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Geothermal Consultation
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28th February 2022

Dear Geoscience Policy Division,

RE: Consultation on the Draft Policy Statement on Geothermal Energy for a Circular Economy and associated SEA Environmental Report and AA Natura Impact Statement

Gavin Doherty Geosolutions are most grateful to the prescribed bodies for the opportunity to provide a consultation response on the Draft Policy Statement on Geothermal Energy.

GDG are passionate about renewable energy. The Company has extensive experience in renewable energy projects across Europe, including a growing geothermal portfolio in Ireland. We have a strong and diverse mix of personnel with a unique technical skillset that includes subsurface data mapping and analysis, planning and legislation, renewable energy use and project management, along with access to a broad network of geothermal stakeholders

A summary of observations and recommendations, both general, and specific to the draft document may be found within the accompanying consultation response. We hope that this response will embody a constructive resource towards publication of policy and legislation that will support significant steps towards carbon neutrality by enabling efficient deployment of this incredible, natural renewable resource.

Yours sincerely,



On behalf of
Gavin Doherty Geosolutions Limited





Consultation Response

Consultation Response to Draft Policy Statement on Geothermal Energy

[REDACTED]

Project Title:	Consultation Response
Report Title:	Consultation Response to Draft Policy Statement on Geothermal Energy
Document reference:	GDG Consultation Response to DECC Draft Policy Statement on Geothermal Energy
For:	Department of the Environment, Climate and Communications
Confidentiality:	Public Consultation
Essential Requirements:	None

Table of Contents

1	Executive Summary	1
2	About Us	2
3	Consultation Response.....	3
	Draft Policy Statement on Geothermal Energy for a Circular Economy	3
	SEA Environmental Report.....	5
	AA Natura Impact Statement	5
4	Wider Role of Geothermal in Supporting the Energy Transition	6
5	Conclusions and recommendations.....	9
	List of Acronyms	10
	Guidelines for use of report:	11
	Document Control	11
	References.....	12
	Appendix A – Table of Responses by Document / Section	13



1 Executive Summary

Gavin and Doherty Geosolutions Ltd. (GDG) welcome the opportunity to respond to the Department of the Environment, Climate and Communications (DECC) call for a public consultation on Draft Policy Statement on Geothermal Energy for a Circular Economy and associated SEA Environmental Report and AA Natura Impact Statement. Observations and recommendations, both general, and specific to the draft consultation documents may be found in the following sections. Key points for DECC consideration are summarised below:

The Potential of Geothermal Energy – The potential of this energy source cannot be understated. It is a stable, clean and local source of energy that could in principle have a profound positive effect on Ireland’s society by significantly reducing emissions while increasing national energy security.

Removing Barriers to Development - Many barriers are non-technical and include absence of a favourable legislative framework, along with risk and costing profiles that may require bespoke supports compared to other renewable sources.

Positive Strategic Impacts – It should be highlighted that at a national strategic level, that there will be significant positive impacts of geothermal energy deployment to the environment and society. These include such as significant reduction in emissions, optimised footprint / land use compared to other energy sources (including some renewables), improvements in air quality, increased stability and security of the energy supply along with positive societal and community impacts. These positive impacts will far outweigh some of the aspects identified in the SEA environmental report, particularly those around temporary construction disturbance.

Targets – Geothermal energy production and emissions reduction targets should be implemented and clearly communicated without delay.

Unlocking Potential – Key focus areas should include the following enablers:

- Forming a dedicated government agency.
- Building on subsurface understanding
- A means to define subsurface geothermal resources.
- A means to grant rights for exploration and development of geothermal resources that includes factors such as timing, licensing, ownership, transfer and sale of assets and produced energy.
- Clarity on abstraction of subsurface fluids.
- Procedures for licensing and reporting.
- Secondary legislation.

We hope that this response will embody a constructive resource towards publication of policy and legislation that will support timely and significant steps towards carbon neutrality by enabling efficient deployment of this incredible, natural renewable resource. Moving forward, GDG are willing to engage as part of a Geothermal Energy Advisory Group should the DECC require this support.

2 About Us

Gavin & Doherty Geosolutions Ltd. (GDG), founded in 2011 by Paul Doherty, is an Ireland-based specialist renewable engineering consultancy, providing innovative solutions across a broad range of civil engineering sectors.

GDG are passionate about renewable energy and supporting the energy transition. The Company has extensive experience in renewable energy projects across Europe, including a growing geothermal portfolio in Ireland. We have a strong and diverse mix of personnel with a unique technical skillset that includes subsurface data mapping and analysis, planning and legislation, renewable energy use and project management, along with access to a broad network of geothermal stakeholders. With a strong background in geomechanics and renewable energy innovation, GDG brings together state of the art research and direct industry experience, and is in a position to offer a unique engineering service, delivering the most progressive, reliable, and efficient designs across a wide variety of situations. GDG was recently acquired by the Venterra Group, which is a pure play renewables group focused on delivering the energy transition.

