



HotScot Minewater Geothermal Policy Roundtable Summary

By Dr Jamie Stewart, Centre for Energy Policy.

In September 2020 the UKRI Strength in Places funded ‘HotScot’ project, led by the University of Strathclyde, held a policy roundtable as part of initial seed-corn funding activities. Here we summarise the event and the 4 key takeaway lessons learned.

1. The challenge of heat decarbonisation

The setting in statute of mid-century [Net Zero](#) targets at both a UK and Scottish level will require significant changes across our society. The decarbonisation of electricity production and reduction in emissions from industry has seen Scotland emissions reduce significantly over the last decades. However reducing emissions from other sectors, such as transport and heating, present challenges that will require significant changes to national scale infrastructure and how people interact with it.

According to the latest [Scottish House Condition Survey](#), 82% of properties in Scotland are connected to the mains gas grid and use natural gas to heat their homes. Options such as electrification and repurposing the gas grid to transport and utilise hydrogen are proposed to reduce the emissions from the heat sector. There is increasing recognition amongst industry, policy makers and academics that a wide variety of heat decarbonisation options will need to be deployed concurrently.

The most appropriate technology option from both a technical, economic and social perspective will depend on geography, housing type and consumer preference amongst other things. In particular, regional challenges, strengths and opportunities may dictate how different decarbonisation options are taken forward in different locations.

The incidence of fuel poverty ([currently 25% of Scottish households](#)) and the opportunity for economic development in communities challenged with deprivation in Scotland are also key considerations for policymakers set with the task of decarbonising heat.

2. Minewater geothermal – an opportunity for heat decarbonisation with local and national benefits?

The University of Strathclyde recently won early stage funding to develop plans to tap into the geothermal energy contained within disused, flooded coal mines in Scotland which could represent a vast untapped low-carbon energy resource. Flooded coal mines contain water with little to no seasonal variation in temperature making them an ideal heat source for district heating networks to support low-carbon, affordable heating, cooling and heat storage for local communities and businesses.

The project known as ‘HotScot’ is one of 17 shortlisted submissions across the UK chosen by the UK Research and Innovation (UKRI) Strength in Places Fund to develop a full-stage bid that could lead to significant economic growth. If successful, the HotScot consortium will develop at least three new mine-water geothermal (MWG) heating/cooling/thermal energy storage sites in the Central Belt of Scotland.

The UK’s former coal mines are a £3 billion liability, but HotScot can demonstrate how these old mines could become an economic asset. £21 million investment in these sites, in tandem with £16 million research and innovation activities, will demonstrate the commercial potential to private sector investors of low-cost, low-emissions heating, cooling and heat storage for communities and businesses. Development of MWG across Scotland could deliver economic growth equivalent to £303 million and around 9,800 jobs.

While these economic opportunities exist, a poll held by the British Geological Survey (BGS) at a recent geothermal energy innovation workshop, showed that regulation and policy was considered by participants to be the biggest challenge for geothermal developments (Figure 1).

At this early stage, the HotScot project aims to firstly fully understand the current policy and regulatory landscape, with the aim of making constructive policy recommendations if the project is awarded funding and proceeds to full development.

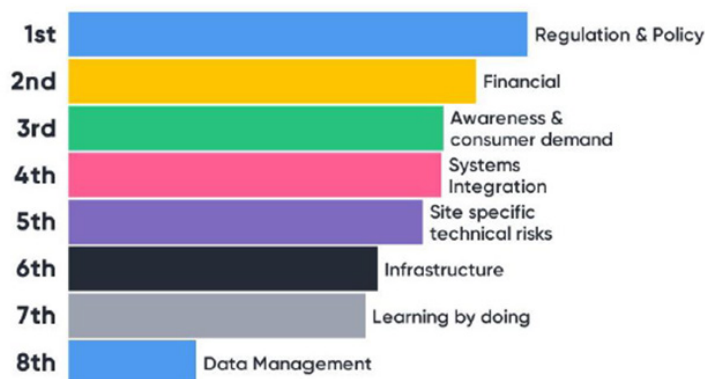


Figure 1 Mentimeter result on ranking of challenges for geothermal by the participants.

