore are very interested in this consultation given the potential for geothermal energy to provide low carbon energy into the future.

ESB experience with geothermal energy

ESB has been engaged with geothermal energy for over 10 years. A sample of some of our activities is given below.

In 2010 / 2011, ESB, in cooperation with GT Energy, explored the possibility of developing geothermal power stations. A 4MW facility in Newcastle, Co Dublin, received planning permission in 2011. However, plans did not proceed due to a lack of regulatory and financial supports.

In 2017, ESB acquired Geothermal International (GI Energy) which was the leading installer of commercial ground source systems in the UK, with over 700 installations.

In 2018, ESB International was awarded a contract by Philippines geothermal generation developer Energy Development Corporation (EDC) to provide operational and maintenance services on their fleet of 40 Flash steam geothermal plants. This project is ongoing and is set to continue until 2022 at least.

ESB installed a Ground Source Heat Pump (GSHP) system at the ESB Head Office in Fitzwilliam Street. This system includes 32 no. 150m deep closed loop boreholes and provides approximately 300kW of heating and 250kW of cooling. The system also includes Air Source Heat Pumps (ASHP) that provide additional heat when required.

General Comments

The Government's interest in the use of geothermal energy for heating & cooling and electricity production is welcomed by ESB.

It is recommended that the terms 'shallow' and 'deep' geothermal be defined precisely in the final policy statement.

There should be different and separate policies for shallow geothermal systems (ground source), which extract stored low temperature heat energy derived from the sun's energy, and deep geothermal, which harnesses high temperature heat energy derived from the earth's core in areas of current or historical volcanic activity. The methods, cost and design considerations and associated risks for both systems are very different

Ireland, where there is some potential for medium temperature geothermal energy from depth in specific geographical/geological locations, shouldn't be compared with the situation in Iceland and New Zealand etc which have relatively shallow very high temperature systems.

The required licensing, with a review after 6 years, would represent a significant commercial risk to a developer/investor. For example, if the license was revoked after 6 years, any business case would most likely become unviable. This point applies to both shallow and deep geothermal.

It is the ESB view that the policy framework appropriate to enabling the effective exploration and exploitation of "deep geothermal" energy resources is distinct from that appropriate for shallow ground-source heating/cooling installations. There is a danger that existing shallow ground-source heating/cooling industry could be undermined or brought to a halt by the introduction of an onerous licensing and regulatory regime that does not consider the different character of the two systems.

There is a concern that a party might want to propose a GSHP heating solution to a customer and find that an existing licensee has exclusive use of the resource in that area for 6 years. This may have the unintended consequence of impeding, rather than enabling development.

'Ground source' relates to the earth's surface temperatures from solar radiation, which is generally 25 deg.C or below. 'Geothermal' we suggest is summarised as relating to the earth's core temperatures and might be a source temperature of 40 deg.C or above.

Specific Comments

Section 4.1	ESB would welcome the opportunity to contribute to the suggested Geothermal Advisory Group.
Section 5.1.1	Based on the geology of Ireland and the return on investments of drilling, the majority of the take up of geothermal energy in Ireland will likely be on shallow very low enthalpy close ground source systems. These should be classified and considered separately from deeper low -mid enthalpy systems.
Section 5.1.1.3	Need to separate shallow and deep geothermal.

Section 5.2.2.1	High temperature Ammonia Heat Pumps can be used to achieve temperature of 80 to 90 degrees – this would likely be more economical than drilling to capture mid to high enthalpy head .
Section 5.2.2.2	Open loop systems can produce high amounts energy for cooling , heating and both where correctly designed. There are risks in regards to potential yields, the yield can only be determined on completion of the well drilling. There are areas (Ole Red Sandstone) where there are good prospects for using open loop systems to provide high yielding systems.
Section 5.2.3	Example of use in Agriculture and food is ESB Greenhouse project which takes waste heat from sewer outflow, transfer it to Greenhouse. Whole system supplies circa 72 MWth.
Section 5.2.4	Dairy processing - use of heat pumps could take the heat from the milk (cooling) and transfer for water heating without the use of geothermal systems. Electrical Generation – Grants or tariffs would be needed to de-risk and encourage geothermal electricity generation in Ireland.
Section 5.3	Ground Source Systems producing 500KW to 1MW are not uncommon and the description of >70kW as advanced geothermal system is slightly misleading.
Section 5.4	There should be distinct and separate code of practise and regulation/license covering shallow and deep geothermal installations. A threshold of 25 kW seems low.
Section 6.2	Distinction required between shallow and deep geothermal for the purposes of defining ownership.
Section 6.3.1	A lease or Licence should apply to deep geothermal or open loop well systems. However, incorporating a lease for shallow geothermal (deemed lower risk) could deter the uptake of such systems due to the potential costs and time involved in obtaining a lease. There should be a mechanism whereby the location of all ground source boreholes should be recorded, this should be included within a standard guidance document.

Section 6.3.3	The deployment of a shallow / deep geothermal system should be based on the merits of the application it would serve and requirements and needs of the end users with respect to CO2 and energy reduction. Imposing a requirement to achieve a return on investment may preclude the deployment of a heat pump system. A requirement to achieve a desired system efficiency and/or a system design for longevity would be a less restrictive requirement.
Section 6.4	The definition of geothermal system over 70kW is problematic. There is a need to separate and understand the difference between hot rock geothermal and standard ground source system. There are many installations which exceed 500kW. One would expect mid enthalpy systems to be producing multiple megawatts to hundreds of megawatts of electrical power and these must be treated completely separately to shallow low enthalpy.
Section 6.5	Registration of systems is beneficial. However, the registration system must not place a detrimental hurdle to those looking to invest in low enthalpy systems, which will be the most common type installed.
Section 6.6	The definition of 70kW as the threshold for Geothermal Energy Exploration Licence (GEEL) as a differential of shallow and deep geothermal and the required legislation is misguided. Most commercial ground source systems will be greater than 70kW. The differentiation should be based primarily on system recovered temperature which reflects on the geological situation by which the heat is produced
Section 6.6.1	The GEEL and Geoscience Regulation Office (GSRO) must only be applied to medium and high enthalpy systems. The same criteria should not be applied to low enthalpy systems. The potential of have a 6 year license on low risk systems will represent too high a financial risk for the majority of ground source systems and limit their take up and use.
Section 6.6.1	Consent and permitting should be applied where appropriate and not a blanket use.
Section 6.6.2	The Geothermal Energy Capture Lease (GECL) must distinguish base on type and risk of geothermal project
Section 6.6.3	The maintaining of a data register of installed system would be beneficial, but this must be undertaken in a way which does not impose significant obstacles and cost which might discourage the uptake of ground source systems

Section 7	ESB agrees that additional data will be a critical step in enabling deep geothermal projects. However, it is noted that there is sufficient knowledge and understanding of the geology of Ireland to enable the installation of a ground source system anywhere in Ireland, subject to the normal checks on the geological risk factors, hydrogeology and historical human activity.

Conclusion

ESB would be pleased to engage further on any of the points above. Please see the contacts below for future communications.

[redacted]