Proposed Joint Activity

Financial Instruments and Funding of R&D and Geothermal Projects

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Geothermal ERA NET Meeting

Offenburg, Germany

4 March 2015

Overview of the presentation

- Objectives and structure of the project
- Funding of geothermal projects
- Funding of R&DD in geothermal projects

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The Overall Objective

- To improve the synergies between different players
- Better understanding of this financial landscape - to highlight barriers and recommend practical solutions
- Knowledge exchange will enhance cooperation and lower barriers and improve joint programming and better funding instruments and opportunities.

Process description

- Analyse the financial instruments that are available and – and map the operational structure of the different national funding bodies

- Highlight the main barriers and opportunities, and how these instruments can more easily work together

The Team – 10 Countries

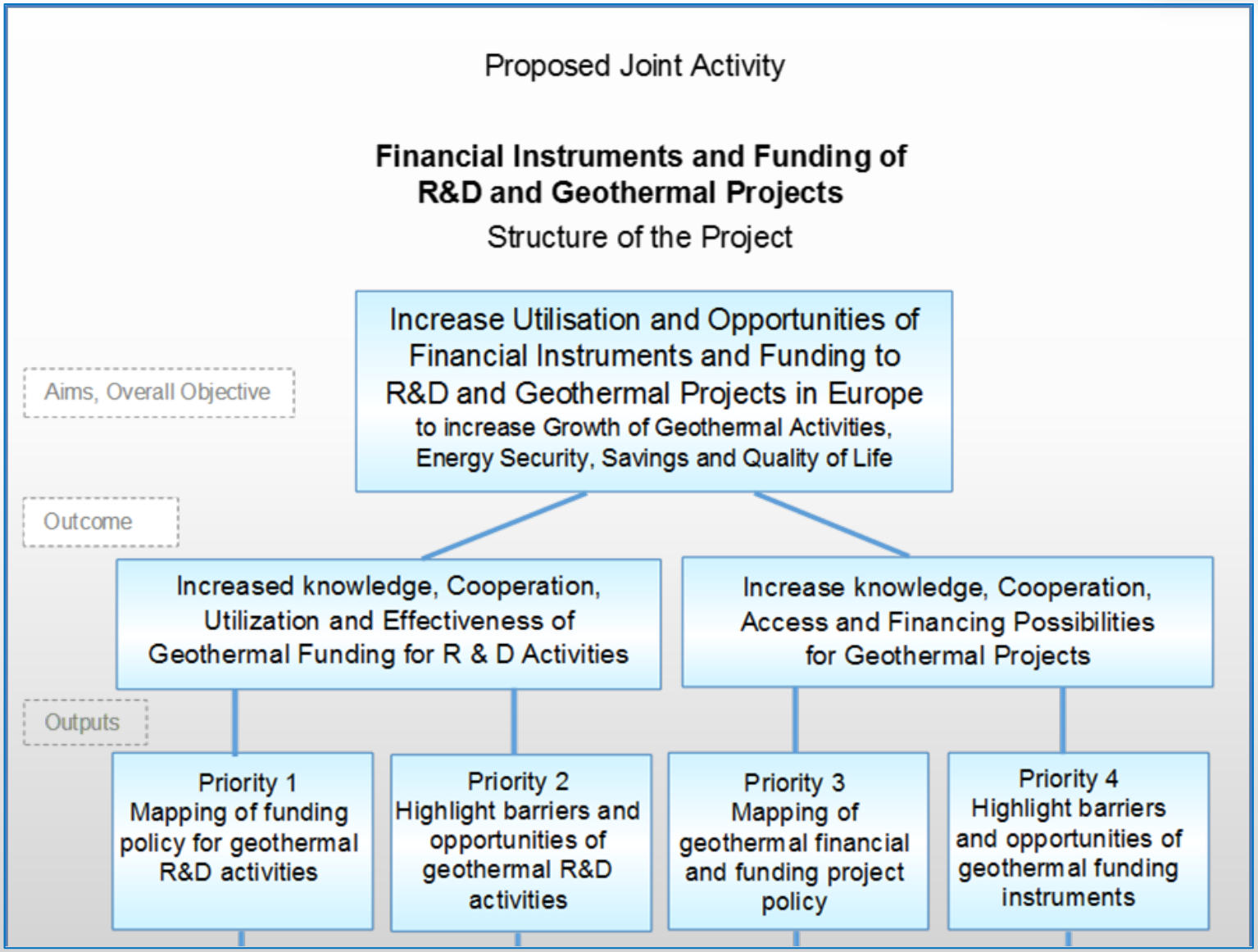
Steering Committee

	Country:	Person in charge:
Leader 1: A	Iceland/Rannis	Sigurdur Bjornsson
Leader 1: B	Iceland/OS	Baldur Petursson
Leader 2:	Switzerland	Gunter Siddiqi

Participants

	Country:	Person in charge:
Partner 1:	The Netherlands	Ramsak/Breembroek
Partner 2:	Portugal	Mathilde Cunha
Partner 3:	Germany	Stephan Schreiber
Partner 4:	Slovakia	Igor Kosic
Partner 5:	Hungary	Annamaria Nador
Partner 6:	Turkey	Kaan Karaoz
Partner 7:	Italy	Adele Manzella
Partner 8:	Slovenia	Andrej Lapanje

Aims, Outputs and Priorities



Activities and Deliverables

Activities

- Coordinated desk research – meeting with experts – collection of data from countries
- Evaluation of existing instruments and national markets
- Working meetings e.g. with stakeholders regarding relevant topics
- Drafting report
- Evaluation of option regarding - possible Joint Call

