

# “From 2020 to 2030: a geothermal decade ! really ?”

Philippe Dumas, Secretary General

# Our mission

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## REPRESENTING THE EUROPEAN GEOTHERMAL INDUSTRY

EGEC is a non-profit international organisation founded in 1998 whose aim is to promote the European geothermal industry and enable its development both in Europe and worldwide, by shaping policy, improving business condition, and driving more research and development.

We are based in Brussels, where we work with our members on policy, market intelligence, and communication, providing a link between the industry and European institutions.



A sound policy framework and financial instruments which allow geothermal energy to compete with traditional sources

Increased research and development



The development of the geothermal industry inside and outside of Europe.



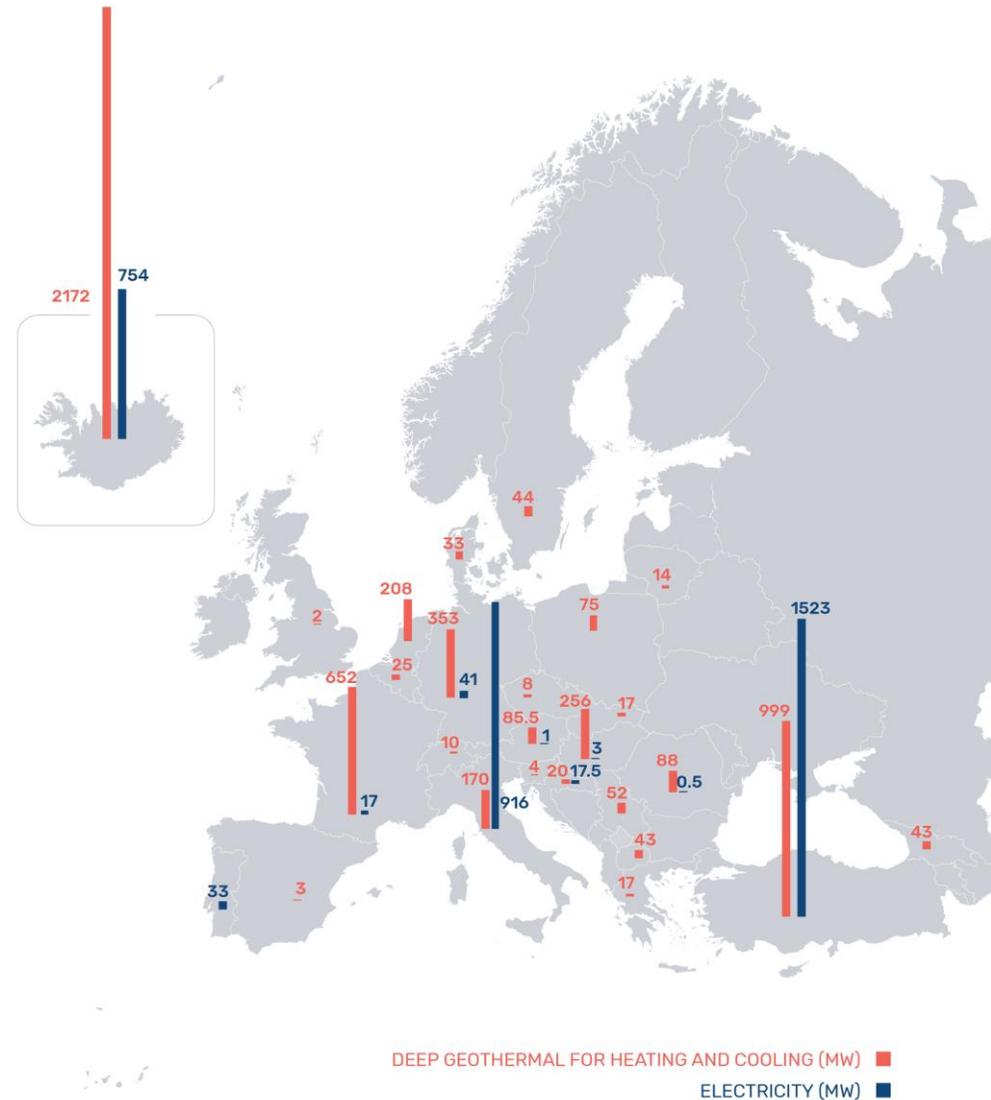
# 1. Geothermal market trends



# Overview Projects in operation - Europe

## Some key figures-2019

- 130 Geothermal electricity plant, with sustained deployment driven by the Turkish Market
- The EU passes the 2 GWth threshold for geothermal heating systems (DH,...)
- More than 2 million geothermal heat pumps in Europe at the end of 2019

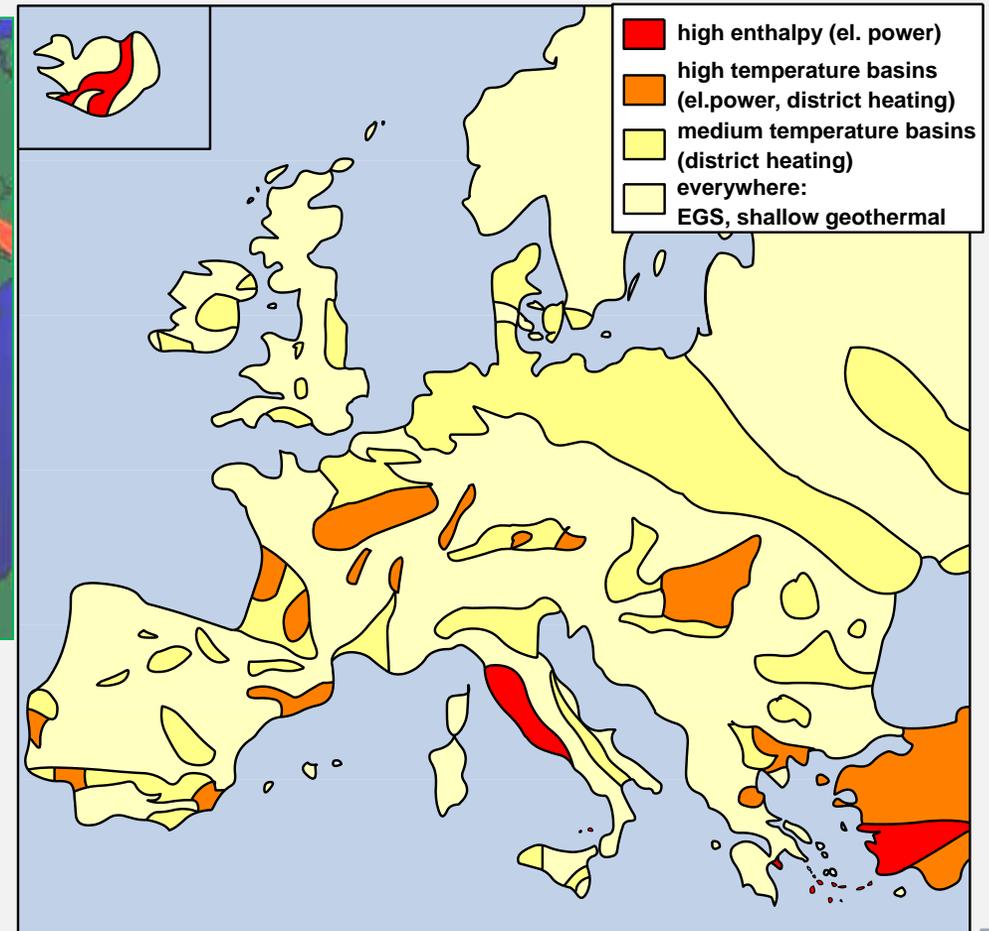


# Geothermal Potential in the world and in Europe



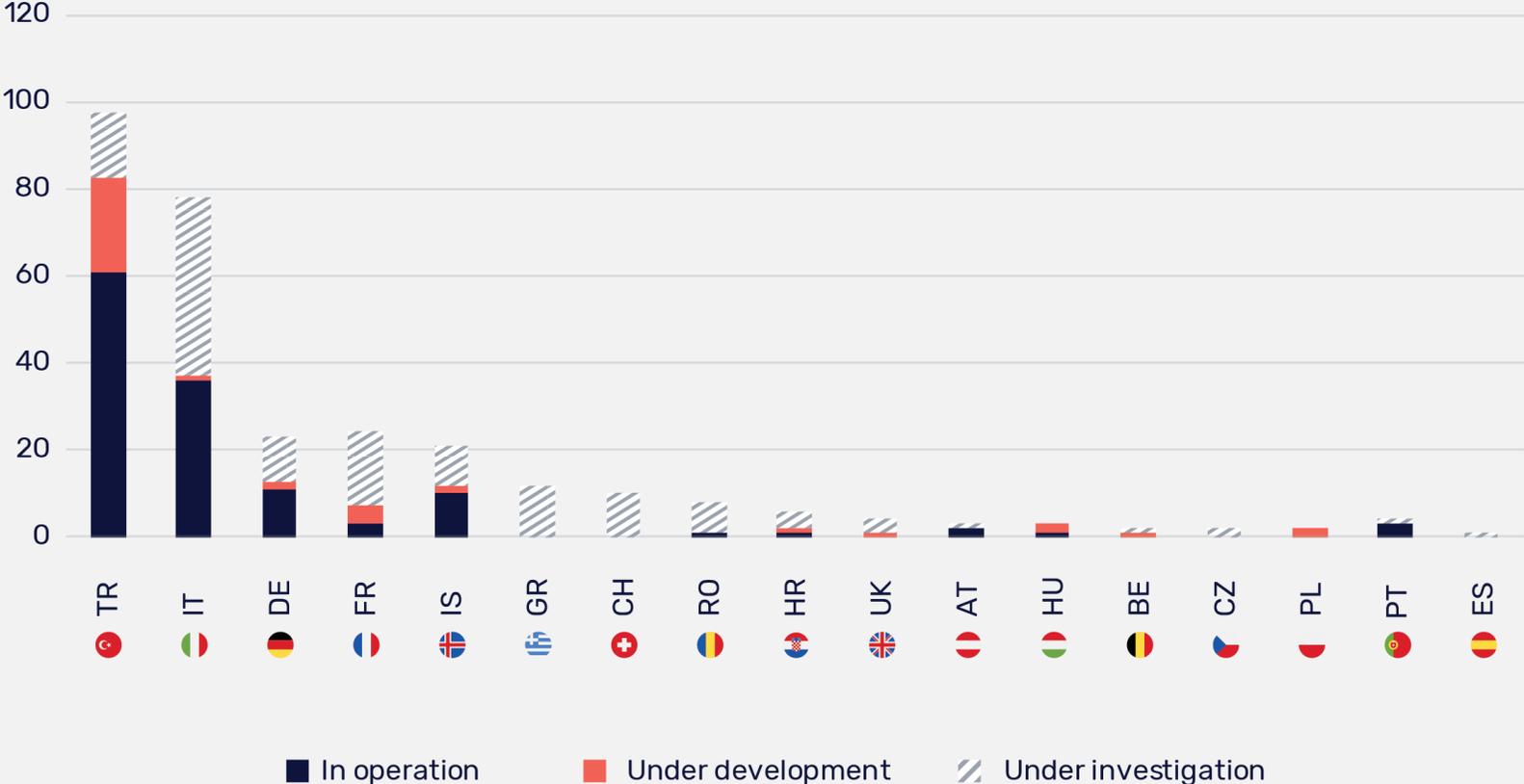
Main power markets:

- Asia / Oceania: Indonesia, Philippines, Japan, N-Z...
- America: USA, Mexico, Chile, Peru...
- Africa: Kenya, Ethiopia...



