Main Conclusions from the Survey – the R & D Activities in ERA NET Countries Barriers & Opportunities

Part II

On behalf of the ERA NET Team:
Baldur Petursson, Orkustofnun
Sigurður Björnsson & Lilja S. Jónsdóttir, Rannis (Iceland)
Gunter Siddiqi, SFOE (Switzerland)

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Typical investments into geothermal energy research and innovations as reported to the IEA (subset of ERA-NET countries)
Public R&D funding is mostly at low TRLs

TRL - Technology Readiness Levels

1. Basic Technology Research (to enable technologies)
   - TRL 1

2. Research to Prove Feasibility
   - TRL 2

3. Technology Development
   - TRL 3

4. Technology Demonstration
   - TRL 4

5. System / Subsystem Development
   - TRL 5

6. Technology Demonstration
   - TRL 6

7. System test, Launch & Operations
   - TRL 7

8. System test, Launch & Operations
   - TRL 8

9. System test, Launch & Operations
   - TRL 9

CRI - Commercial Readiness Indices

1. Hypothetical Commercial Proposition
   - No dedicated geothermal “pot”

2. Commercial Trial / small-scale

3. Commercial Scale Up

4. Multiple Commercial Applications

5. Market competition driving deployment

6. Bankable Projects

Barrières to research and innovation

Technical
Required tools, equipment, processes and methodologies can not be developed efficiently; lack of stable framework for transnational collaboration (EC is an exception, but calls too infrequent to enable long-term durable cooperation).

Economical
Companies are usually SMEs without access to significant financial resources

Commercial
Intellectual property rights do not foster an open, collaborative research and innovation environment

Organizational
Applied research and innovation is difficult to achieve in operational settings. Research communities need to interact more strongly with one another and a willing industry.

Political
In many countries the political will to invest in geothermal research and innovation is limited (poor public perception, weak (often insignificant) national networks to promote geothermal energy research and innovation)
Existing opportunities

• Important and historic background on hydrothermal systems
• High level of knowledge in academia
• In some cases a large degree of internationalization.
• Operators are in general readily open to grant access to researchers.
• Follow the Italian example of research collaboration with industry and availability of national labs
• Beginnings of organized research infrastructures (EPOS)
New opportunities

• Improved information and data exchange
• Raising awareness of geothermal energy’s credentials as a green and renewable energy resource
• A “lighthouse”-project to show that geothermal energy is a valuable technique for almost any geological setting.
• Demonstrate reliability to investors.
• Drive towards improved reservoir management
• Development of start-up community.
• European joint call for research and innovation (GEOTHERMICA*)
• Develop a back-bone for a transnational European geothermal innovation system (GEOTHERMICA)

*GEOTHERMICA; ERA-NET Cofund Action on Geothermal Energy within the H2020 framework of the EC (currently under development)