Source: Record of proceedings, UK Geoenergy Observatories Glasgow, Geothermal Energy Innovation Workshop, Monday 3rd June 2019, 10am to 4.30pm University of Strathclyde, Technology Innovation Centre, Glasgow

3. Understanding the policy landscape for MWG heat, cooling and storage

In the September 2020 event, attended by a wide range of organisations including Local Authority representatives, Scottish and UK Governments, the Coal Authority, SEPA and civil society organisations, participants heard from the following speakers.

- **Professor Zoe Shipton, University of Strathclyde and HotScot consortium lead** described the HotScot objectives and outlined the projects three key themes of: Minimising technical, geological, environmental, societal risks; maximising socio-economic benefits; and engaging communities in their energy future.
- **Onshore and Subsurface System Policy Unit at the Scottish Government** outlined key features of the legislative programme that contribute towards emission reduction targets, particularly in the heat sector. These include the recently published Programme for Government which included a commitment to; update the Climate Change Plan; publish a refreshed Energy Strategy; publish a Draft Heat Policy Statement; refresh the Energy Efficient Scotland Routemap; publish a policy position on the National Planning Framework 4; and publish a third Land Use Strategy. An update on the Heat Networks (Scotland Bill) which was introduced to the Scottish Parliament on 2 March 2020 to regulate the sector was also provided by the Scottish Government. The Bill aims to stimulate the deployment of heat networks in Scotland by providing regulation which will increase investor, consumer and supply chain certainty as well as building trust in the sector. The Scottish Government also highlighted the role that Planning has to play in addressing climate change and ensuring that communities are sustained and supported across Scotland. Participants were told that the next National Planning Framework (NPF4) will be aimed at radically accelerating emissions reductions. Both of these policies may have implications for the MWG sector.
- **Heat Network Delivery Unit at the UK Government Department for Business, Energy and Industrial Strategy (BEIS)** summarised some of the key learnings from Geothermal energy project development in England. It was highlighted that significant opportunities exist across the UK for coal mining to be used for geothermal energy, thermal storage and cooling and that 5 key factors had to be considered for each project which included: demand; supply; distribution; economics; and commercial. BEIS noted that sites that worked well included factors such as: existing pumped sites; proximate to heat demand; sufficient below ground information; ratio between depth and temperature flow; opportunities to co-locate renewables; strong local connection to coal mining legacy; and horticulture. Barriers to deployment were identified by BEIS as: proximity to demand; lack of demonstrable projects (at scale) in the UK; availability of data on location, temperature and flow; development costs (boreholes, modelling and analysis); well-developed commercial models; and regulation and policy.

4. Key takeaways from roundtable discussions

- **No significant policy and regulatory barriers exist - but the landscape is perceived to be somewhat complex and does not currently incentivise or support widespread rollout of MWG projects**

In 2017 The Scottish Government published [regulatory guidance](#) which outlines the regulatory framework for exploring and exploiting Scotland's geothermal resource. It highlights the key primary and secondary legislation specific or relevant to projects involving the exploration and extraction of geothermal heat from the ground. The guidance summarises that different aspects of a geothermal project require interaction with a range of regulatory bodies including the Coal Authority, SEPA and the relevant Local Authority. The guidance was produced after the recommendation of the Geothermal Energy Regulatory Structure Sub-Group who in 2016 concluded that while the regulatory landscape is sufficient for purpose, guidance would help promote awareness of the current regulations.

The perception of participants at the roundtable was that this assessment remained true today and that evolving regulation, such as the introduction of a Heat Networks Bill in Scotland was seen as an opportunity rather than a barrier to deployment. However, it was noted that a number of uncertainties around policy and regulation needed to support the wider roll out of MWG and heat decarbonisation in general remain. For example, the regulatory framework and licensing around heat produced through MWG was noted as an ongoing source of uncertainty as the regulator does not currently charge for the ongoing extraction of heat.

