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[redacted]

Url: https://megamicro.org

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

From Department of the Environment, Climate and Communications

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Micro Electricity Generation Association Clg. (MEGA)

Not-for-Profit – Company Limited by Guarantee – Having no Shareholders -founded 2008 in Ireland.

"MEGA is first and foremost a collaboration. It is the diversity and determination of this original group, and its gradual expansion, along with on-going support of the Sustainable Energy Authority of Ireland (SEAI) and other sponsors which has enabled MEGA to pass that critical line where it no longer had to rely on theory and concepts, but could move to the point of referring to research activities and discoveries, which point the way forward, not just for Ireland's Energy Challenge, but the international community."

Sustainable Energy Authority of Ireland (SEAI) – quote from SEAI Website

The Micro Electricity Generation Association (MEGA) owes its origins to the pioneering Wind Generator Design and Development Work carried out, as early as the mid-seventies, on the most extreme and exposed Atlantic Wind Test-Sites in Ireland – among the many outcomes was the modern governor systems, blade design fundamentals, grid modulated inverters. MEGA is a non-for-profit Research, Development and Incubation Organisation involving Active Energy Citizens, Communities, Local Authorities, Research Institutes, and both local and International Energy-Tech Companies. Siemens has worked closely with MEGA since 2008. For over a decade the Micro Electricity Generation Association, MEGA, in partnership with South Dublin County Council has been incubating new Smart Grid Systems through a

unique consortium of Local Authorities, Communities, Research Institutes and Energy-Tech Enterprises on the Tallaght Smart Grid Living-Lab/Test-bed. (www.tallaghtsmartgrid.com). https://www.smartmpower.com/2018/12/13/global-summit-and-expo/ https://www.tyndall.ie/news/consumers-at-the-centre-of-ireland-s-new-community-grid-energy-research-project/

Cellular Smart Grids powered by Prosumers (Active Energy Citizens). For over a decade the Micro Electricity Generation Association, MEGA, in partnership with South Dublin County Council, has also been incubating new Smart Grid Systems through a unique consortium of Local Authorities, Communities, Research Institutes and Energy-Tech Enterprises. What has emerged is a highly automation-friendly Prosumer-based Cellular Smart Grid System. Within each cell bounded by a local substation (or Node) Prosumer Groups (Active Energy Citizen Groups/Communities) are organized, and regulated by contract, to accelerate the roll-out of grid-friendly Distributed Energy Resources by contracting willing prosumers to power-match increasing levels of local generation and preventing spill outside of the contracted cell area – local prosumer production "regulated by contract" is consumed or stored (for later use) in real-time under the control of the dedicated ultra-high speed Micro Grid Stabilizer. In its most basic form prosumers are encouraged to form Community Energy Groups to bring significant Grid Stabilization inside local area cells to free up the grid for long haul power objectives. The net result is increasing prosumer numbers providing increasing Flexibility to modern Grid Systems that are coming under severe pressure from increasing levels of inflexible electricity systems. Effectively Prosumers are being empowered to build balanced Community Grid Systems "behind the meter" – Grid-Edge – *Regulated by Contract*. EUROMET (EU National Physics Laboratories 2012-2016: http://www.smartgrids2.eu/wp-content/uploads/sites/12/2016/03/P2P-1425-MEGA-Cellular-Smart-Grid-presentation-feb-16.pdf IEA Award 2019 Community Grid – Smart Virtual Microgrids.

Introduction

MEGA welcomes the opportunity to input into this consultation process, as an active RDI & Action Association made up of actively participating members from Multi-nationals in Ireland, SMEs, Academia, Local Authorities, Associations, Communities and Expert Citizens – these include the councils of IESA, IrDEA and many other representative associations. MEGA has contributed in every possible way to the 2015 Energy White Paper and through IrDEA the District heating Framework 2020 - the list of submission to SEAI, CRU, ESBN, EIRGRID, IrBEA are numerous, having consumed significant voluntary expert from both expert individuals and experts empowered by employers, both big and small.

Through earlier submissions the barriers to the use newly harvested and stored data has been highlighted as a road block to developing a definitive view over fuel mix and usage across the state but also the future role of Geothermal resources.