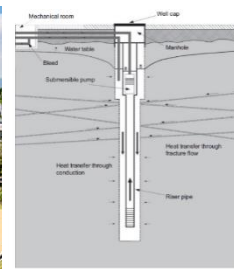
GDG is actively involved in a range of international infrastructure projects including harbours/marinas, onshore and offshore windfarms, and solar developments. Our clients include developers, contractors and investors/financial parties. We also offer forensic engineering and expert witness services to the Insurance and Legal sectors.

GDG has been very active in the geothermal arena for over a decade, promoting advancement of geothermal technologies towards commercialisation through a range of innovative projects. These include the projects outline (by no means exhaustive) summarised below:

RESULT – A project to demonstrate the potential for increased performance of urban geothermal resources, especially for replacement of fossil fuels to transition to clean cities, by characterising the geology of the Dublin basin towards this goal.

GEONORM – The GEONORM project will showcase the impact of geothermal energy in decarbonising a district heating network as part of a broader renewable energy mix, focussing on a Dublin University Campus site.

THERMOWELL – A research project to gain valuable information on the construction and performance of Deep Standing Column Wells (a type of geothermal well design) for deriving heat from Irish geothermal resources.



A selection of geothermal projects currently in progress with GDG

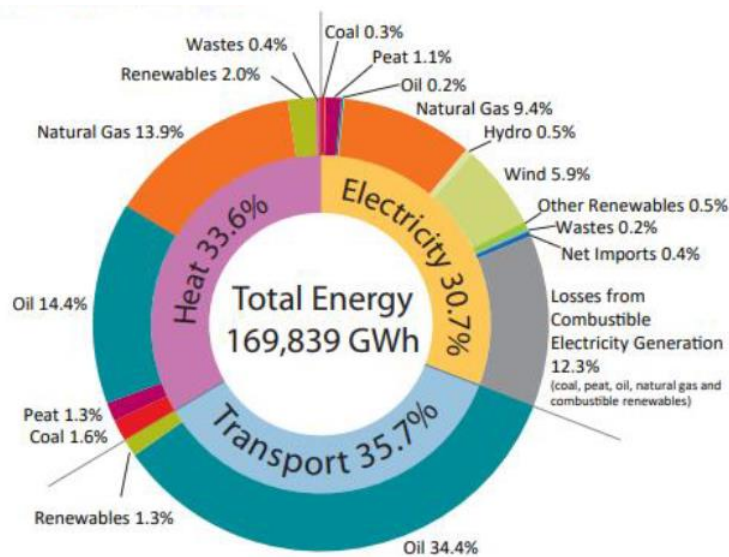
3 Consultation Response

A more detailed response is included in the following section. The response is built around the structure of the documents provided by DECC as a basis for the policy consultation.

Draft Policy Statement on Geothermal Energy for a Circular Economy

A clear goal of the regulatory regime should be to facilitate and remove barriers to the deployment of geothermal energy projects. The policy should identify the significant opportunity that geothermal energy embodies, and go further to set clear goals for energy production and emissions reduction.

Approximately 1/3 of the entire energy usage of Ireland is currently for heating purposes, and over 95% of this is currently provided by fossil fuel sources, with associated national energy insecurity caused by dependency on energy supplies from sources remote to the country. Along with district heating, geothermal energy can provide energy solutions in a wide range of applications. Broadly speaking there is no technical reason why 100% of heating and some of the national electricity demand couldn't be supplied by geothermal means, resulting in an annual emissions reduction of over 14 million tonnes of CO₂. With the right vision, a large proportion of this goal could be realised.



Heat and electricity sectors: Positively impacted by geothermal energy deployment (SEAI, 2019)

The technical superiority of geothermal source heating should be recognised as part of an integrated energy plan. In comparison to alternative systems such as air source heat pumps, heating with a geothermal base has distinct advantages such as lower seasonal variation in performance, and lower fluctuating grid demands.

In terms of environmental protection, the positive environmental impact of geothermal energy in comparison to other sources must be recognised. For example, air quality can be improved compared to combustive heating / energy processes, CO₂ emissions can be reduced, and due to the minimal ground footprint, surface site impact can be reduced compared to other means of energy supply.

Defining projects by heat volume, and “guaranteeing” that volume within the lease opens the government or the operator up to liability. This proposed guarantee mechanism appears to be unnecessary and appears to imply that heat output can be known in advance of exploration and even commissioning. This is not the case with subsurface resources – Parallels with oil and gas legislation show that mechanisms such as up-front reservoir volume specifications and reservoir production guarantees are not conducive to committing exploration and development.

The approach of project definition by an archetypal approach, with a 70kW threshold appears simplistic and may lead to sub optimal project design and classification as a means to apply a lower threshold mitigation, study and licensing burden. There should be a multicriteria matrix to determine the threshold for projects that could include; area (km²), well depth (m), number of wells, number of buildings serviced, heat pump / water pump electricity demand, is electricity generation the aim, etc. Just kW alone is insufficient, easy to work around (split projects), and impossible to know in advance.