Deliverables

- Report - Recommendations for financial instruments for the development of geothermal R&D and for the development of geothermal projects in Europe.
- Conclusion Seminar - Barriers & Opportunities and Policy recommendation.
  - National research funding
    - Needs –Barriers – Opportunities and Policy recommendation.
  - Financial funding for geothermal projects
    - Needs –Barriers – Opportunities and Policy recommendation
- Implementation of Joint Call

Process description – draft timing

Timing

	April	May	June	July	August	Sept	Oct
Preparation and planning							
Coordinated – desk research							
Working Process							
Group Meetings							
Working meetings with stakeholders							
Additional items							
Conclusion seminar/workshop							

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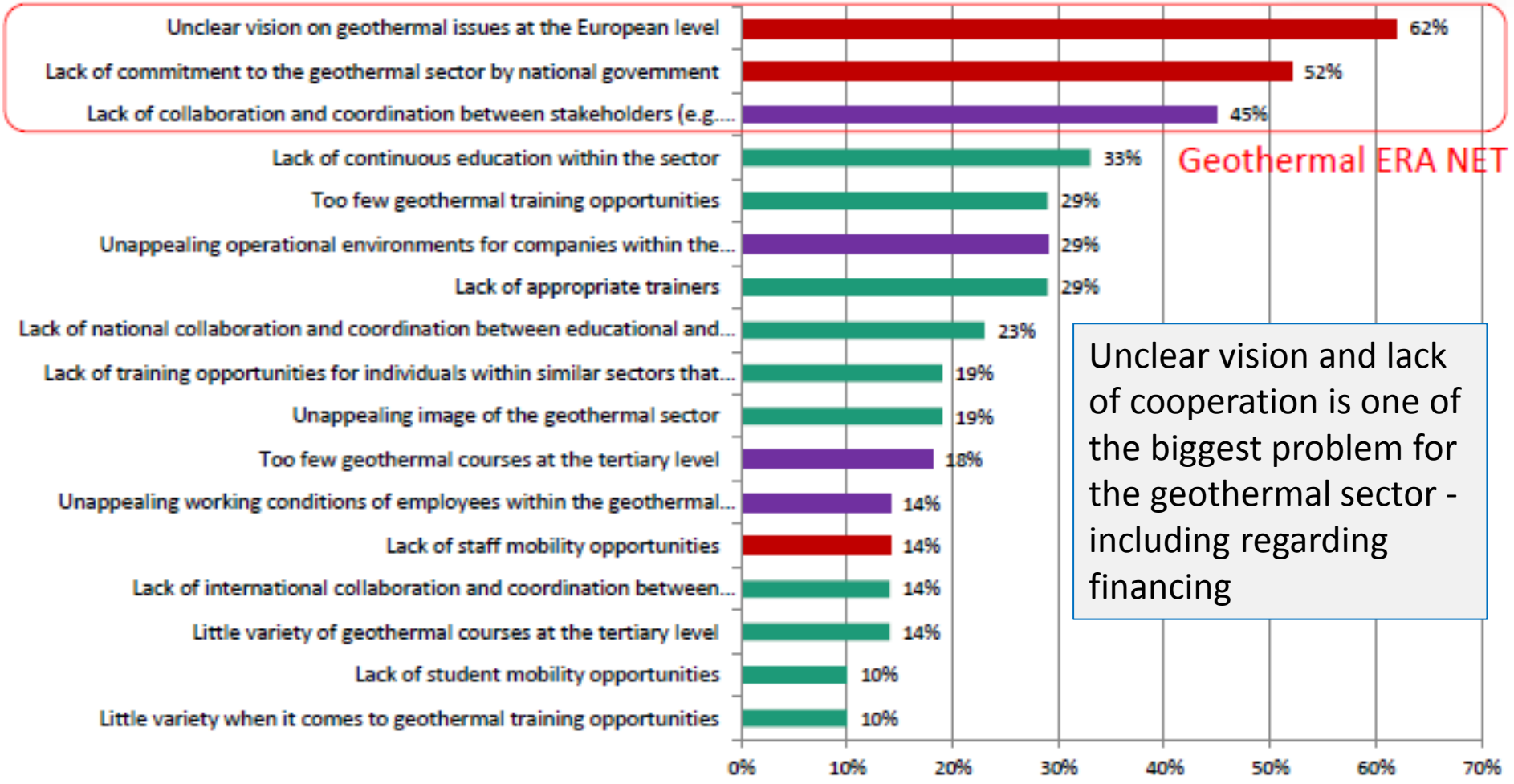
The Main Geothermal Problems



Unclear vision and lack of cooperation is one of the biggest problem for the geothermal sector - including regarding financing

Factors deemed of high importance as contributors to a lack of human resources within the geothermal sector. Educational factors are coloured green, policy/sectorial factors red and industry factors purple

