Legal and Regulatory Issues in the Development of Geothermal Resources

Professor John Paterson
Centre for Energy Law
Overview

• Legal and regulatory issues raised by
  • Proposal for onshore deep geothermal project in Scotland
  • Possibility of developing geothermal resources offshore
Onshore – Issues

• Who has authority to regulate geothermal in Scotland?
  • Energy in general – reserved to Westminster
  • Onshore hydrocarbons – devolved to Holyrood
  • Power to promote renewable heat – devolved to Holyrood
  • Geothermal?
    • UK and Scottish Governments have discussed this in the context of licensing, but no conclusions reached due to uncertainty over who owns geothermal energy or even how to characterise it...
Onshore – Issues

• What has happened in England?
  • Initial projects permitted on the basis of environmental and planning law

• Relevance for Scotland?
  • Environmental and planning issues are devolved to Holyrood

• Conclusion?
  • Appears that a deep geothermal project could proceed with relevant environmental and planning permission
Scottish Government Guidance

• Scenarios
  • Hot wet rock
    • Sufficient permeability (fractures) and presence of groundwater
    • Geothermal energy could be extracted from abstracted water and reinjected
  • Hot dry rock
    • No permeability (fractures) and absence of groundwater
    • Geothermal energy exploitation would require engineered geothermal system
Scottish Government Guidance

• Three legal and regulatory issues
  1. Risk to the environment
  2. Planning permission
  3. Occupational health and safety
Risk to the environment

• SEPA Guidance – relevant activities
  • Construction and operation of boreholes
  • Abstraction of water
  • Return of abstracted water

• Relevance of Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR)
CAR – General Binding Regulation 17

• A project may be authorised if it meets certain conditions:
  • Abstracted water must be returned to the same part of the geological structure
  • Any volume may be abstracted, but volume not returned must not exceed 10m$^3$/day
  • No substances may be added to (or allowed to enter) water prior to return
  • Must be able to demonstrate net abstraction below 10m$^3$/day
  • Water leakage must be minimised
  • No activity within 250m of abstraction for human consumption
Planning and Occupational Health and Safety

• Planning
  • Permission would be required for boreholes, wellhead development and ongoing operations

• Health and Safety
  • No specific regulation for geothermal operations
  • Health and Safety at Work Act 1974
  • Borehole Sites and Operations Regulations 1995 (supplemented by guidance)
  • Offshore Installations and Wells (Design and Construction) Regulations 1996
  • Ionising Radiation Regulations 2017
  • Waste Management Regulations 2017
Any legal and regulatory problems?

• Standalone project looks relatively straightforward
• What about multiple neighbouring projects?
• Would require relevant regulators to consider impact of new developments on existing ones
• SEPA? Planning Authority?
• They already have to consider such issues, but would they have the relevant information to make an assessment of possible negative impacts on geothermal energy potential?
• Note EA disclaimer in England re GSHPs
• Licensing regime required?
Offshore

• Scenarios
  • Geothermal co-production with hydrocarbons
  • Geothermal repurposing from hydrocarbon operations
  • Standalone geothermal production (drilling dedicated boreholes)
Offshore – Issues

• Does a coastal state have the right to extract geothermal energy in its exclusive economic zone?
• Not specifically mentioned in UNCLOS, but no obvious prohibition
• Coastal state has sovereign rights to:
  • Explore for and exploit natural resources of continental shelf (including subsoil) (defined broadly to include mineral and non-living resources, including in the subsoil)
  • Authorise and regulate drilling for all purposes
Offshore – Issues

• Continental Shelf Act 1964
  • Any rights exercisable by the UK outside territorial waters with respect to the seabed and subsoil and their natural resources...are hereby vested in Her Majesty

• Thus, any proposal to exploit geothermal energy offshore will require authorisation of the state

• But who will grant such authority?
Scenario 1 – geothermal co-production

• Conversion of the heat energy present in produced water
  • Appears to be a simple adjunct to existing process
  • Currently treated as waste
  • Key issue offshore is contamination rather than heat of returned water
  • No regulation of abstraction
  • Nothing in licence appears to prevent it
  • Would need to consider implications for Safety Case
Scenario 2 – geothermal repurposing

- Transitioning of existing hydrocarbon producing wells from scenario 1 to dedicated geothermal energy production or new purpose as alternative to decommissioning
- Geothermal is no longer an adjunct to an existing process
- Specific authorisation required
- Licensing analogous to hydrocarbons?
- Analogy is not precise – geothermal involves reinjection of the medium from which heat is extracted rather than depletion of a finite resource
- Suggests that a Crown lease would also be required (e.g. wind, CCUS)
Scenario 3 – standalone geothermal production

• Dedicated offshore wells drilled with main objective of geothermal heat extraction
• Need for state to characterise offshore geothermal potential
• The possibility of one project impacting another
• All leads to a stronger case for lease and licence approach
• Which regulator?
  • NSTA
  • SEPA/EA
  • CE/CES
• A case can be made for any one of these depending on how geothermal is perceived and characterised
Conclusions

• There appear to be few if any legal or regulatory obstacles to the development of pilot deep geothermal projects onshore and co-production projects offshore

• Once we begin to think on a larger scale, the case for licensing onshore and licensing and leasing offshore becomes stronger

• We can draw inspiration from other energy sectors as well as from other jurisdictions

• Benefits include greater certainty for potential investors