As per previous submission we would ask DECC to inform the relevant bodies to seek out, with urgency, new ways of opening up access appropriately to data on building heat demands or data to allow estimates of heat demand, is fundamental to developing DHC systems - it has become increasingly difficult to obtain data, even public data, on buildings in order for heat demand modelling and mapping to be carried out. Census data that was available at small area level is now unavailable for 2016 Census due to misinformed use of GDPR. It isGDPR

has become an excuse for many public bodies not to release data, as their legal teams are overly cautious on releasing data. This is a problem for ALL energy research, not just DHC, but particularly relevant for DHC given its reliance on locational data attributes for spatial analysis.

We would therefore ask that DECC to seriously consider and revise the policy on data control and advise relevant bodies such as the CSO & SEAI. Semi-state energy utility companies, while they hold commercially sensitive customer data, have data that can be anonymised easily to allow researchers to assess the most cost-effective and low-carbon solutions for heating in Ireland. Allowing these companies (particularly fossil-fuel companies) to retain this data only for their own use reinforces the status-quo and does not allow a level playing field for new technologies and solutions to gain the same market insights. This data needs to be made available to Local Authorities who are developing new DHC utilities for the public good and helping to meet national level emissions targets.
Section 7 of the Draft Document gives a new road map to develop and maintain Data into the future, which is welcome however, existing/historic data is required to develop systems across the state.

Feedback from Expert Members of MEGA

We agree, in general with the GAI position, as conveyed, and hereby submit our recommendations. We would ask that Geological Association of Ireland, or Causeway GT views, be given greater weight than our own feedback, when weighing up the Pros and Cons. MEGA concedes it simply cannot match the expert knowledge of these bodies at this point. There are aspects not taken up which we hope to add from our knowledge bank, but the general view is 99% all good. It is of great importance in finding a balanced policy approach which ignites this industry and gives fire that a whole sector of the Energy Transition "Heat" which, we believe, has now fallen into disarray and short-sighted strategy driven by short-term profit only and poor long term change.

"We support the intent of a strong policy with associated regulatory body to oversee geothermal energy. We strongly support the approach of having a Geothermal Energy Advisory Group (we could assist here) to aid the process of developing the policy and regulatory framework.

Key elements where we believe the draft policy can be strengthened include the following:
• Use this consultation to the fullest to come up with very clear and universally acceptable goals.

- **There needs to be now or soonest possible:**
  - Clear numerical **targets** for geothermal adoption (different targets for Shallow and Deep) aligned to Ireland and EU targets for heating and cooling;
  - **Incentives** for adoption of geothermal (Shallow and Deep different); and
  - Clear policy statement on the building of **capabilities** to deliver policy targets.
  - **Shallow** (<500m) and **Deep** (>500m) Geothermal to be be separated as they have different characteristics that require different treatment in policy and regulation. (Shallow can bee seen as solar … deep equated to mineral rights somewhat – but we do see a gradual revolt and informal sector growing if this "one-resource-view" is made legally binding.
- Shallow Systems that have **low impact should be automatically Permitted**:
- Propose a Net Energy Yield/Usage per Unit Area of property is a more appropriate classification than a maximum energy used (e.g. in kW/m_2 not a kW);
- Below an appropriate kW/m_2 threshold Shallow systems be registed only (the permit is automatic). Over the threshold GSRO review possible project permits;
- For systems with wells closer to (5m) or outside the property boundaries, a permit should be required from the proposed GSRO.

Deep Geothermal should be licensed:

- **But is licensing by area appropriate? There must be other less confining and accessible options** – could this be abused by big operators and speculators?
- All commercial and industrial systems should register their usage quarterly

We agree that the proposed objective be: ***"the policy aims to promote the sustainable development of Ireland's geothermal resources such that they play a material role in decarbonizing heating and cooling for residential, public, commercial and industrial uses as a key element of fulfilling Ireland's climate and EU commitments".***

The policy in its statements and in how it sets capacity levels is purely focused on heating when geothermal heating/cooling and storage of heat have the potential to play a material role in the Irish sector. As a proportion of energy use in Ireland, Heating/Cooling is the largest user (Figure 2) of energy with very little use of renewable sources. The lack of use of renewables in this heating/cooling is materially impacting Ireland's ability to meet its climate objectives. Without clear targets for sectors that can decarbonise this element of our energy sector this misstep unlikely to be rectified.