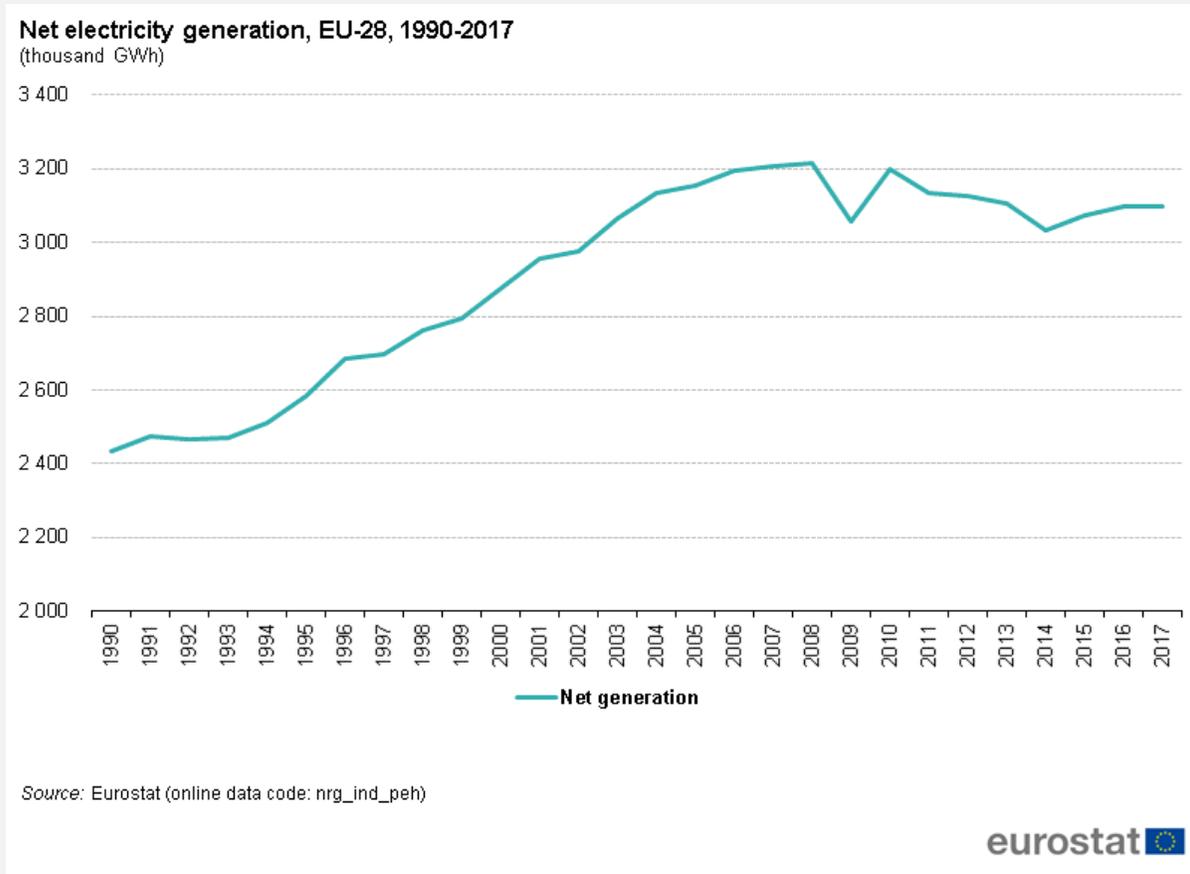
# Europe: Number of Geothermal power plants per country in operation, under development and under investigation

Number of units



# Electricity demand in Europe

The demand is stagnating. An issue for the power decarbonization and the demand for new geothermal powerplants !

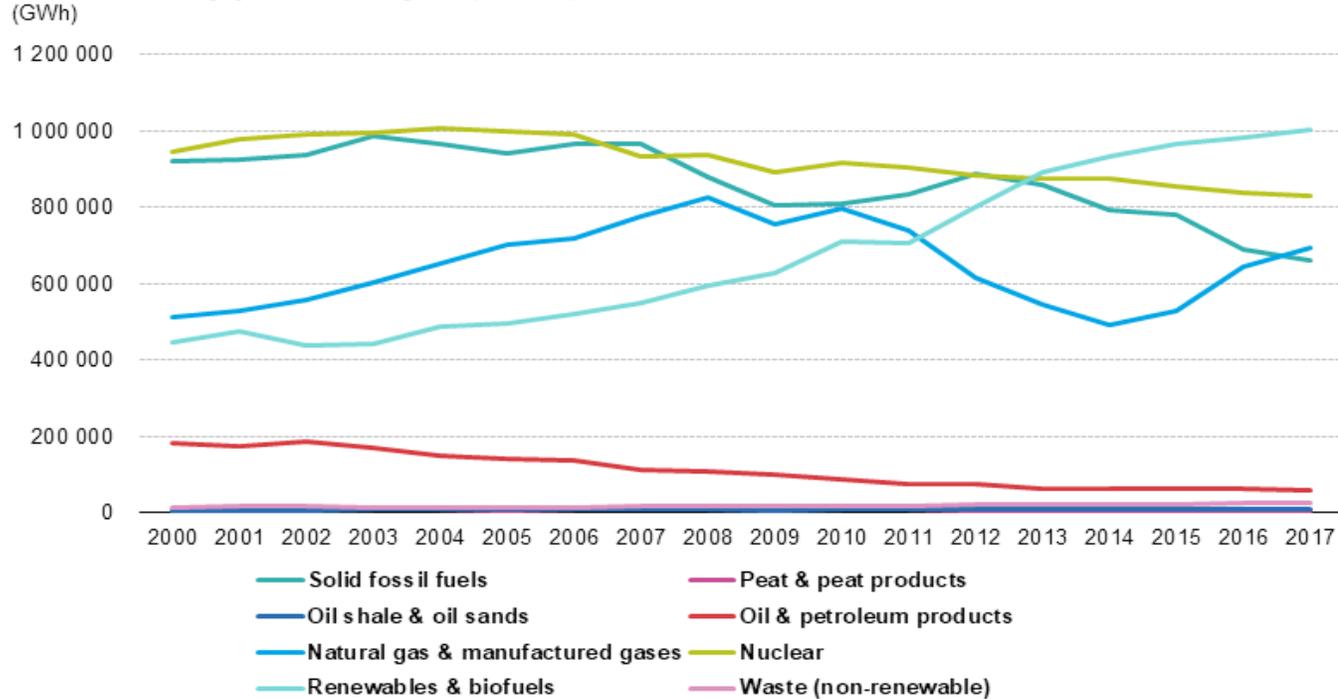


# Decarbonisation of the power sector: where are we?

Power generation by source (2000-2018)

- coal
- other fossil fuels
- nuclear
- renewables

Gross electricity production by fuel, EU-28, 2000-2017

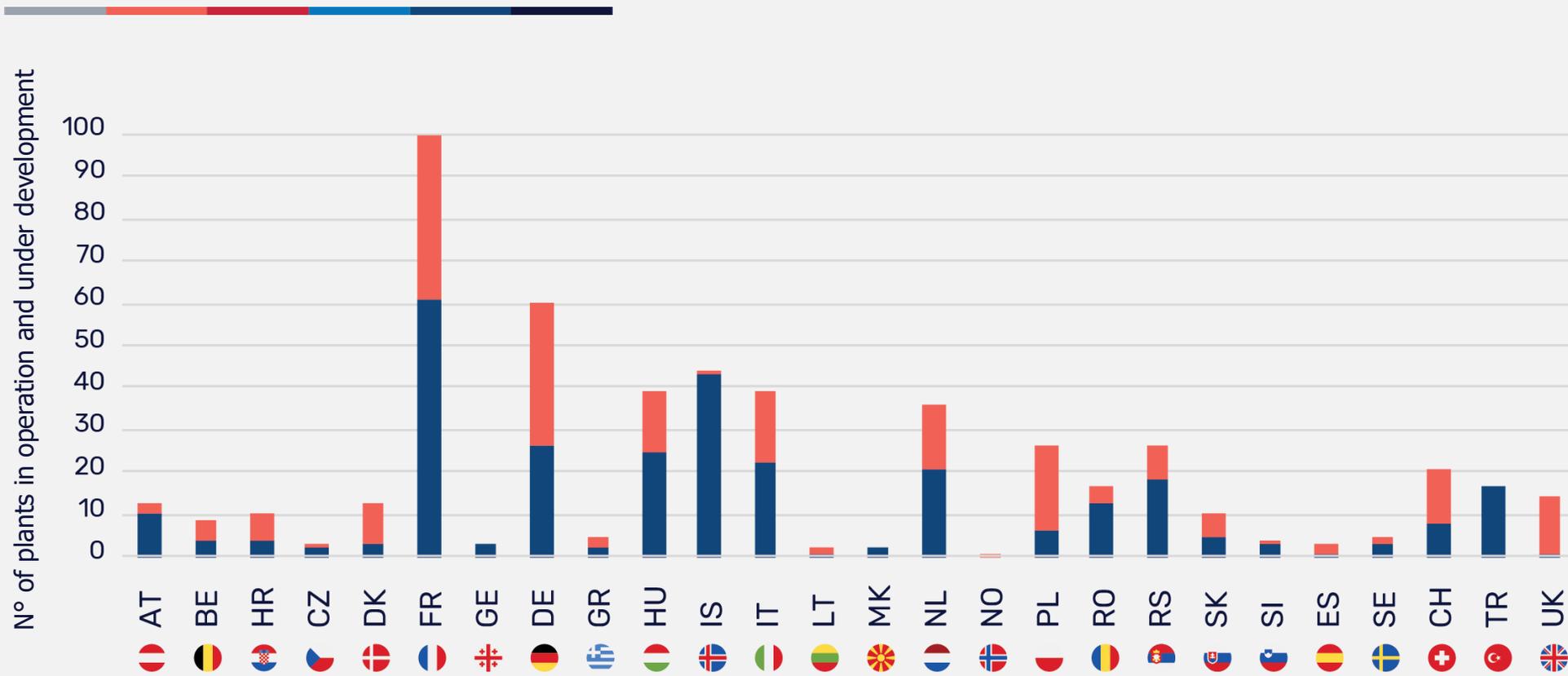


Source: Eurostat (online data code: nrg\_bal\_peh)