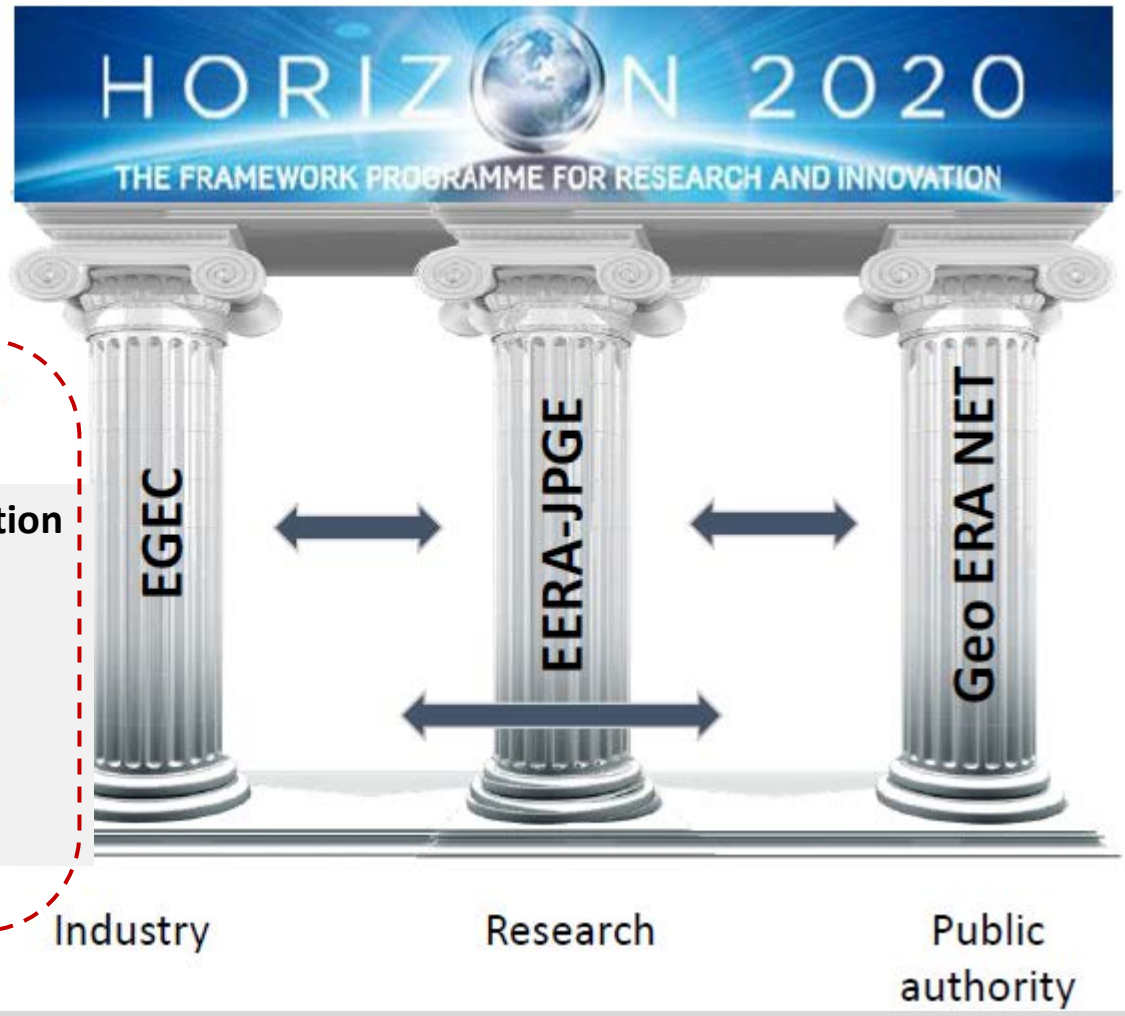
Geothermal ERA NET
Coordination Office
Orkustofnun, Iceland

The three pillars of the EU Geo Policy

Formal communication necessary

Industry, Banks, etc - Cooperation

- Practical information
- Using existing information
- Highlight barriers
- Financial - opportunities
- Awareness – building
- Policy - recommendation