The lack of clear targets is disappointing and inconsistent with other energy policies recently published by government. Many of our EU partners have demonstrated that geothermal can play a material role in heating/cooling across multiple sectors which significantly reduces greenhouse gas emissions in sectors where Ireland has failed to come anywhere close to meeting its targets. The target (RES-H target) was for 12% of energy used for heating and cooling to come from renewable sources in 2020. The actual RES-H achieved in 2020 was 6.3%, falling well short of the national target (Figure 3). This poor progress in RES-H was the main reason for failing to meet the overall RES target (SEAI 2021 report[6]). The RES targets are mandatory under EU Renewable Energy Directives Ireland is lagging peers in the decarbonisation of heat and in the use of **Shallow geothermal** in countries that have similar Shallow geothermal resources and population densities. In 2020, renewable energy accounted for 23% of the total energy used for heating and cooling in the EU, steadily increasing from 12% in 2004 and 22% in 2019. Renewable energy sources used for heating and cooling include solar thermal, geothermal energy, air and water ambient heat captured by heat pumps, solid, liquid and gaseous biofuels and the renewable part of waste[7].

Sweden and Ireland have similar shallow geothermal resources (low enthalpy). In 2019 the shallow geothermal energy systems provide approximately 23 TWh of heating and cooling in Sweden, of which around 17.5 TWh is renewable heat from the ground and approximately 1.1 TWh is a free-cooling from the ground. The total installed heating and cooling capacity in Sweden was approximately 6.8 GW[8] This compares to approximately 200 MW of installed capacity in Ireland in 2019[9]. This is circa 30 times less capacity in Ireland which has 50% of the population. In fact, Ireland has a higher population density than Sweden (75 versus 25 people per km^2)[10] and should be more suited geographically.

One powerful action that the Policy could take is to state that **geothermal must be assessed for deployment in publicly funded buildings** that are new builds or where there is material change in the heating/cooling systems that considers the cost and carbon savings of geothermal. This would demonstrate government leadership in reducing their dependence on fossil fuels for heating and cooling of government sponsored buildings. Additionally, by inducing activity in the sector it would give the opportunity for more examples for other potential users to consider as they look at geothermal for decarbonising their heating and cooling.

Geothermal Energy and Climate Action

The policy states that geothermal here is the "heat radiating from the Earth's core, or stored heat from the Sun". With that, the policy is looking to cover all forms of geothermal development. However, in this section it appears to mix the shallow ground source resource – which is available everywhere in

Ireland – with the deeper geothermal resource that is less evenly distributed (in some areas you need to go deeper to get the same heat).
Shallow geothermal resources that are ubiquitous and relatively evenly distributed, well understood in Ireland and can be developed with no risk as demonstrated by hundreds of thousands of deployments across Europe in similar geological regimes. There is approximately 7 **GW** of deployed shallow geothermal capacity in Sweden, the leading country for renewable heating/cooling in Europe (Figure 4). **Deeper Geothermal** is more variable, less well understood, significantly more expensive and less predictable geothermal resources, and has seen less deployment in areas that have significant renewable heat, for example Sweden has only 44 **MW** of deployed deep geothermal.
We recommend a simple divide of Shallow versus Deep (e.g. Germany's federal definition of 500 m would be our recommendation, another equally valid consideration would be 400 m[11]) which would enable a policy approach that will promote deployment in the very short term of Shallow geothermal systems which immediately have the ability to materially impact Ireland's greenhouse gas emissions and impact our 2030 targets. The appropriate regulations, targets and incentives for deep geothermal can then be developed which will enable deep geothermal to play its material role in Ireland's 2050 goals. For the policy to deliver on its title – "Geothermal Energy for the Circular Economy" we suggest that **added to this should** be:
5. Targets for geothermal usage aligned to Ireland and EU targets for renewable heating and cooling;
6. Incentives for adoption of geothermal, that should differ between shallow (e.g. heat purchasing agreement support) and deep (e.g. exploration risk mitigation);
7. Re-skilling and upskilling support for the workforce.
As stated, the lack of **targets** undermines the effectiveness of the policy. Additionally, the lack of any mention of any targets is inconsistent with how Ireland has approached other elements of the energy sector, for example Wind where clear targets have been set
Incentives are highly dependent of the profiles of investment in geothermal, as is the approach to licensing. Our considerations on incentives are detailed later in our feedback to the consultation.