eurostat



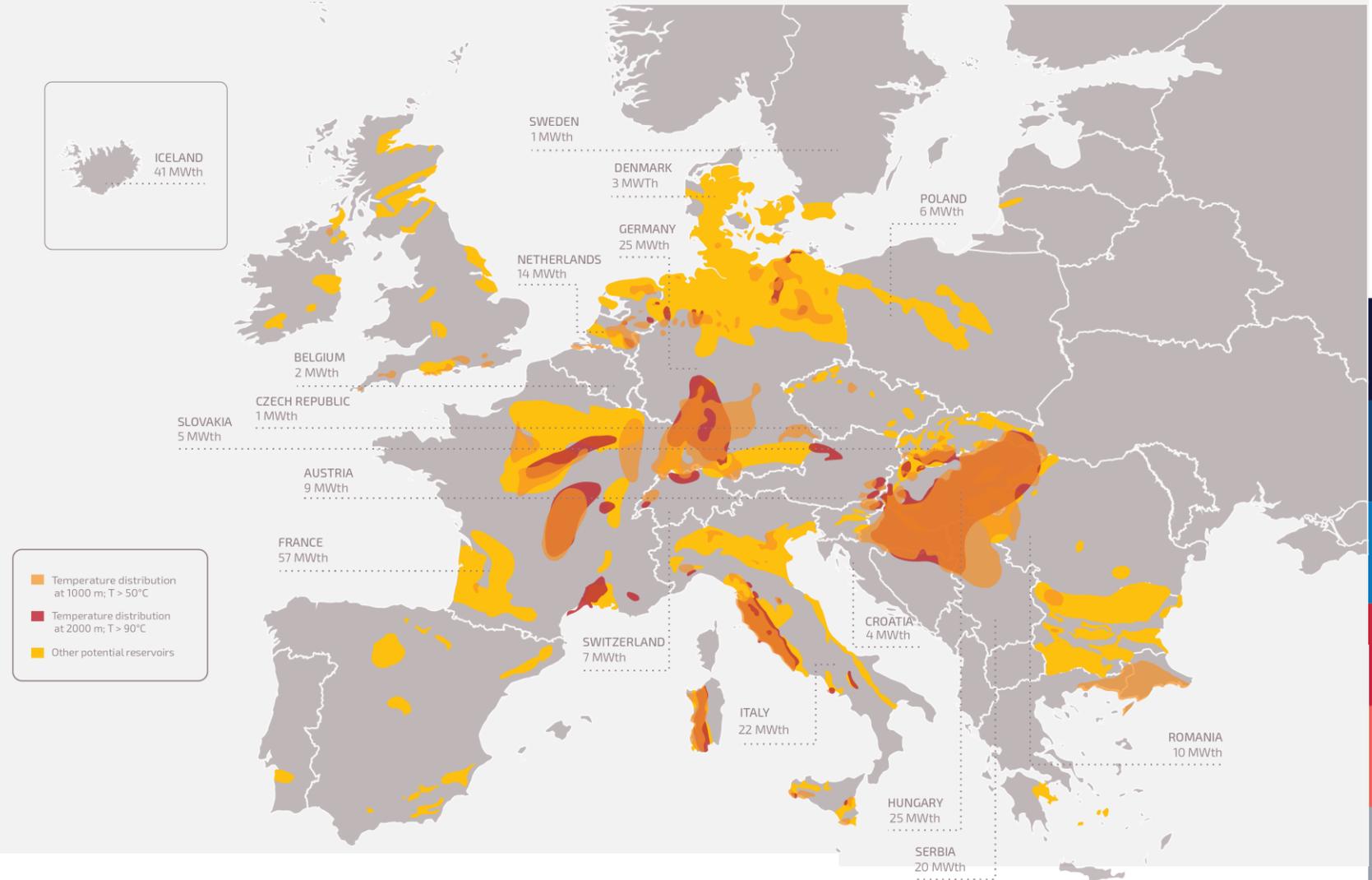
# Geothermal district heating & cooling systems in operation and under development



# More than 25% of the EU population lives in areas directly suitable for geothermal district heating

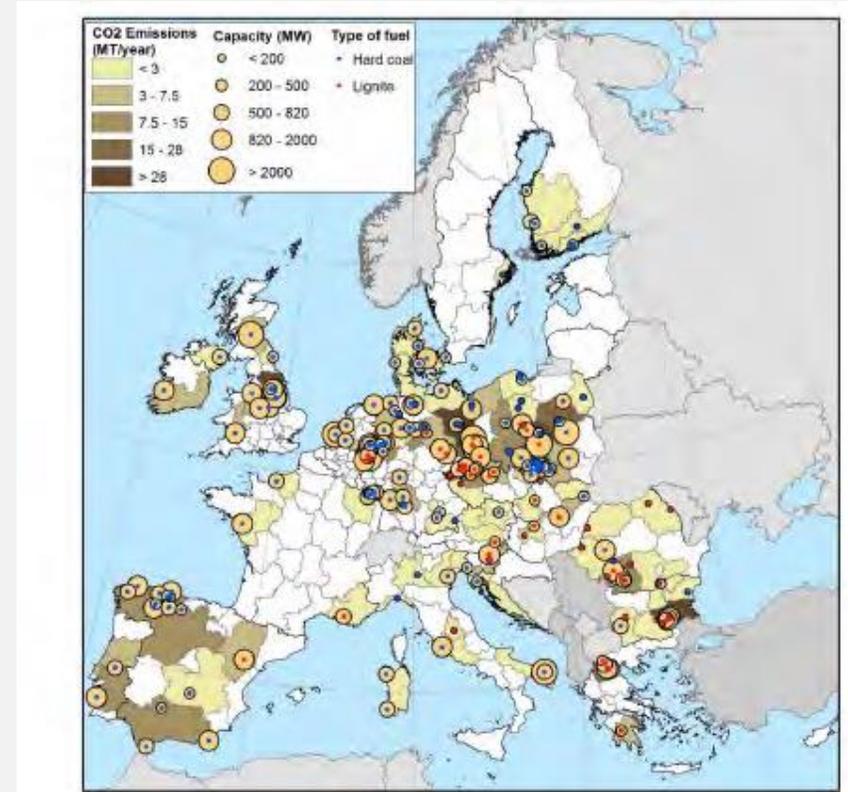
Map of areas suitable for geoDH networks and actual geoDH installed capacity according to available geological data

Source: ETIP-DG, adapted from GEODH and EGEC market report



# Focus on decarbonising H&C

- In 2019, there was about 200 coal power plants operating in 21 Member States, with a total capacity just above 150 GW
- average age of a coal power plant in the EU is 35 years
- New plants continue to be put online in the EU
- Geothermal can cover much of this supply, but specific frameworks are needed to allow a fair and rapid transition



**2. Market segment:  
Generation (base load),  
Drilling, Turbines,  
Equipments, Materials,  
Minerals, lithium**

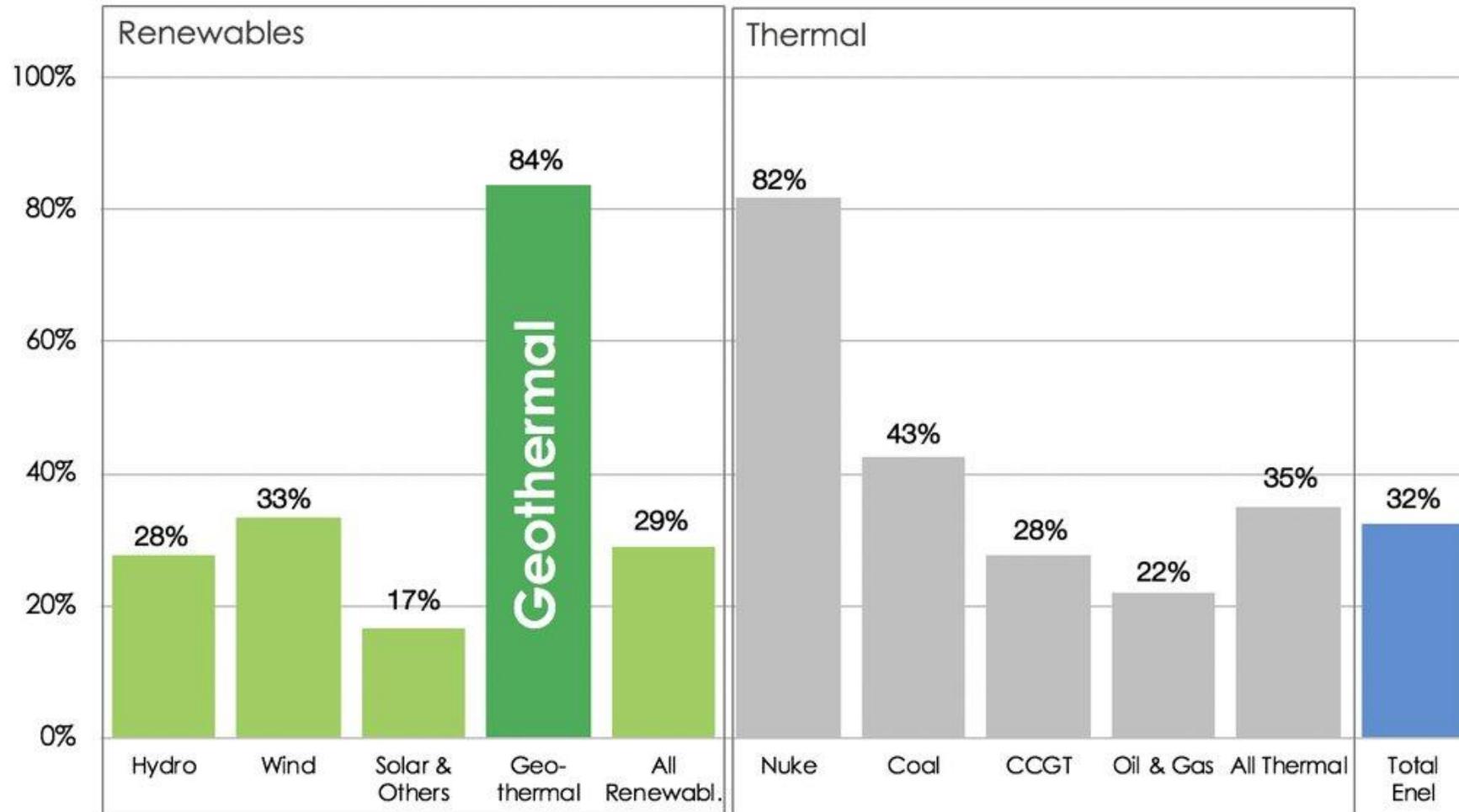
# CAPACITY FACTOR (CAPACITY VS GENERATION)