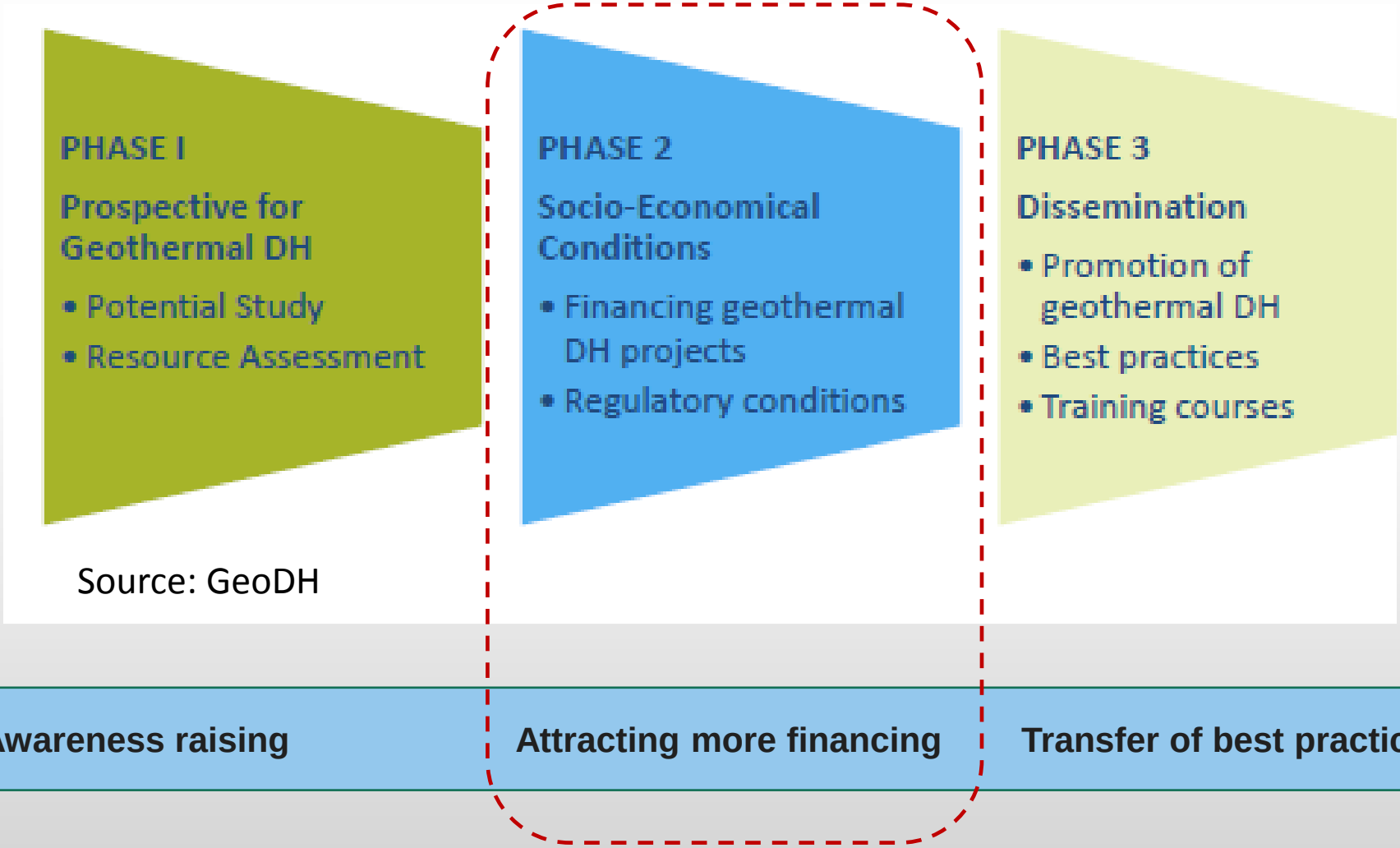
Geothermal Financial Barriers - EGEC

Barriers to Geothermal Development
District Heating

Financial barriers

- Risk associated to the first drilling and its coverage;
- Capital intensive (2,2 Mio € / MWth);
- Need new business models to make GeoDH economically viable;
- Fragmented and very limited support financial support; unfair competitive with conventional sources

Geothermal Financial Barriers - GeoDH



How can we scale up Geothermal Financing? Global view – WB / IFC

Sponsors

- Geothermal Expertise
- Local knowledge
- Financial Resource
- Scale to be able to finance on a corporate/portfolio basis

Source: IFC

Regulatory / Sector Framework

- Transparent, predictable and sustainable
- Geothermal Incentives
- Standardized contracts
- Public role in bearing geothermal resource risk?