However this has the potential to change in the future if the sector expanded significantly. It was also highlighted that further regulation may be needed if the sector experiences growth and multiple projects are developed in close geographic proximity where 'heat poaching' could be a risk. The lack of clarity on the future policy framework to support low carbon heat production, such as the continuation of the existing Renewable Heat Incentive (RHI), was also seen as a significant policy barrier to the deployment of MWG projects.

- **There is a need for co-ordination and alignment between energy efficiency, heat supply and regional economic development policy**

The need for coordination between different policy areas was highlighted as a key issue for MWG projects in Scotland. This was noted to be particularly important if geothermal is to play a role in contributing to energy integration - such as at the interface between heat and power. It was noted that policies that aim to reduce emissions from heating existing and new buildings and improving their energy efficiency need to be closely aligned to policies that support the development of MWG projects. Integrating these with regional economic development plans was also seen to be an important factor. It was also noted that although new commercial developments and housing represent a small proportion of total buildings in Scotland, they are often the focus of new Government policy on heat – particularly district heating. It was felt that policies that retrofit heating systems in existing buildings, whether through MWG or not, need to be a focus of ongoing policy development.

- **Improved data on heat supply and demand is needed to develop robust and holistic regional and national heat policy**

A strong theme arising from discussion at the roundtable event was the need for improved data on heat demand and supply. While the Scottish Heat Map does this at a national level, it was agreed that further detail on MWG supply potential in particular was needed to develop supportive policy for the sector. For example, the availability of heat supply and demand data was seen to be an essential component needed for Local Authorities to develop effective and holistic Local Heat and Energy Efficiency Strategies (LHEES) and Local Area Energy Plans (LEAPS). A number of initiatives are underway to improve the availability of data, but it was felt that the HotScot project could help to resolve this issue.

■ **Further supportive policy and regulation may be needed to de-risk MWG activity and ensure long-term consumer demand**

While participants agreed that the Central Belt of Scotland provided a prime location and opportunity to develop MWG projects, it was noted that the final demand for heat, cooling or storage remained a key risk. Some participants stated that MWG projects must provide cost effective, lower carbon solutions than an individual building level solution (such as an air source heat pumps). The relatively cheap cost of current mains gas heating was also perceived to be a barrier to the deployment of low carbon MWG projects. A key question arose around whether policy levers, such as a reduction in business rates or stable heat supply contracts, could be used to increase the competitiveness of the MWG against the current counterfactual – which may be higher carbon. It was noted that these policy interventions could be needed to unlock the wider economic and social contribution that the sector could bring to both the Central Belt of Scotland.

It was also noted that while new policies such as the Heat Networks (Scotland) Bill might provide investors and developers with confidence in the sector, the Bill does not currently include regulations that will control or oversee the price of heat delivered to the consumer. Given consumers connected to a heat network may not be able to switch supplier to reduce costs, as those with a regular electricity and gas supply can, it was felt that policies may be needed to protect consumers and ensure that their heat supply is both reliable and affordable. It was felt that policy intervention in this area would help to ensure that consumer demand for heat, cooling or storage provided by MWG projects would be consistent over time, therefore reducing risks for project developers. It was also noted that policy or regulatory mechanisms that allowed project developers to share risk, especially for public sector led projects, would help to reduce overall project risk for developers and users of the system.

5. Conclusion

The roundtable event highlighted that stakeholders consider that MWG projects in the Central Belt of Scotland present a significant opportunity to reduce emissions and fuel poverty as well as stimulate economic and social development. While regulatory and policy aspects were not seen to present significant roadblocks to project development, a more coordinated, stable and supportive policy environment was thought to be needed to encourage widespread deployment of MWG heating cooling and storage. This policy environment is essential to reduce risk for both project developers and users and operators of the final system. It is hoped that HotScot project can contribute to the development of the policy environment needed to unlocking the key benefits noted above.

The consortium is being led by Professor Zoe Shipton, from the Department of Civil & Environmental Engineering, and includes Glasgow, Heriot-Watt and Stirling universities, British Geological Survey, Coal Authority, Community Energy Scotland, ENGIE, Envirocentre, Ramboll, Scottish Enterprise, SSE Enterprise, Synaptec, Synergie Environ, and TownRock Energy.