## COMPARING ENEL'S RENEWABLE ENERGY TECHNOLOGIES

### 1H 2018



Source: Enel – Quarterly Bulletin, Q2 & 1H 2018

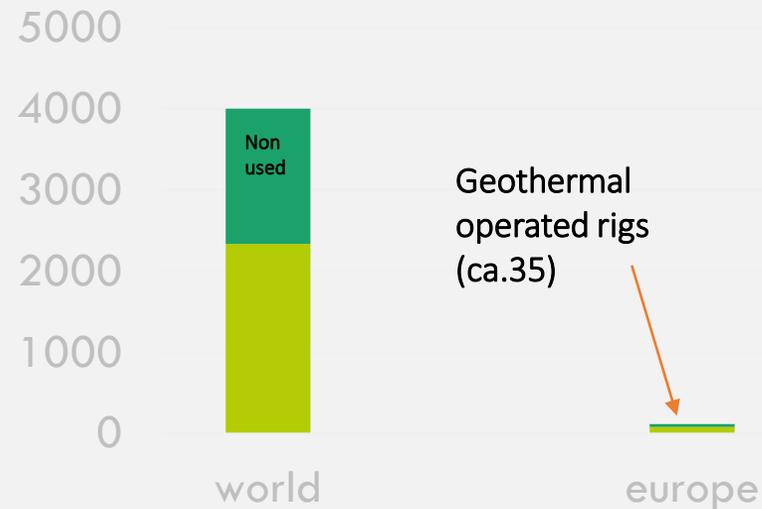


# A better functioning drilling market

Drilling prices are dependent on:

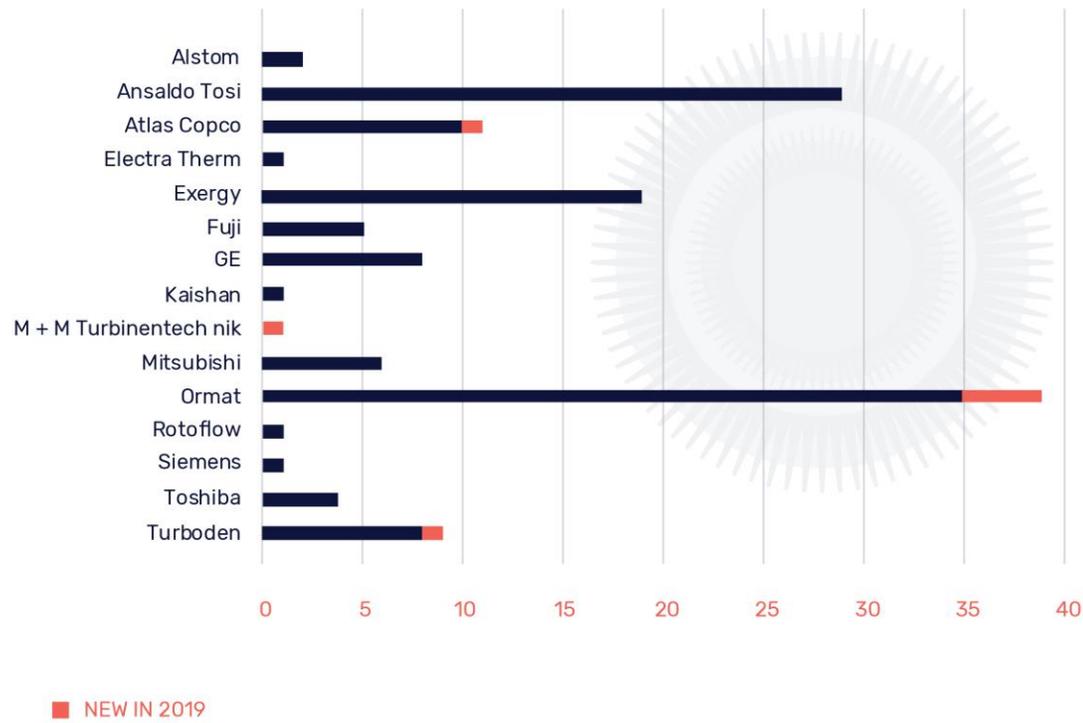
- the rig demand (mainly for oil & gas, therefore dependant on crude oil prices),
- the drilling price (€/m),
- and the raw material cost.

Rigs availability and adequacy

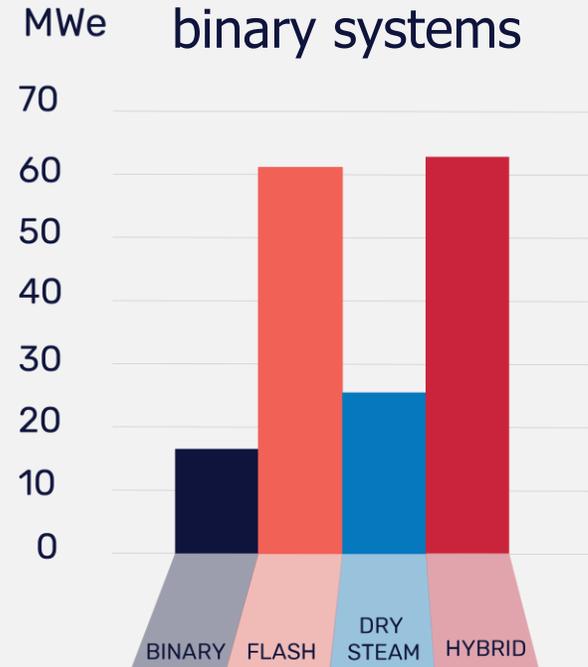


# Trends in turbines -2019

Number of turbines installed per manufacturer



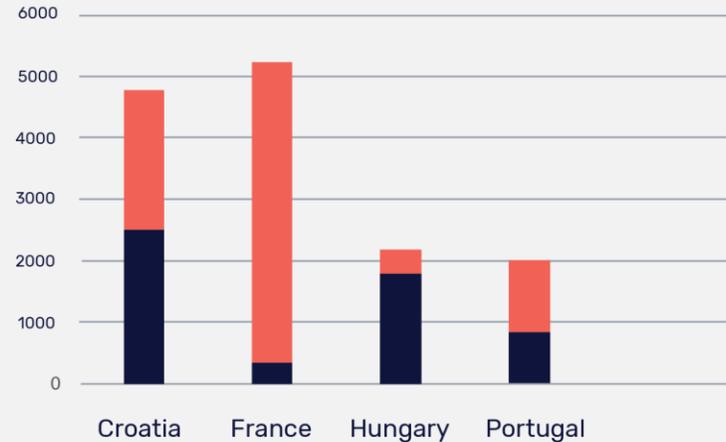
- Consolidation of leading suppliers in the Turkish market
- New entrant-German (flash turbine in Iceland)
- Continued dominance of new binary systems



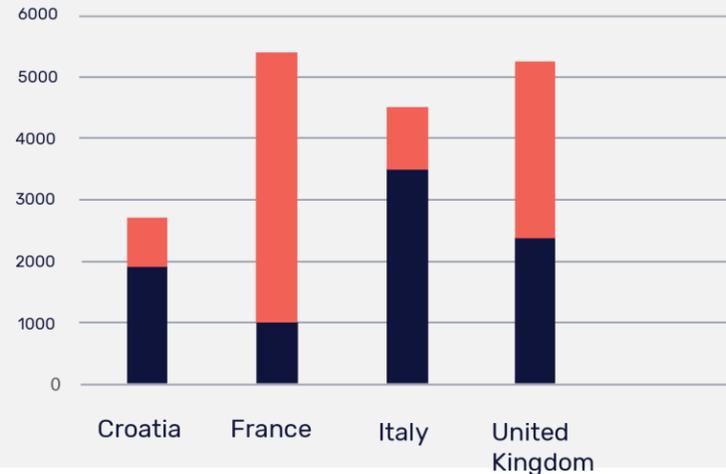
# Well profiles in geothermal electricity production

- 1 to 5 Km
- Trends to deeper wells and more wells per plant to upscale production