Scaling up Geothermal Financing

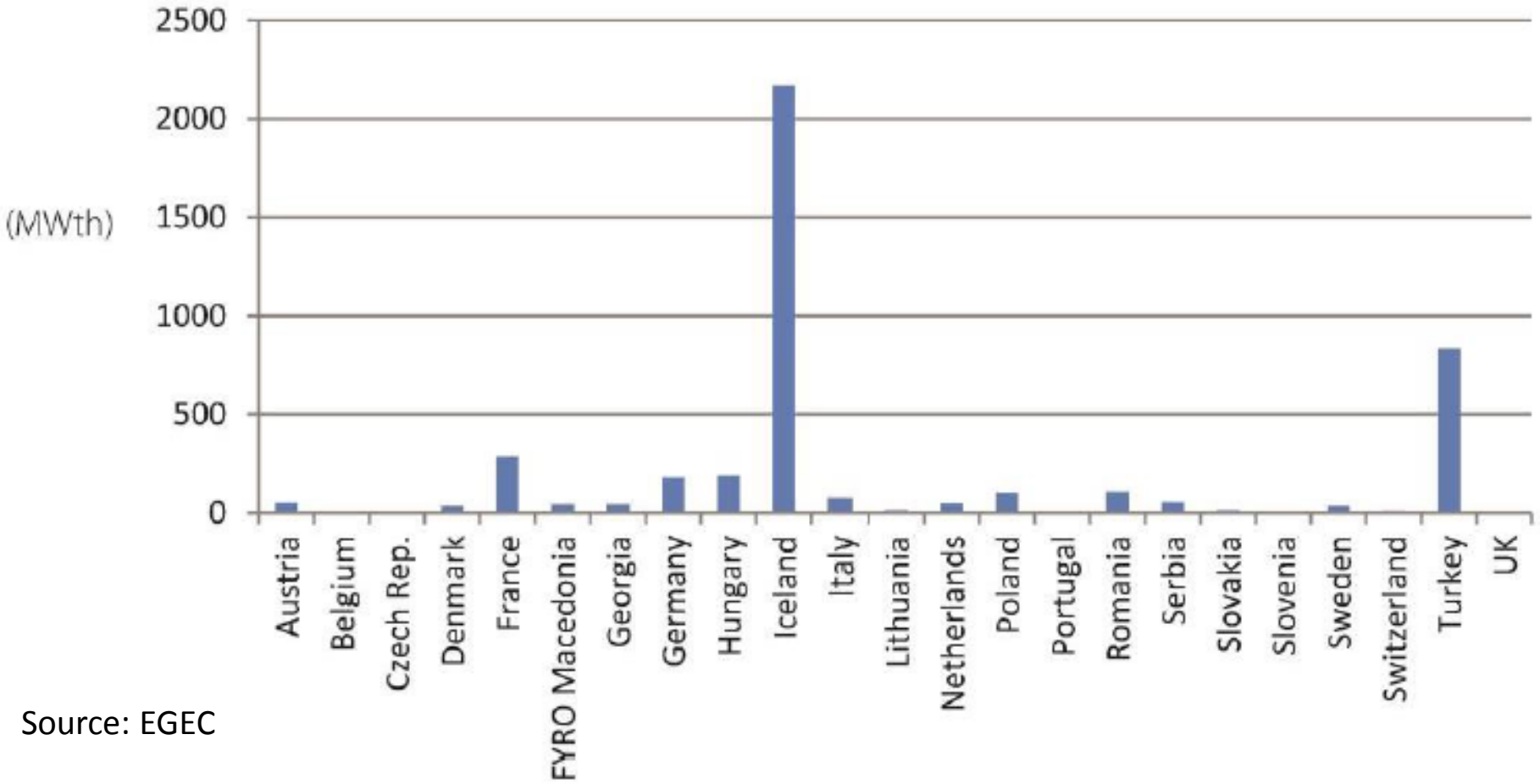
Technologies

- More accurate and faster resource assessment
- Faster and less costly drilling
- Reduction in US$ per MW and equipment lead-time

Lenders

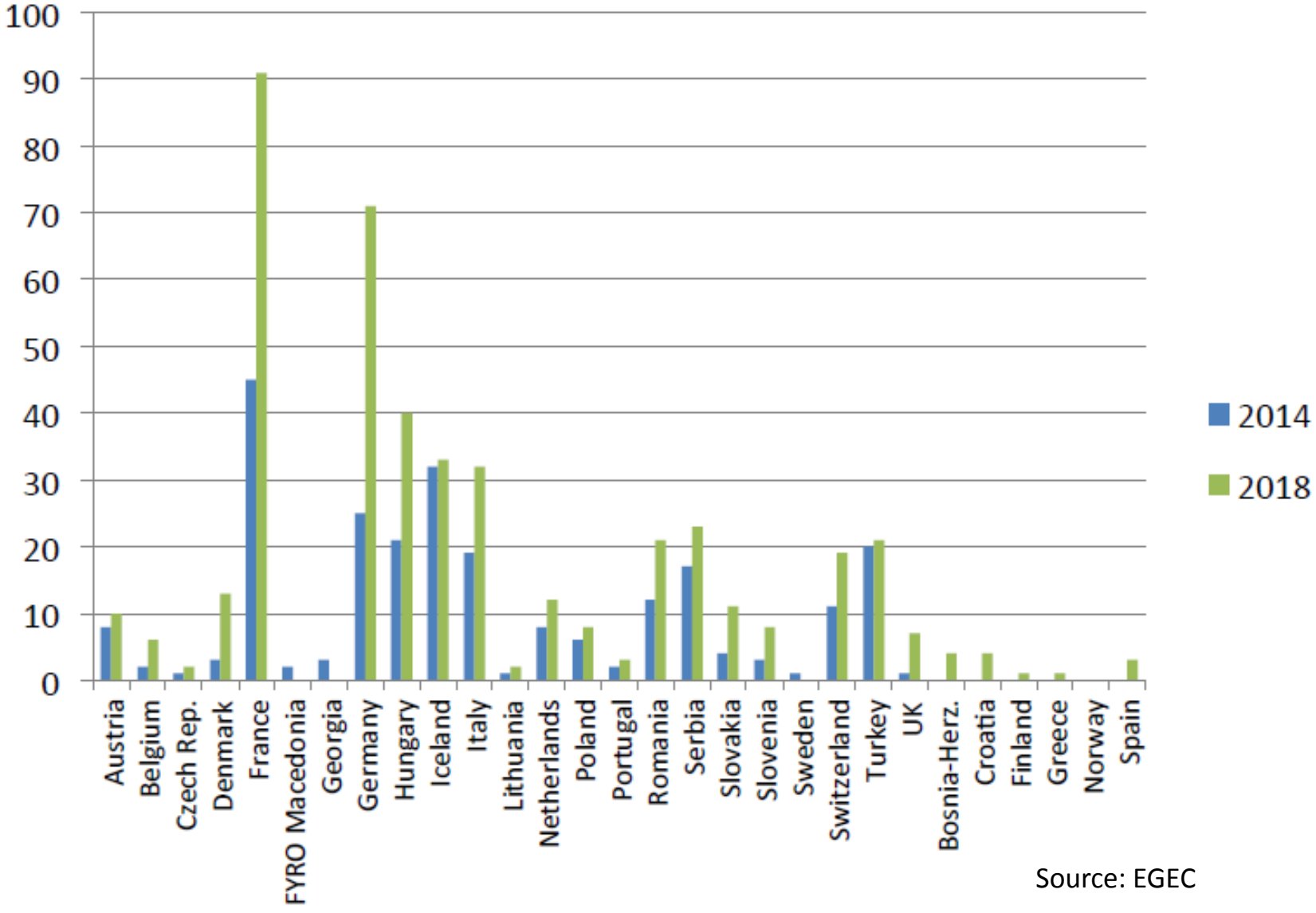
- In-house resource engineer (or close collaboration with outside resource consultant)
- Geothermal financing experience
- Creativity and innovation

Geothermal DH capacity Installed in Europe, 2013 (MWth)