Circular Economy and Geothermal

We agree with the assessment that geothermal is consistent with the Circular Economy. We would go further and suggest that the use of geothermal energy for heating, cooling and storage may additionally be a way of managed electricity demand by using electricity at "off peak" times to store heat geothermally to be used for heating when electricity demand is high reducing electricity demand from heat pumps.

Purpose and Scope of this paper

As the title of the policy is "Draft Policy Statement on Geothermal Energy for a Circular Economy" we believe that the purpose and scope of the document falls short. We would propose the overall objective, aligned with the title should read: *"the policy aims to promote the sustainable development of Ireland's geothermal resources such that they play a material role in decarbonizing heating and cooling for residential, public, commercial and industrial uses as a key element of fulfilling Ireland's climate and EU commitments"*.
Also aligned with the title we would believe that **added to the current intent should** be:

- **Targets** for geothermal usage aligned to Ireland and EU targets for renewable heating and cooling;
- **Incentives** for adoption of geothermal, that should differ between shallow (e.g. heat purchasing agreement support) and deep (e.g. exploration risk mitigation);
- **Re-skilling and upskilling** support for the workforce.

Engagement with the public in harnessing Ireland's geothermal resources

We support the intent of the engagement with public. It is important to focus on developing a bottom up approach as has happened quite naturally elsewhere and can move quickly through primary school to parents with best use of Irish animation and Film-making Skills for rapid assimilation.

Geothermal Energy Advisory Group

We **support** the establishment of a **Geothermal Energy Advisory Group**. Great care is needed to avoid either a technocrat or non-technocrat make-up. People to get the word out, experts, Trusted communicators, Astute political manager, architects and energy experts

Information Resources for the public

We support the elements of the work that look to inform all stakeholders. It should also ensure that it delivers the information the public needs to unambiguously demonstrate the low risk associated with geothermal energy and not only focus on the higher risk approaches to geothermal energy that are used in very specific circumstances and may be limited in their deployment in Ireland. This should be further reinforced with the proven cases of geothermal energy as one of the lowest impact (e.g. Shallow Closed-Loop etc), cleanest forms of energy available.

Access to Land

We agree that the policy needs to clearly articulate how this will be handled and that the Geothermal Energy Advisory Group should have the critical skill sets available to ensure that they can inform the policy. Under our recommended changes this would only be an issue for deep deployments. This is an additional reason to separate shallow deployment that are on the site of the user from licenses for deep that would likely cover multiple surface landowners.

Geothermal Energy Explained

We agree that the policy needs to clearly articulate how this will be handled and that the Geothermal Energy Advisory Group should have the critical skill sets available to ensure that they can inform the policy.

Geothermal Energy Resources

The use of shallow geothermal resources is neglected in this section. Globally shallow geothermal has been used since 1945. Since the mid-1970s France has been installing on average over 10,000 units a year, peaking in the early 1980's at over 50,000. Shallow geothermal in low enthalpy environments has, and can have, a material impact on decarbonising heat. Ensuring that the **distinction between shallow** (ground source heat) and **deep** (earth source heat) is **essential for a balanced policy approach**.

Geothermal Systems

The geological and technological characterisation of the different types of geothermal projects that *could* be delivered is a very useful framework for policy (page 20). We need to add a number of attributes to the framework to make these archetypes most distinct (see Exhibit A). Depth of geothermal resource, as well as the footprint of the developed subsurface resource relative to the surface user facility are critical. A depth threshold needs to be applied to distinguish shallow from deep geothermal resources, as the former can be deployed at pace and scale in the short term, whereas the latter is more reliant on exploration, resource delineation and technology development. We propose a depth threshold of 500 m similar to Germany, however there is no exact number that differentiates shallow v deep. The cut-off can reasonably range from 400m to 800m. An explicit characterisation of the archetypes will help link the necessary regulatory processes and controls. We also suggest that output temperature and the use of the energy (heat or electricity) are important distinguishing factors.