Depth range geothermal electricity plant wells

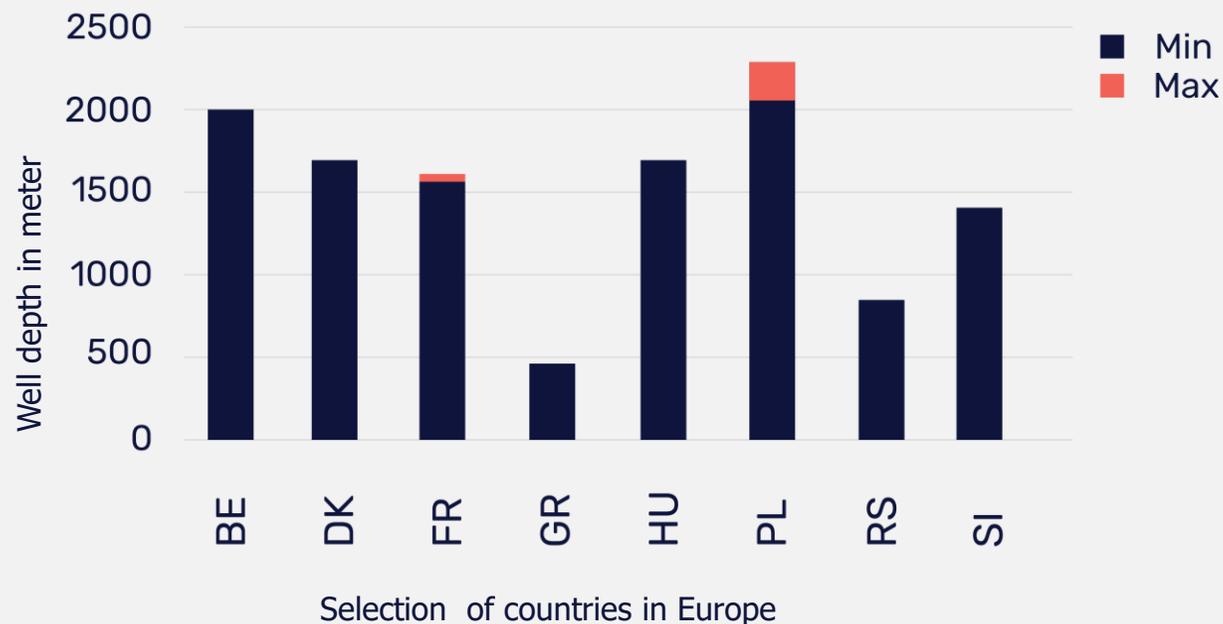


Depth range geothermal electricity plant wells under development



# Geothermal district heating & cooling

*Average depth of geothermal district heating wells in meters*



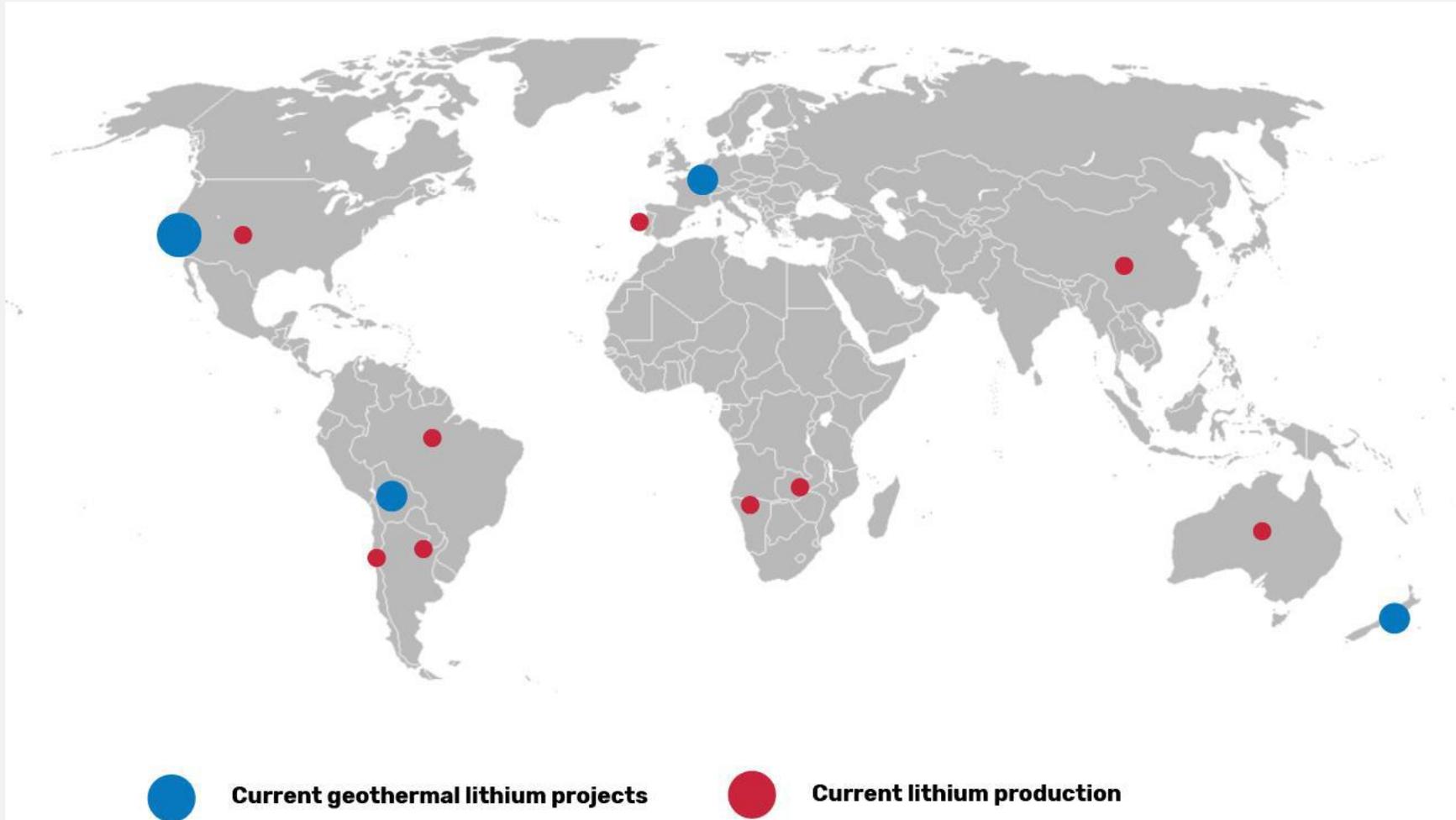
- Wide disparity in the average depth of geothermal district heating and cooling wells from one country to another

# Materials

## DEEP GEOTHERMAL INDUSTRY SUPPLY CHAIN

TECHNOLOGY	USES	VALUE CHAIN	EQUIPEMENT	KEY MATERIALS
<p>Electricity generation</p> <p>CHP</p> <p>Heat production</p>	<ul style="list-style-type: none"> <li>- Electricity production</li> <li>- District heating and cooling</li> <li>- Process heat</li> <li>- Agricultural uses</li> <li>- Other uses (balneology)</li> </ul>	<ul style="list-style-type: none"> <li>- Manufacturers of components</li> <li>- Manufactures of equipment (e.g. rigs..)</li> <li>- Drillers</li> <li>- Developers</li> <li>- Research &amp; exploration (geosciences)</li> <li>- Installers (surface installations..)</li> <li>- Operators</li> <li>- Investors</li> </ul>	<ul style="list-style-type: none"> <li>- Pipes</li> <li>- Casing</li> <li>- Heat exchangers</li> <li>- Turbines</li> <li>- Pumps</li> <li>- Valves</li> <li>- Surface equipment</li> <li>- Monitoring equipment</li> <li>- Exploration equipment</li> </ul>	<ul style="list-style-type: none"> <li>- Iron</li> <li>- Carbon</li> <li>- Chromium</li> <li>- Nickel</li> <li>- Molybdenum</li> <li>- Titanium</li> <li>- Aluminium</li> <li>- Epoxy / Plastic</li> </ul>

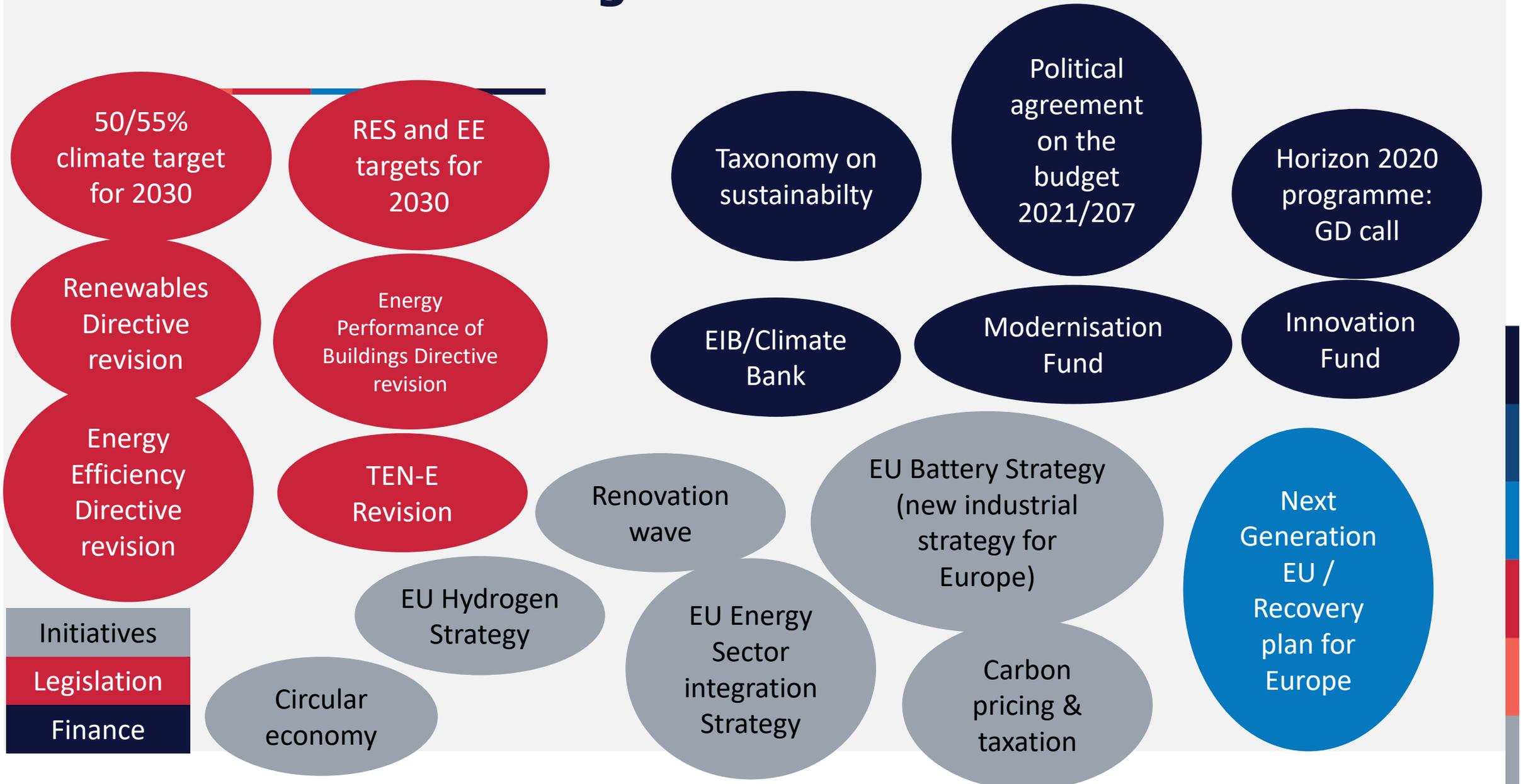
# The Global race for geothermal lithium