Source: EGEC

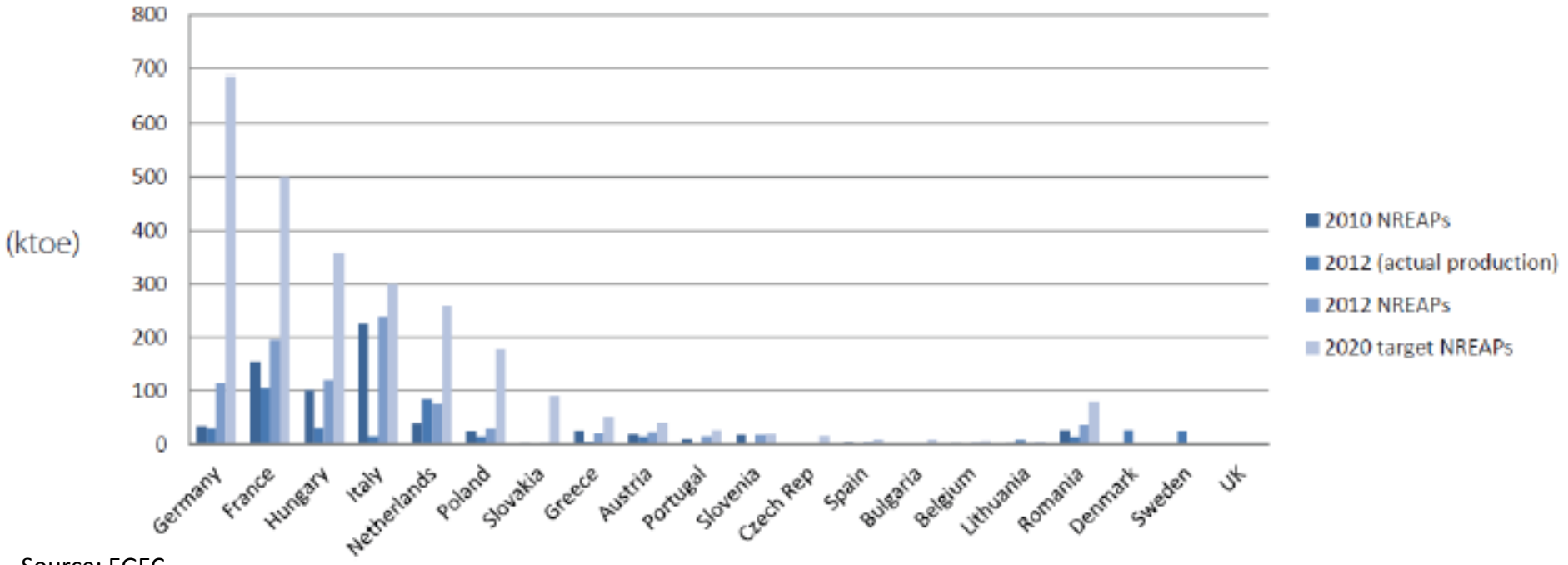
Number of GeoDH systems in Europe potential possibilities



Source: EGEC

Geothermal DH Potential in Europe

Actual Geothermal DH production towards the 2020 target (ktoe)



Source: EGEC

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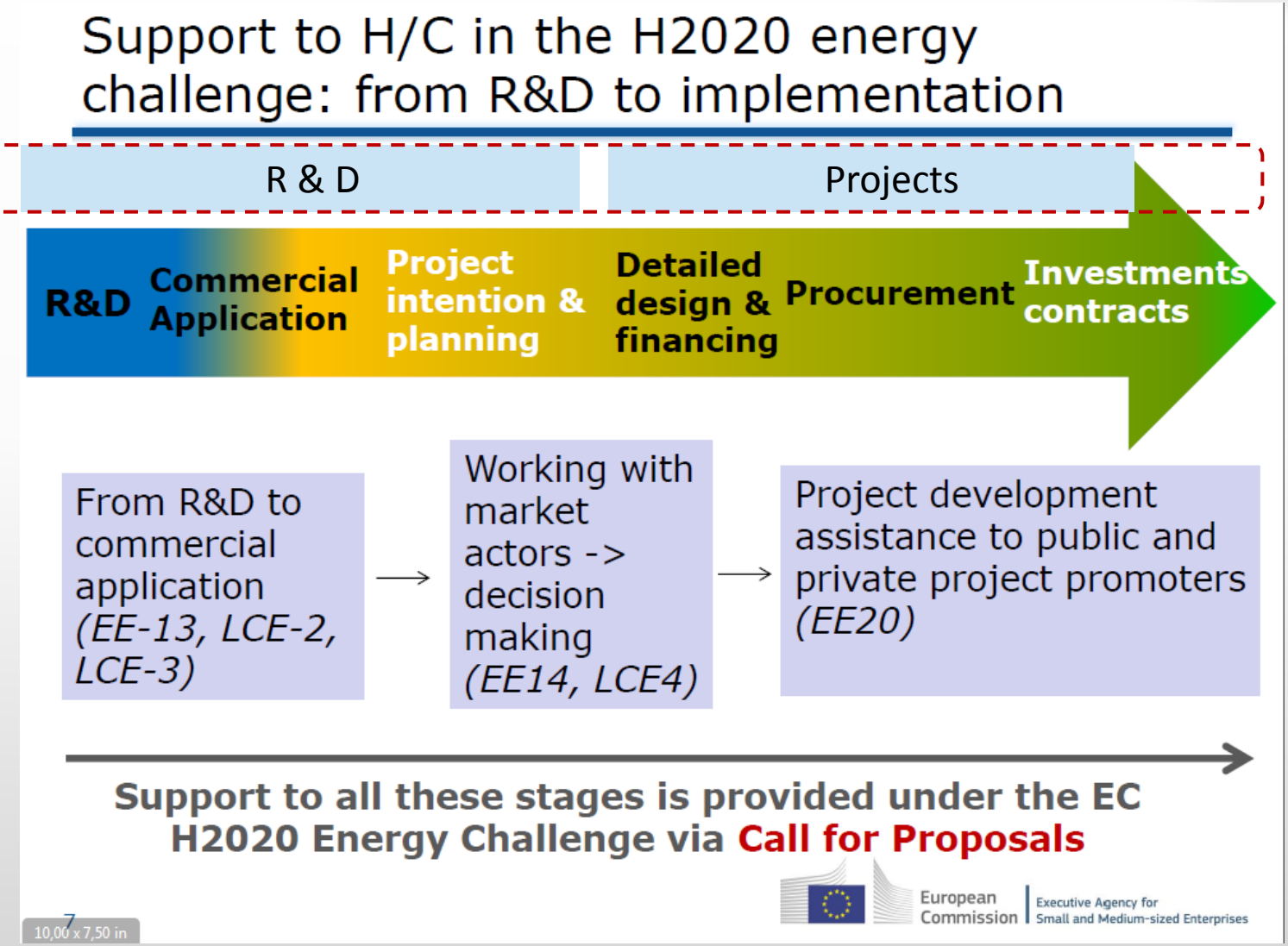
Increasing focus on the overall process