For projects where water abstraction is employed, integration with existing EPA licensing & regulations should be possible.

A 6-year Geothermal Energy Exploration License with one review after 3 years may be difficult to apply to a range of projects. A residential scheme would aim to perform exploration and desktop studies in 1 year or less, as with most applications, so 3 years only appears to apply to projects such as large-scale electricity generation, in which case is a policy that enables inaction for 3 years may encourage speculation and hoarding. At a minimum GDG suggests annual reviews / submissions to show progress.

Support for geothermal projects, in terms of increasing national subsurface knowledge, and implementing means to offset potentially higher capital investment against long term reduction in energy costs and emissions, along with categorisation of, and support for, different risk and return profiles compared to other renewable energy types should be considered as part of the new legislation. For example, a multiple shallow borehole project may have a very different risk profile and surface footprint to a single, deep well, but may have a similar energy output.

Flexibility must be incorporated for projects that find more / less heat to adapt initial plans to the new resource such as extract more heat, drill more wells, or convert usage after well construction and evaluation of heat resource. Exploration licensing requirements should be high level, with project aims defined after resource is known. Perhaps there is scope for exploration license to be granted based solely on attributes such as location and well depths.

Actions to de-risk geothermal projects by enabling activities that increase publicly available subsurface knowledge is welcomed. In addition to the proposed programs of deep drilling and geophysics data acquisition, requirements for commercial project data submission and access to the National Geothermal Database should be considered as a means to enable development of this resource on a national scale. Further research supports and options should also be considered.

Acknowledging the urgency of our emissions reductions targets, and the role that geothermal energy can play as part of an integrated energy policy this response aims to promote development of

geothermal resources and realise the profound benefits that they can bring to Ireland’s energy use and society.

SEA Environmental Report

The SEA Environmental report appears to address negative impacts of geothermal energy deployment, and appears to be largely focussed on temporary disturbance around well construction and building of surface facilities. At a strategic level, all impacts, including positive aspects such as significant reduction in emissions, positive societal benefits, improvement in air quality, minimum impact land usage, and profound potential improvement of national energy and economical security appear to be a significant omission of this report. For a strategic review, a holistic, balanced approach to assessing the overall impact on the environment of a policy (including positive aspects) should be employed. For example, in the policy area of air quality & emissions, the report summary states “Emissions to air from geothermal energy exploration and development activities are largely accounted for by drilling activities, which may include hazardous dust emissions as well as noise emissions” whilst no corresponding analysis or statement is included to quantify the effects on air quality and climate goals of removing up to 30% of Ireland’s emissions (for example of CO₂ and associated particulates from solid fuel combustion) that could be achievable with a large scale deployment of geothermal heating solutions.

The non-technical summary begins by stating that geothermal energy has failed to develop as a significant source of heating – it should be highlighted that geothermal energy has been successfully deployed in other countries, some with similar subsurface and ground conditions, with minimal environmental impact. The study could question why this is the case and point towards best practices in locations where successful establishment of geothermal projects has taken place.

Where a review of relevant programmes is carried out, the review could be expanded to include best practices in the form of case studies and examples of countries where plans and legislation have promoted successful, timely and safe deployment of geothermal technologies.

AA Natura Impact Statement

The overarching objective of the Natura Impact Statement (NIS) is to assess whether the policy statement may adversely affect the integrity of any European site. It is to be recognised that by supporting climate action goals, deployment of geothermal energy has the potential to positively impact all sites, by contributing to the reduction of effects of climate change on natural habitats.

Impact predictions include potential positive contributions, as above (Reduction in CO₂ emissions resulting in indirect positive effects for Natura network is mentioned). AA assessment criteria could be streamlined, for example to clarify if there is a distance from sites or project scale threshold beyond which it could be automatically concluded that AA would not be required. There is a list of possible impacts, but little quantification of likelihood, probable severity, or examination of benchmark activities for context.

The mitigation measures indicate that AA screening is required for any project, regardless of scope. Consider exempting projects below a certain threshold, or putting in place a mechanism to standardise / streamline this process to reduce unnecessary regulatory burden.