# 3. The EU Green Deal



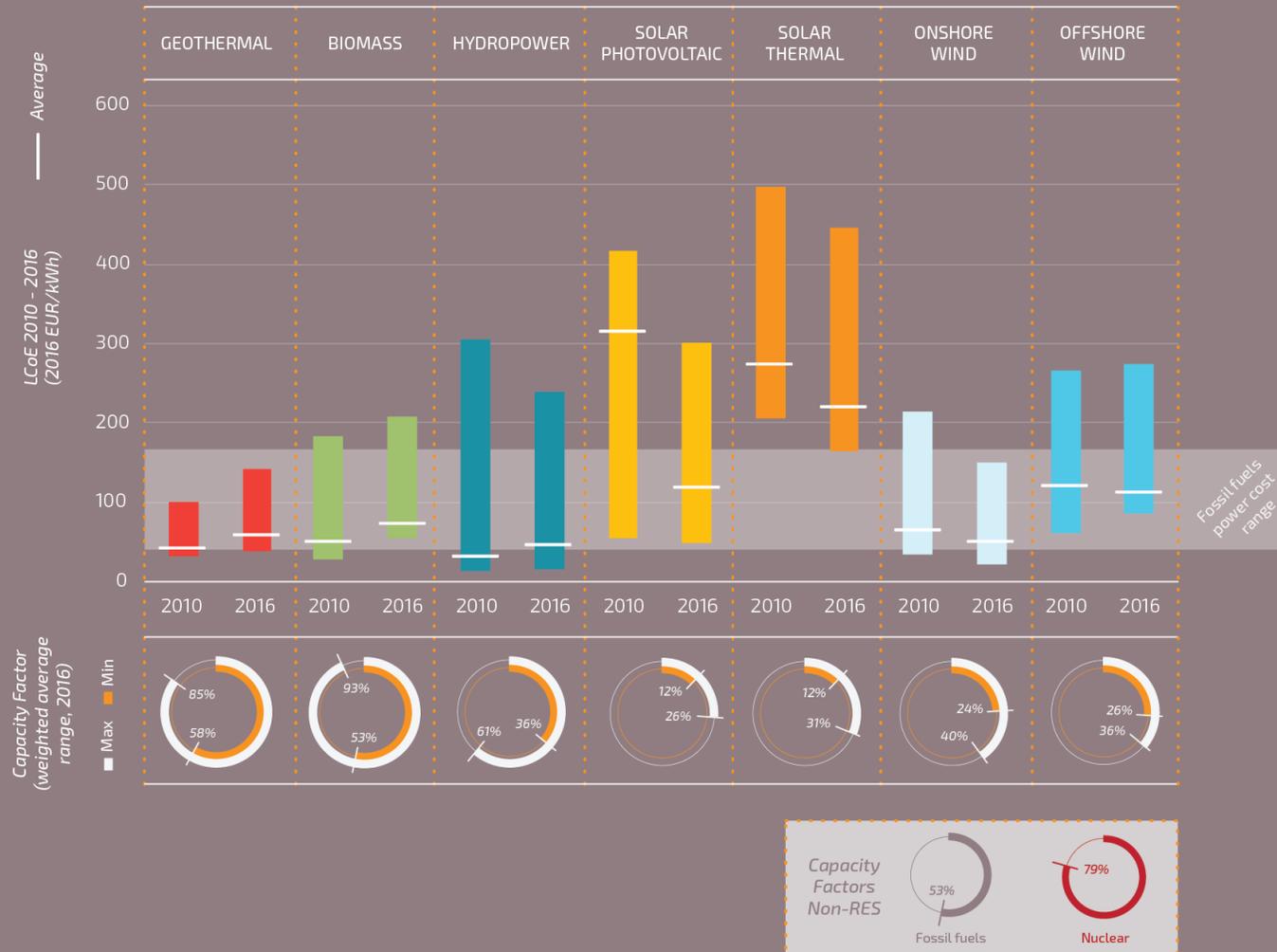
# Green Deal areas for geothermal



# 4. Costs comparison & Innovation



# GEOHERMAL POWER COSTS

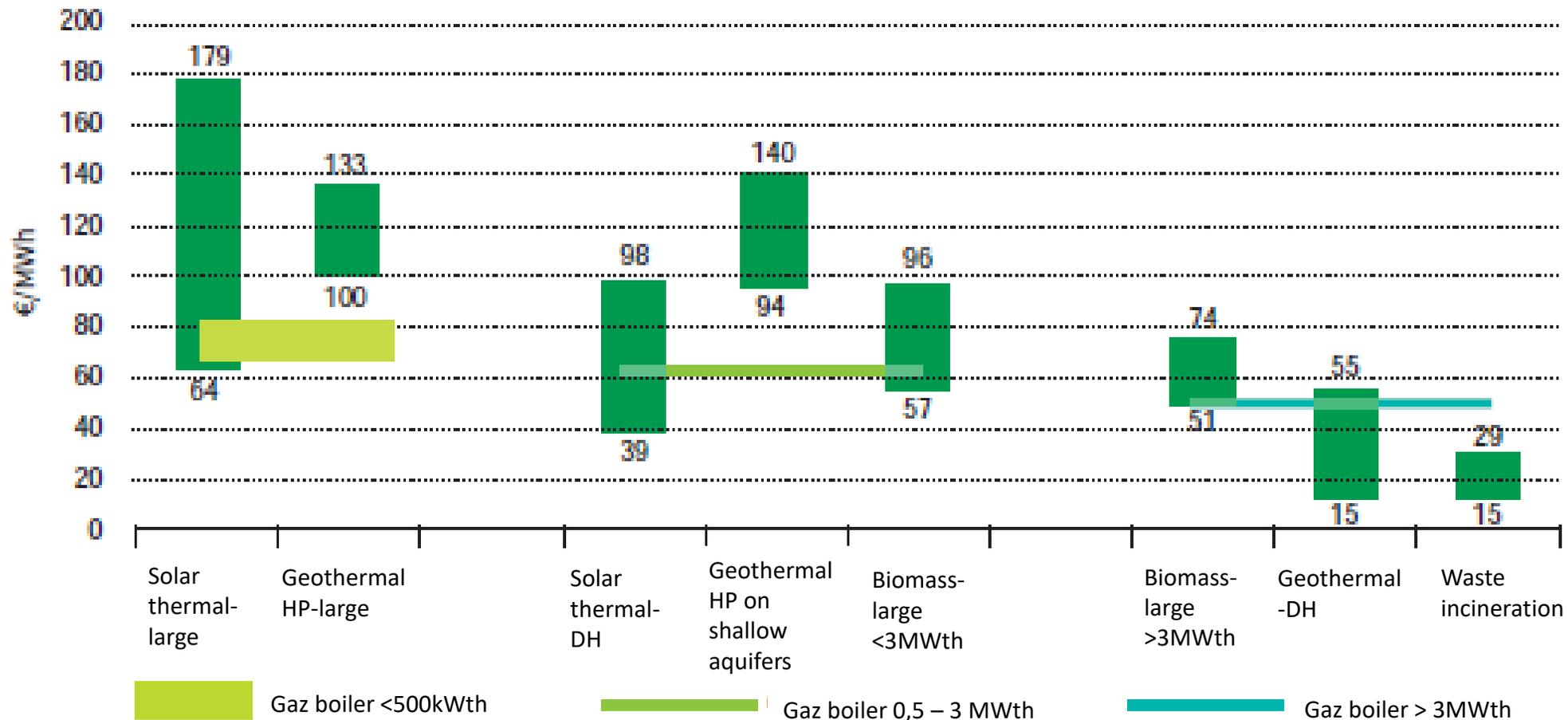


Source: ETIP-DG



# The competitiveness in the heat sector— Large buildings

LCoE of heating in large buildings, comparison with gaz boilers (France, 2019)