The Geothermal R&DD Challenges

Where is H/C in the H2020 energy challenge?

Energy efficiency

- Buildings, consumers, products
- **Industry – heat recovery (EE18)**
- **Heating and Cooling (EE-13, EE-14)**
- Finance for sustainable energy

Smart Cities and Communities

- **SC&C solutions integrating energy, transport and ICT sectors – lighthouse projects (SCC-1)**
- others

Low Carbon Energy

- **RES E and H/C technologies (LCE-2, LC-3, LCE4)**
- Energy storage
- Sustainable bio fuels
- others

H/C is included in a number of topics of the Energy Challenge

Actions supported go from R&D to market uptake and include DHC

The Geothermal R&DD Challenges

Topic EE 14: Removing market barriers to the uptake of efficient H/C

1. SPECIFIC CHALLENGES

Action is needed to **remove non-technological** (including legislation) **barriers** to exploit the full potential of efficient H/C

2. SCOPE

A number of areas relate to **DHC**, for example:

- Identifying, developing, and promoting **new markets for the recovery of heat from industry**
- **For district heating and cooling industry**
  - improve the transparency of the market and increase consumer trust
  - exchange of information, best practice examples, consumer practices, motivations and barriers
- **Heating and cooling planning**

The Geo - Technical & Regulatory Barriers

Barriers to Geothermal Development
District Heating

Technical barriers

- Lack of wide and detailed information on geothermal energy resources
- Renovation of DH

Regulatory barriers

- Lack of national/regional/local geothermal regulatory framework
- Length and administrative burden of licensing procedures for exploration and drilling;
- Management of cascade uses

The Geothermal ERA- Opportunities

Conclusion:
3 Factors Affecting Geothermal District Heating

Challenges of funding R&D projects

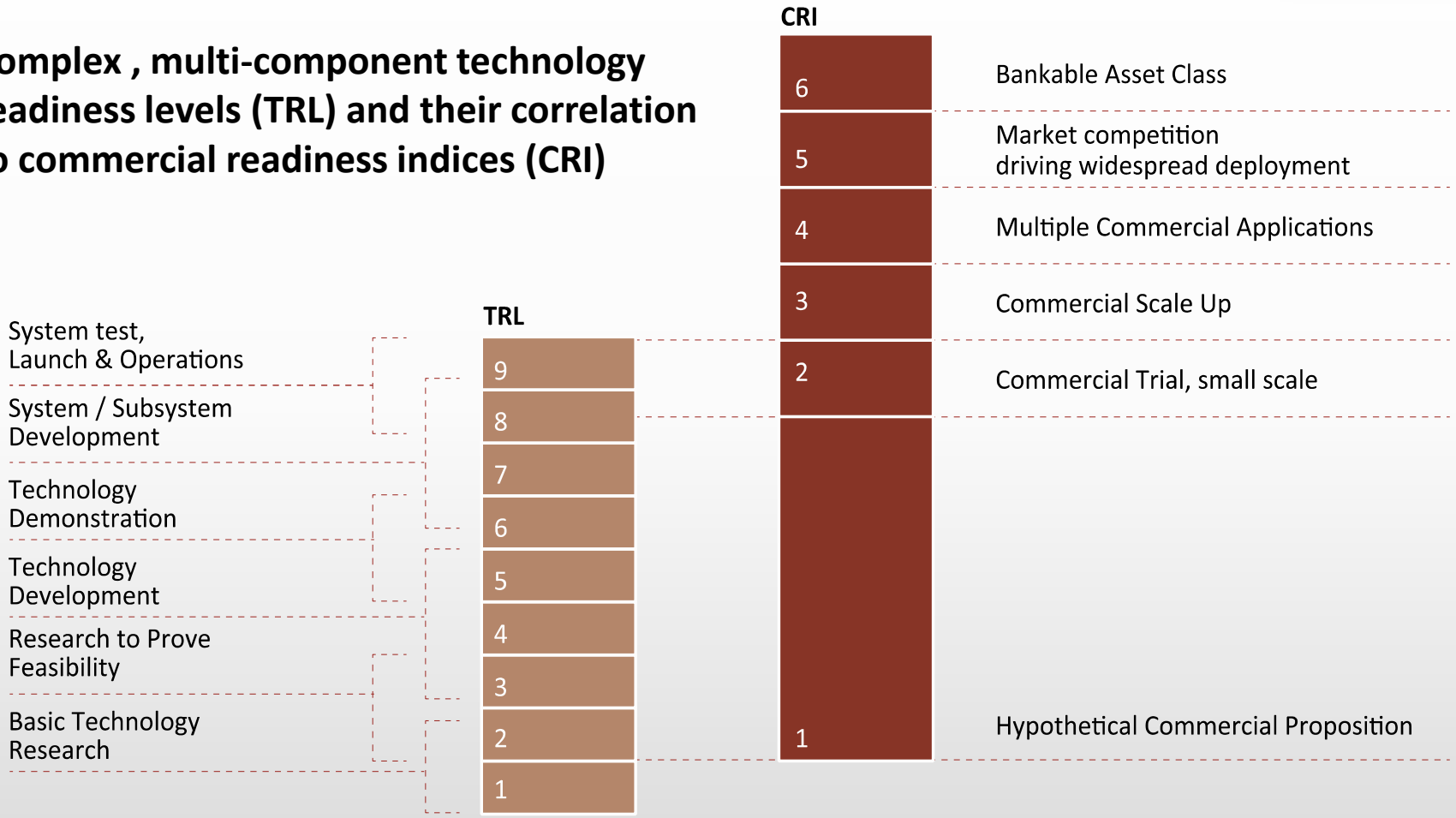
Outputs: Increased knowledge, cooperation, utilization and effectiveness of geothermal funding for R & D activities.