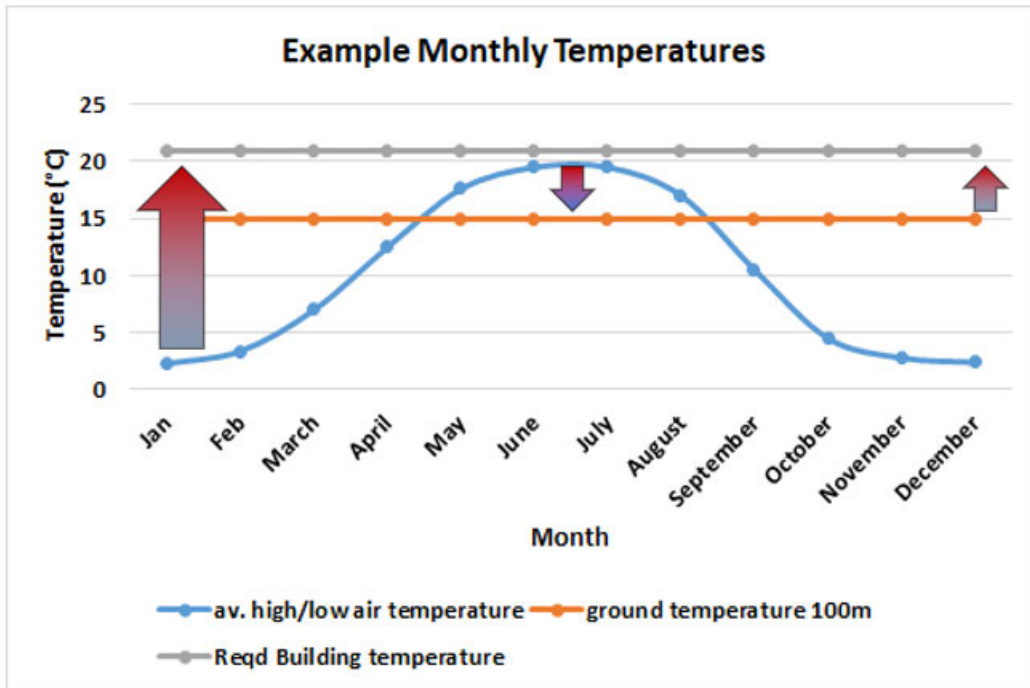
4 Wider Role of Geothermal in Supporting the Energy Transition

Successful transition from current fossil fuel driven energy to a comprehensive renewables energy mix requires integration of a number of technologies. Geothermal energy is a vital element of this integrated approach. As geothermal energy is literally right under the feet of the user, and is constantly replenished (in a balanced system), it can be considered a truly local, baseload, non-variable energy source. Consider the two graphics below: The first shows proportional generation of energy by sector, demonstrating that heat and electricity generation account for approximately a third each of Ireland's energy requirements.

Replacement of fossil fuel based heat with highly efficient, emission free geothermal energy sources achieves two objectives – it reduces the energy output required, and converts the generation of this energy to an [effectively] emission free source. For broader ranging investment and applications, advancements in geothermal electricity generation technology mean that variability in renewable electricity supply from sources such as wind and solar can be supported by a baseload supply.

In addition, the small footprint of geothermal energy installations gives a favourable land usage and enhanced overall area productivity compared to solar or biofuel applications (where land is used for biofuel crops or solar panel installations) with little or no additional environmental impact.

By introducing a localised, highly efficient energy source across a broad range of sites, widespread deployment of geothermal energy heating / cooling sources leads to lower energy use, greater efficiencies and reduced seasonal variation and potential additional loading on existing grid infrastructure compared to other technologies (such as air source heat pumps as mentioned above) currently being rolled out in cases where heat pumps are employed for low enthalpy sources

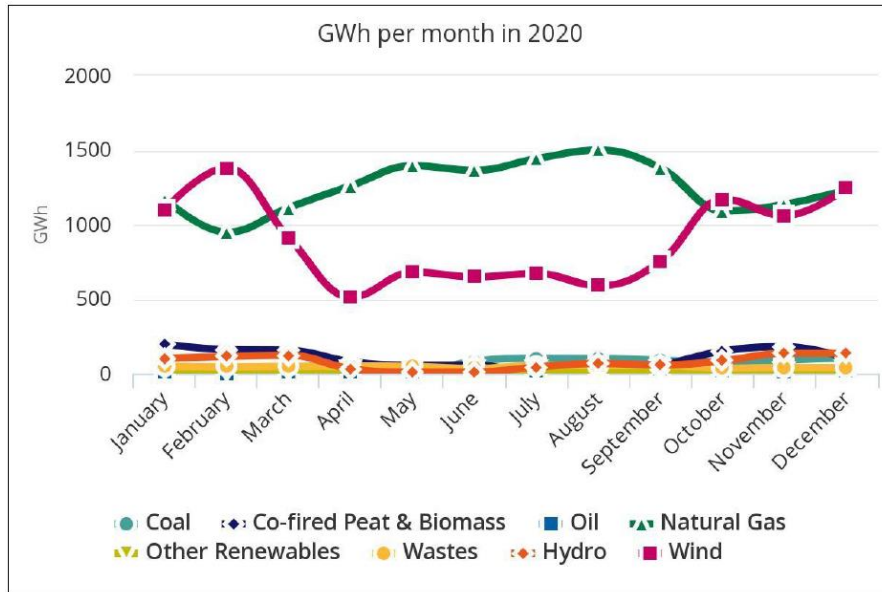


- Comparison to air source heating;
 - External unit that uses the air as a source of heat
 - Much higher energy requirement in winter
 - More work required to cool in summer
 - Ground source heat input is constant
 - GSHP = Stable Coefficient of Performance
 - ASHP = Variable Coefficient of Performance

CoP = Energy Out ÷ Energy In

Geothermal energy – constant ground temperature compared to variable air temperature - lower energy requirements and minimal impact of seasonal temperature variations -

An integrated approach incorporating energy sources such as wind, solar, direct storage, hydrogen storage and use, geothermal, tide and wave, and hydroelectric, will deliver a diverse, robust, and secure energy supply to the country.