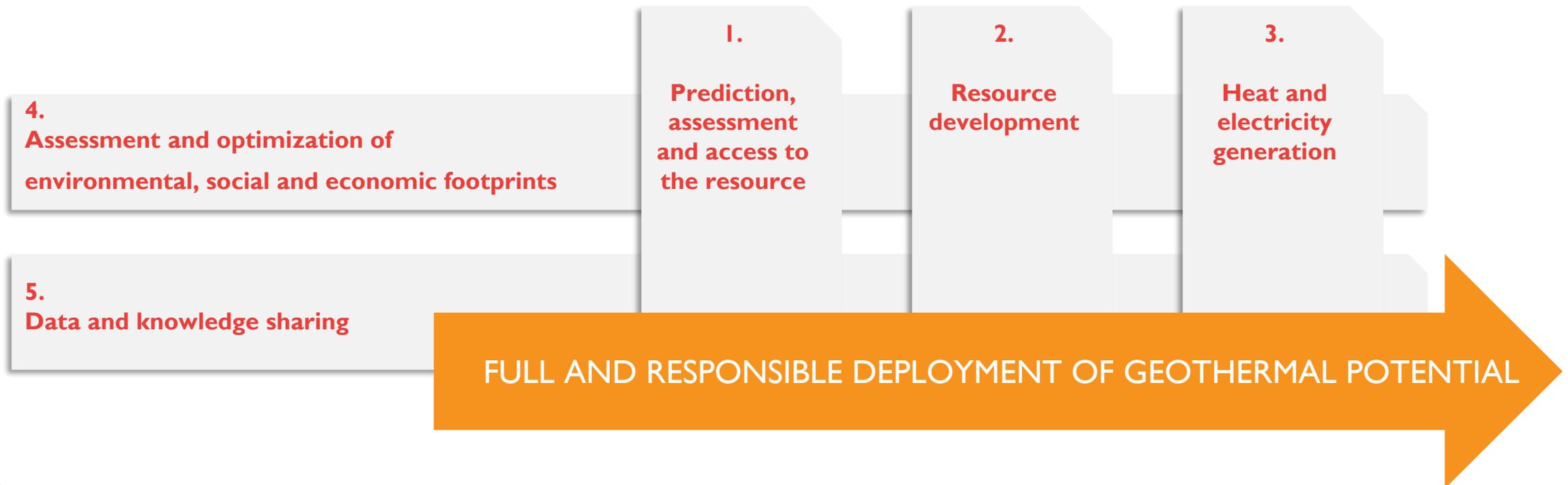


Source:  
ADEME

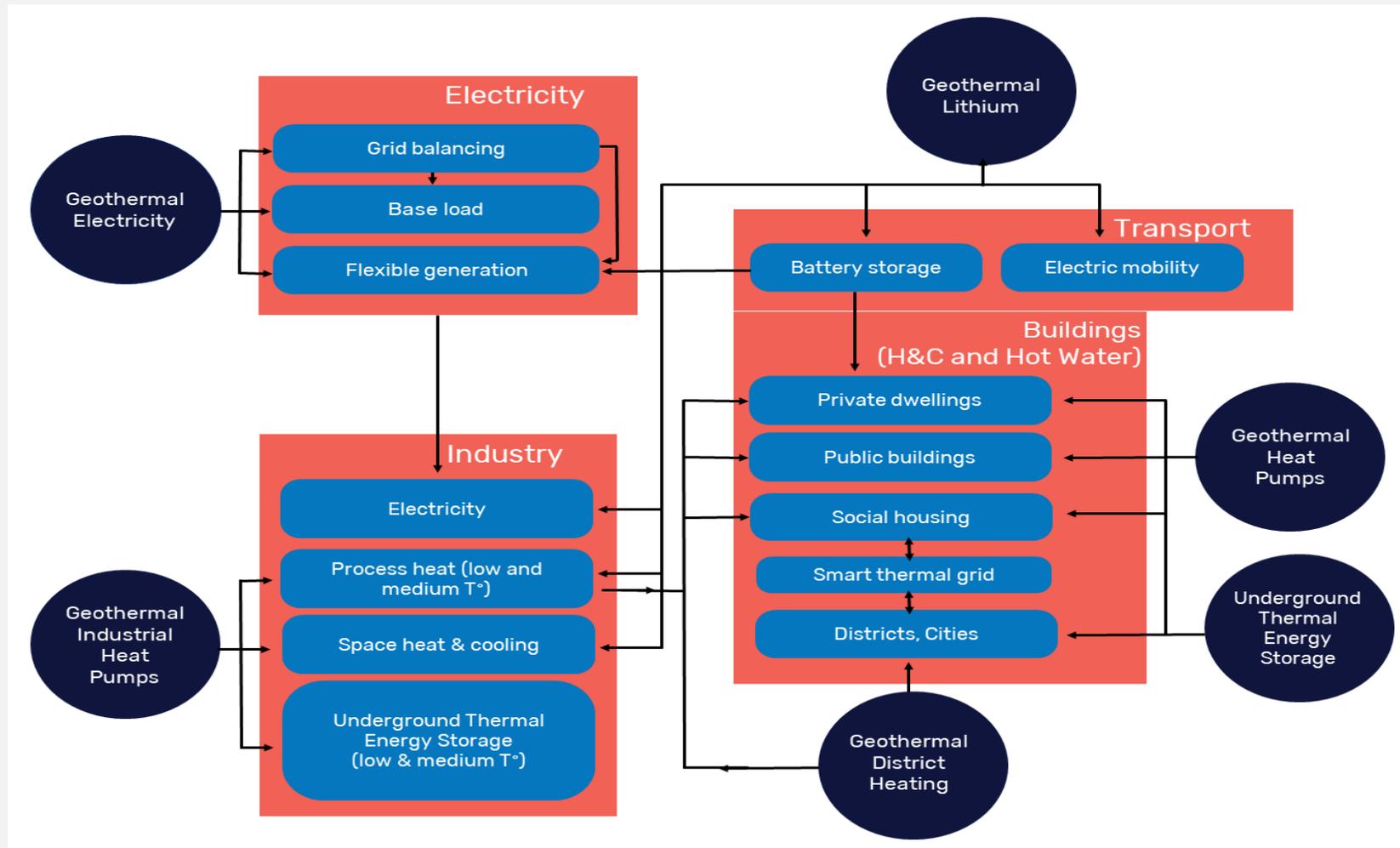
# Novel technologies for full and responsible deployment of geothermal potential: towards a SRIA

> Technologies beyond H2020

> While targeting the EU long-term goal of **reducing costs** and **increase performance** of geothermal technologies and installations, RD&I pursue all opportunities for complete deployment of geothermal resources, aiming at various advancements