- Priority 1: Mapping of funding policy and regulatory framework for geothermal R&D activities.
- Priority 2: Highlight barriers and policy opportunities of geothermal R&D activities.

1. Achieve knowledge regarding the various national research policies related to geothermal energy in European countries.
2. Present and discuss the handling of national research funding workflows starting at funding opportunity announcements, grant applications, evaluation processes, and award processes.
3. Share experiences on strengths, weaknesses, opportunities and threats of national funding programs vis-à-vis the national needs.

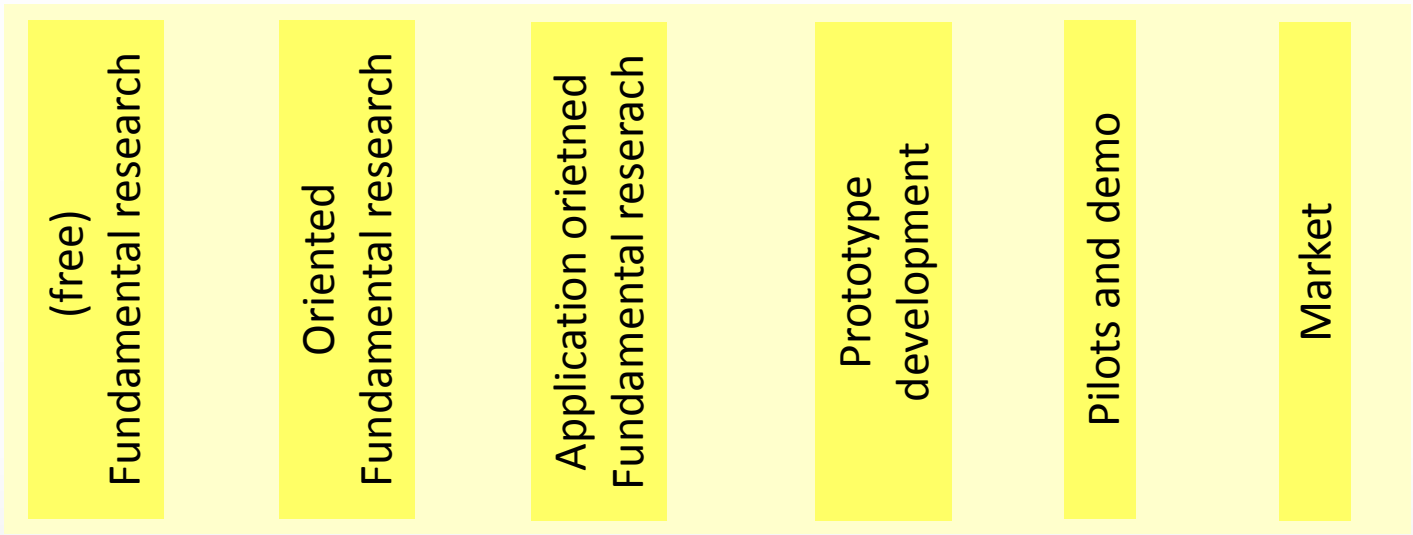
Funding Research and Innovation
Goal: Delivering technology to enable commercial readiness

Complex , multi-component technology readiness levels (TRL) and their correlation to commercial readiness indices (CRI)



Source: Australian Government, Australian Renewable Energy Agency (2014) LOOKING FORWARD: BARRIERS, RISKS AND REWARDS OF THE AUSTRALIAN GEOTHERMAL SECTOR TO 2020 AND 2030

Funding for Research and Innovation



Universities(via Swiss National Fund SNF and Cantons) – 0.5 million

ETH-Domain – 1 mln

Unis of Applied Sciences - < 0.1 mln

Private sector

SNF – 1.5 mln

Comm for Tech. & Innov. - 0.2 mln

Swiss Federal Office of Energy – 3.5 mln

- Legal basis
- Dedicated / general funding
- Ability to fund activities abroad
- Call process
- Selection process
- Award process
- Reporting
- Quality control
- Assessment of impact

Typical figures – annual funding in Fr. / € mln

ERA NET - Enjoyable Work Ahead

Communicate with principal **stakeholders** and others

Gaining expert knowledge –
on **financial barriers and opportunities**

Prepare Policy Recommendation for better Financial Framework and more Capital for Geothermal Activity

Prepare and Implement Joint Financial Geothermal Activities (e.g. transnational funding activities)