Gaps in seasonal electricity production can be supplemented by baseload geothermal energy (Wind Energy Ireland, 2020)

GDG maintain a strong focus on subsurface analytics, project delivery and research and development, along with a high level of support for commercial and academic ventures in the renewables field. Coupled with close ties with department units in many relevant areas of planning and applications, GDG are well placed to support geothermal developments as part of the wider, integrated renewables deployment that is at the heart of the government’s Climate Action Plan.



GDG: Strong subsurface knowledge coupled with renewables expertise

5 Conclusions and recommendations

GDG would like to thank the DECC once more for the opportunity to contribute to the establishment of a favourable policy and legislative framework for the effective and timely deployment of geothermal energy on the island of Ireland. We conclude that, especially as part of an integrated energy plan, geothermal energy can have a profound positive effect in the areas of clean energy deployment, emissions reductions, air quality, energy security, community benefits and land usage.

The following general recommendations are made, with some in alignment with, or as refinements of, the proposed policy approach by DECC:

1. Recognise the potential benefits of geothermal energy and incorporate into national climate plans.
2. Remove non-technical barriers to development.
3. Introduce supports for project risk and costing profiles.
4. Recognise positive strategic impacts on the environment and society.
5. Set Geothermal Energy production targets and clear timelines.
6. Form a dedicated government agency.
7. Expand on subsurface understanding through a program of subsurface exploration and appraisal.
8. Introduce a means to define subsurface geothermal resources.
9. Introduce means to grant rights for exploration and development of geothermal resources that includes factors such as timing, licensing, ownership, transfer and sale of assets and produced energy.
10. Energy thresholds for project archetypes and energy guarantees should be reconsidered.
11. Introduce a clear procedure and guidelines for abstraction and use of subsurface fluids.
12. Introduce procedures for licensing and reporting.
13. Introduce required secondary legislation.
14. Ensure scalability for the permitting / licensing administrative burden.

GDG can add value and are willing to engage as part of a Geothermal Energy Advisory Group should this be required.

List of Acronyms

AA	Appropriate Assessment
ABP	An Bord Pleanála
CAP	Climate Action Plan 2021
CD	Consultation Document
CEO	Chief Executive Officer
CSSO	Chief State Solicitor’s Office
DECC	Department of the Environment, Climate and Communications
DHLGH	Department of Housing, Local Government and Heritage
DPER	Department of Public Expenditure and Reform
EIA	Environmental Impact Assessment
GDG	Gavin & Doherty Geosolutions Ltd.
GEAG	Geothermal Energy Advisory Group
GECL	Geothermal Energy Capture Lease
GEEL	Geothermal Energy Exploration Licence
GSRO	Geoscience Regulation Office
NGD	National Geothermal Database
PDA	Planning and Development Act(s)
RSC	Rules of the Superior Court
SEAI	Sustainable Energy Authority of Ireland
SEIA	Strategic Environmental Impact Assessment
SID	Strategic Infrastructure Development
SOEF	Shaping Our Electricity Future
WEI	Wind Energy Ireland

References

Consultation on the Draft Policy Statement on Geothermal Energy for a Circular Economy and associated SEA Environmental Report and AA Natura Impact Statement

<https://www.gov.ie/en/consultation/d07f7-consultation-on-the-draft-policy-statement-on-geothermal-energy-for-a-circular-economy-and-associated-sea-environmental-report-and-aa-natura-impact-statement/>

Draft Policy Statement on Geothermal Energy for a Circular Economy

SEA environmental report for the draft Policy Statement on Geothermal Energy

Draft Policy Statement on Geothermal Energy Appropriate Assessment Screening Report

Draft Policy Statement on Geothermal Energy Appropriate Assessment Screening Determination

Natura Impact Statement for Draft Policy Statement on Geothermal Energy

Gavin & Doherty Geosolutions Ltd. <http://www.gdgeo.com/>

Appendix A – Table of Responses by Document / Section

Gavin Docherty Geosolutions: Policy Document Response by Document / Section, for:

- a) Draft Policy Statement on Geothermal Energy for a Circular Economy
- b) SEA Environmental Report
- c) Natura Impact Statement

a) GDG Consultation Response to DECC Draft Policy Statement on Geothermal Energy

Reference Document: Draft Policy Statement on Geothermal Energy for a Circular Economy

Document Location: <https://www.gov.ie/en/consultation/d07f7-consultation-on-the-draft-policy-statement-on-geothermal-energy-for-a-circular-economy-and-associated-sea-environmental-report-and-aa-natura-impact-statement/#>

Specific Response by Document Section:

Section:	Section Title & Summary	GDG Response
	Minister’s Foreword	<ul style="list-style-type: none"> i. Note that Geothermal applications can be used for heat energy storage. ii. An indicative timeframe for establishment of the legislative framework might be of benefit to potential stakeholders. iii. Indicative targets for geothermal energy deployment might help to set expectations and provide context. iv. Mention of, and reference to, the contribution of policy and the legislative framework to successful geothermal deployment in other European countries. v. Commitment to geothermal energy as part of an integrated systems approach to achieving zero emissions. vi. Statement lacks the urgency befitting the problems and opportunities it relates to.
1	Executive Summary	<ul style="list-style-type: none"> i. The goal of the regulatory regime, along with robustness, transparency, and enhancement of the environment is to facilitate and remove barriers to the deployment of geothermal energy projects.
2	Geothermal Energy and Climate Action	<ul style="list-style-type: none"> i. Note that, along with heating, cooling, and electricity generation, geothermal applications can be used for heat energy storage. ii. The summary mentions the potential for geothermal to be an important source of heating across multiple sectors, would be of benefit to identify the current gaps / key barriers to deployment of geothermal projects to achieve this potential. iii. There is a focus on district heating in this section, however it is important to note that geothermal energy systems can be applied to heating in a large range of settings, for example: Residential, domestic, municipal and state buildings, commerce and industry, sports venues, education and agriculture. iv. Increased energy efficiency of geothermal versus air source heat pumps, and therefore lower and less volatile electricity demand which assists in overall RES-E targets.
2.1	Circular Economy and	<ul style="list-style-type: none"> i. More consistent ground temperatures means that geothermal system energy demand does not increase during cold periods to the same extent as

Section:	Section Title & Summary	GDG Response
	Geothermal Energy	air source systems, and therefore does not apply the same level of pressure to the electricity grid.
2.2	Environmental Protection and Geothermal Energy	<p>i. Note that compliance with environmental protection law is not the only environmental aspect: The positive environmental impact from use of geothermal energy should be highlighted: For example, air quality can be improved compared to combustive heating / energy processes, CO2 emissions can be reduced, and due to the minimal ground footprint, surface site impact can be reduced compared to other means of energy supply.</p> <p>ii. Legislation should aim to reduce the likelihood that projects are unnecessarily delayed by standardising elements of the application process (EIS and others), and creating appropriate exemptions for systems of certain scales and in certain use cases.</p>
3	Purpose and Scope of this paper	<p>i. Recommend a firm commitment to setting targets for geothermal energy production and timelines</p> <p>ii. Note that are in a position to assist the Department with studies regarding aspects of geothermal energy such as costs and comparisons with other renewable sources, technical implementation, pricing and financial supports.</p> <p>iii. Welcome the recognition that geothermal is uncertain, and an attempt to reduce risks by undertaking drilling and data acquisition, though later attempts at categorising projects does not take this uncertainty into account.</p>
4	Engagement with the public in harnessing Ireland’s geothermal resources	i. Noted that public engagement is critical. Is there any scope for the Department, or through other government agencies (such as SEAI or a new geothermal unit) to carry out additional public engagement activities such as awareness / educational campaigns.
4.1	Geothermal Energy Advisory Group	i. GDG are willing to engage as part of a Geothermal Energy Advisory Group.
4.2	Information Resources for the public	i. Inclusion of geothermal in the SEAI information and grants could greatly increase public awareness and engagement.
4.3	Access to land	Supported / No additional comments.
5.	Geothermal Energy Explained	<p>i. Note that geothermal energy is a very scalable energy source and can be economical over a wide range of projects (favourable economics is not limited solely to large scale projects)</p> <p>ii. Carbon footprint associated with harnessing geothermal heat (for example, electricity used for pumping of heat or fluids) can be easily offset by use of a green electricity source.</p> <p>iii. Same principal as the highly successful Air Source Heat Pump, but by drawing heat from the ground there is less variation, hence greater efficiency and lower electricity consumption.</p>
5.1	Geothermal energy resources	Supported / No additional comments. i. Figure reference error on page 13.
5.2	How geothermal energy can be used	<p>i. Recommend a general statement is made on any future documents that any process where heat is required could be supported by geothermal energy.</p> <p>ii. 5.2.1.2 Recommend explanation of generations of district heating applications in future documents (mentions 4th & 5th gen)</p>