# Visualising smart sectoral integration for geothermal energy

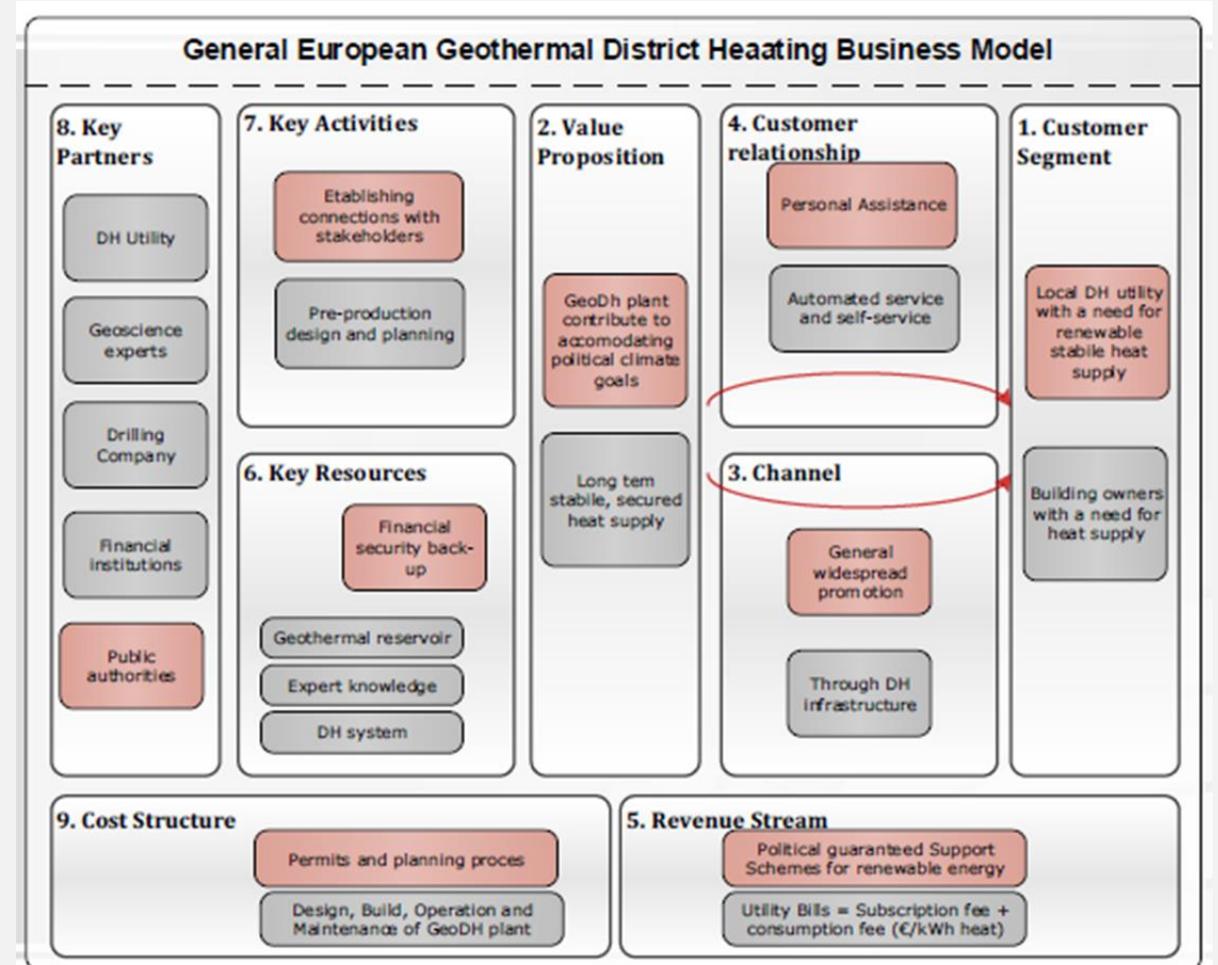


# 5. Business models

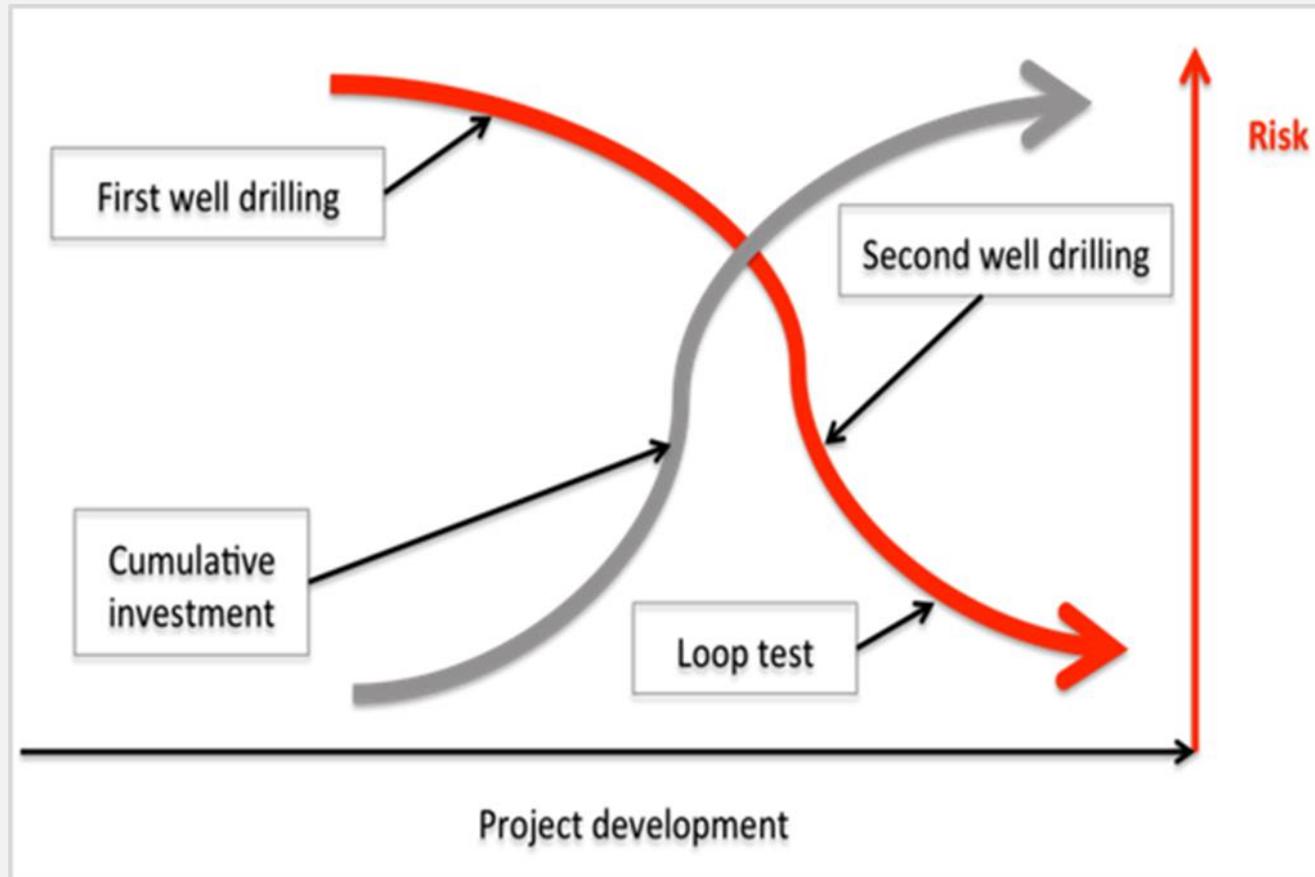


# Challenges

- Demand for Heat supply
- Firmness of electricity supply

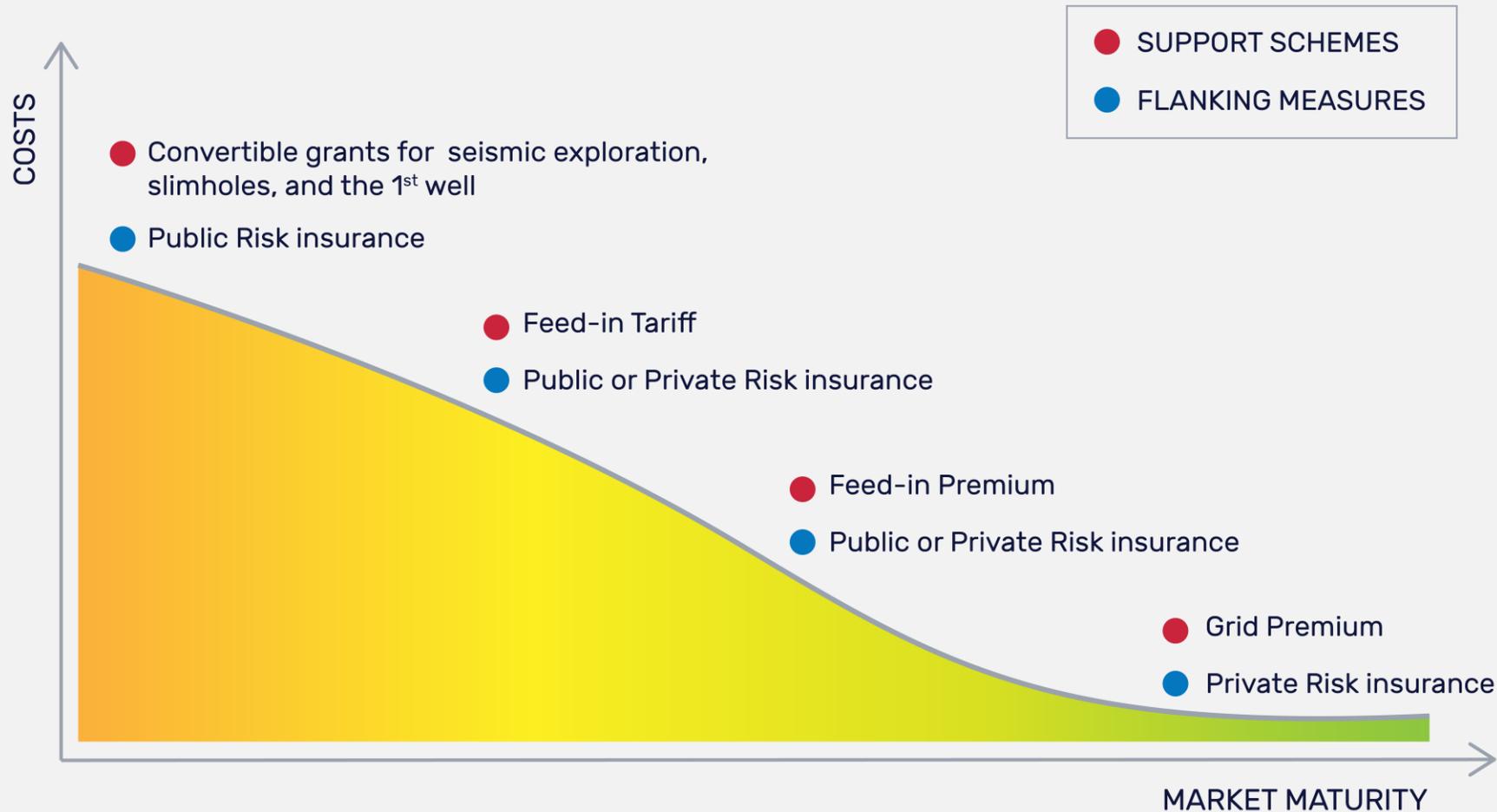


# Risks in investments



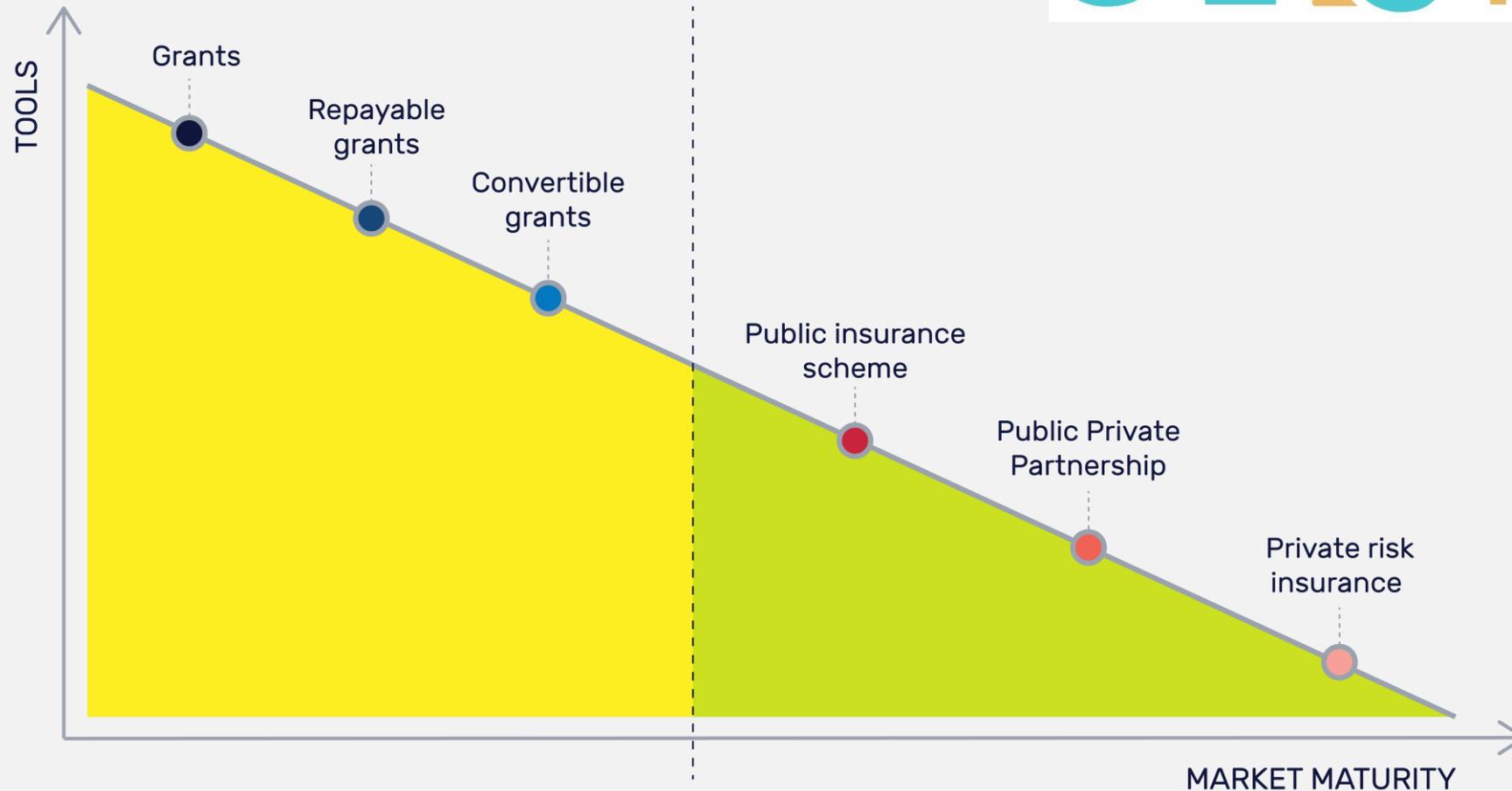
# From subsidies to auctions

*Support schemes for Geothermal adapted to technology maturity*



# The case of Risk Insurance

GEORISK





**2020**

**The**

**#GeothermalDecade**

**begins...**