Section:	Section Title & Summary	GDG Response
		<p>iii. Any mention of DH should also include reference to the benefits of economies of scale, energy poverty alleviation, emissions reductions, and energy cost reductions they can offer.</p>
5.3	Geothermal Project Archetypes	<p>i. Recommend adding a clear definition for system / technology output in alternative units such as kWh, or using alternative and more sophisticated means to define project archetypes and thresholds – State whether this refers to the total heat harnessed from the subsurface source (for example, to ensure no confusion with heat generated downstream of a heat pump)</p> <p>ii. Closed loop systems – Technology is evolving rapidly; it may be possible to achieve electricity production through advanced closed loop systems that do not require enhanced geothermal systems / hydraulic fracturing of subsurface formations.</p> <p>iii. Definition of 70kW limit for small scale heating – If this limit is used to define legislative approach, could lead to arbitrary project designs, for example a 140 KW heating project could be split into two 70 kW projects, resulting in lost engineering efficiencies.</p> <p>iv. Difficult / Not possible to define a project in advance of exploration, meaning these archetypes only apply to existing projects and cannot be applied in advance, therefore applying the correct regulatory framework is also not possible in advance of initial exploration.</p>
5.4	Geothermal Projects and Regulation	<p>i. 25 kW threshold is proposed for closed loop systems, however in the archetype definitions in Section 5.3 this threshold is not introduced, reasoning is also unclear/absent.</p> <p>ii. A differentiation is proposed for deeper / more complex projects, recommend that a further differentiation is extended between projects where EGS systems are not required or are deployed, and that measures are recommended for the latter (i.e. to differentiate between projects where subsurface hydraulic fracturing may be utilised).</p> <p>iii. For projects where water abstraction is employed, existing legislation is in place with the EPA that could be utilised.</p> <p>iv. Updated legislation may be required for applications where water is abstracted, the heat removed, then the cooled water is re-injected into the subsurface, resulting in a net zero water removal from the subsurface.</p>
5.5	Geothermal Project Stages and Activities	<p>i. The DECC can make a great contribution to supporting new projects through minimising project risk, by taking steps to support the GIS in further establishing a public data set of Ireland’s onshore geology, including geothermal gradients and, where available, mapping of stratigraphy and formation characteristics such as thermal conductivity, porosity and permeability.</p> <p>ii. Recommend that the DECC considers support mechanisms for geothermal exploration</p> <p>iii. Recommend that the DECC categorises risks associated with geothermal projects as a means to establish a consistent approach to risk management – as an example, a multiple shallow borehole project may have a very different risk profile to a single, deep well, but may have a similar energy output.</p>
6	Outline Regulatory Framework for Geothermal Energy	<p>i. Welcome a leasing model but highlight that provisions must be in place to prevent hoarding and ensure that leasers advance the projects in earnest such as through timed milestones. Failure to advance projects should result in a lease/permission being withdrawn.</p>

Section:	Section Title & Summary	GDG Response
6.1	Environmental Protection and Geothermal Energy	<p>i. Deep drilling is mentioned in a number of places in the document – recommend a definition of deep drilling is established – and consideration to overall project scale is incorporated as a means to establish appropriate levels of control, hence, a level above which the project is considered ground source only, and not subject to the same controls as geothermal should be established.</p> <p>ii. An example or template EIAR that addresses potentially common geothermal issues should be produced, highlighting that increased focus should be required regarding soil and water, but also recognising that many geothermal projects have minimal impacts on fauna and landscape for example.</p>
6.2	Ownership of Geothermal Energy	<p>i. Welcome formalising ownership such that a leasing model can be put in place.</p>
6.3	Geothermal Regulatory Authority	<p>i. Guaranteeing access to a specific volume of heat would appear to be something that the government cannot do as it depends first on the exploratory work, the confirmation of a certain resource, and then the competent design and operation of a facility. GDG would suggest that a range be specified and that the government is not responsible if that range is not met.</p> <p>ii. When determining the lease performance requirements the alternatives must be considered to avoid rejecting a project that is then, for example, forced to continue to utilise fossil fuels or another unfavourable solution.</p>
6.4	Thresholds	<p>i. Current proposal to define projects by kW will not differentiate for example between a project consisting of multiple shallow wells within a fixed site boundary supplying space heating, and a deep well aiming to generate electricity, which should be treated differently.</p> <p>ii. A justification of thresholds is required, along with additional criteria including for example well depth, number of wells, drilling direction.</p> <p>iii. Unclear to what part of the system the kW figure relates, final delivered power, pumping power, thermal energy content of pumped fluid etc.</p>
6.5	Registration	<p>i. Propose Ground Source Heat Pump for dwellings be exempt from such registration or be the responsibility of installer.</p>
6.6	Licencing process	<p>i. Flexibility should be allowed for developers to propose alternative energy projects where the resource is found to be less than expected, for example by extending the area, increasing the number / depth of wells, or including a back-up, thus reducing the risk associated with the project. Proposals for such can be outlined alongside the initial submission.</p> <p>ii. 6 years with a single review at the midpoint does not reflect the extent of the opportunity, or urgency of the issue that geothermal can address. Suggest developer must submit proof of project advancement annually as well as deviations from the agreed work programme.</p> <p>iii. Knowledge sharing will be essential to de-risking investment, where projects / leasees have the protection of the state in such that they will deny permission for projects that infringe on existing projects, it would appear unnecessary to withhold data for extended periods as suggested.</p>
7	Data, Knowledge Gaps and Research Areas	<p>Consider data management and ownership and the potential contribution to national deployment of geothermal technologies, including commercial project data.</p> <p>Consider further research support for geothermal technologies, through GSI, grants, and university or industry projects.</p>

Section:	Section Title & Summary	GDG Response
8	Conclusion	Recommend any future conclusions to highlight the limited timeframe to reach emissions targets and the role that geothermal energy can play as part of an integrated energy policy. Highlight the commitment to promote development of geothermal resources, along with the profound benefits that can be realised for Ireland’s energy use and society.

b) GDG Consultation Response to SEA Environmental Report

Reference Document: the Environmental Report prepared as part of the Strategic Environmental Assessment process

Document Location: <https://www.gov.ie/en/consultation/d07f7-consultation-on-the-draft-policy-statement-on-geothermal-energy-for-a-circular-economy-and-associated-sea-environmental-report-and-aa-natura-impact-statement/#>

Specific Response by Document Section:

Section:	Section Title & Summary	GDG Response
	Non-Technical Summary	The non-technical summary begins by stating that geothermal energy has failed to develop as a significant source of heating – it should be highlighted that geothermal energy has been successfully deployed in other countries, some with similar subsurface and ground conditions, with minimal environmental impact. The study could question why this is the case. The SEA methodology outlined mentions assessment of potential impact against 9 environmental topics – however, the subsequent summary table mentions only negative impacts where the relationship to the draft policy statement is tabled – Positive Impacts at a strategic level, such as significant reduction in emissions, positive societal benefits, improvement in air quality, minimum impact land usage, and profound potential improvement of national energy and economical security appear to be a significant omission of this report. For a strategic review, a holistic, balanced approach to assessing the overall impact on the environment of a policy (including positive aspects) should be employed.
1	Introduction	No additional comments.
2	Contents and Main Objectives of the Draft Policy Statement	The background mentions that geothermal energy has failed to develop as a significant source of energy, however this is particularly the case for Ireland. Could note that other countries have successfully rolled out geothermal energy projects and highlight best practices (in terms of environment, regulation and society)
3	Strategic Environmental Assessment Methodology	For SEA scoping, some key stakeholders do not appear to have been included in the consultation – For example, the Geological Survey of Ireland, the Geological Survey of Northern Ireland (for cross border and whole island considerations) the International Geothermal Association, and the Geothermal Association of Ireland are well placed to provide expertise in any assessment process.
4	Review of Relevant Plans and Programmes	The review of relevant plans and programmes could be expanded to include case studies / examples of countries where plans and legislation have promoted successful and timely deployment of geothermal technologies.
5	Relevant Aspects of the Current State of the Environment	As above – include and quantify potential for positive impact on policy areas such as Climate, Air Quality & Emissions, Nature, Waste & Circular Economy.
6	Framework for Assessment	No additional comments.
7	Consideration of Alternatives	For alternative scenarios 3 “A national target set for geothermal energy, similar to other renewable energy sectors such as wind”, no significant impact is indicated for all environmental factors – see comments above. Reference is made to the GSI study on district

Section:	Section Title & Summary	GDG Response
		heating potential as the best route to characterise geothermal technologies, there is a large body of scientific and industrial literature that can also be accessed for this purpose.
8	Assessment of the Preferred Scenario	Regarding impact assessments for the preferred scenario, see above.
9	Mitigation and Monitoring	Discussion on definition of deep geothermal drilling – consideration should be given to overall project scope – for example, with this approach drilling many shallow wells may not require EIA but may have a greater impact than one deep well (for an equivalent energy output)
10	Next Steps	No additional comments.

c) GDG Consultation Response to Natura Impact Statement

Reference Document: the Natura Impact Statement prepared as part of the Appropriate Assessment process

Document Location: <https://www.gov.ie/en/consultation/d07f7-consultation-on-the-draft-policy-statement-on-geothermal-energy-for-a-circular-economy-and-associated-sea-environmental-report-and-aa-natura-impact-statement/#>

Specific Response by Document Section:

Section:	Section Title & Summary	GDG Response
1	Introduction	An introductory note – by supporting climate action goals, deployment of geothermal energy has the potential to positively impact all sites, by contributing to the reduction of effects of climate change on natural habitats.
2	Background and Overview of the Policy Statement	No additional comments.
3	Assessment Methodology	Additional sources of information should be considered for direct expertise in geothermal energy, such as the Geological Survey of Northern Ireland (for cross border and whole island considerations) the International Geothermal Association, and the Geothermal Association of Ireland.
4	Overview of the Receiving Environment	No additional comments.
5	Stage 1: Screening for Appropriate Assessment	No additional comments.
6	Stage 2: Appropriate Assessment	Impact predictions include potential positive contributions, as above (Reduction in CO ₂ emissions resulting in indirect positive effects for Natura network is mentioned). Not clear if there is a distance from sites or project scale threshold beyond which it could be automatically concluded that AA would not be required. List of possible impacts, but little quantification of likelihood or provision of benchmark activities for context. The heat volume guarantee, and associated performance requirements in the form proposed are most likely unworkable. See previous comments regarding project threshold specification.
7	Mitigation Measures	Appears to indicate that AA screening is required for any project, regardless of scope. Consider exempting projects below a certain threshold, or putting in place a mechanism to standardise / streamline this process.
8	Preliminary Conclusions: Draft Policy Statement	No additional comments.
9	Next Steps	No additional comments.

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