THREE360 ENERGY

Capabilities, well services and experience from HPHT well management

January 2023, CGER meeting in Oslo

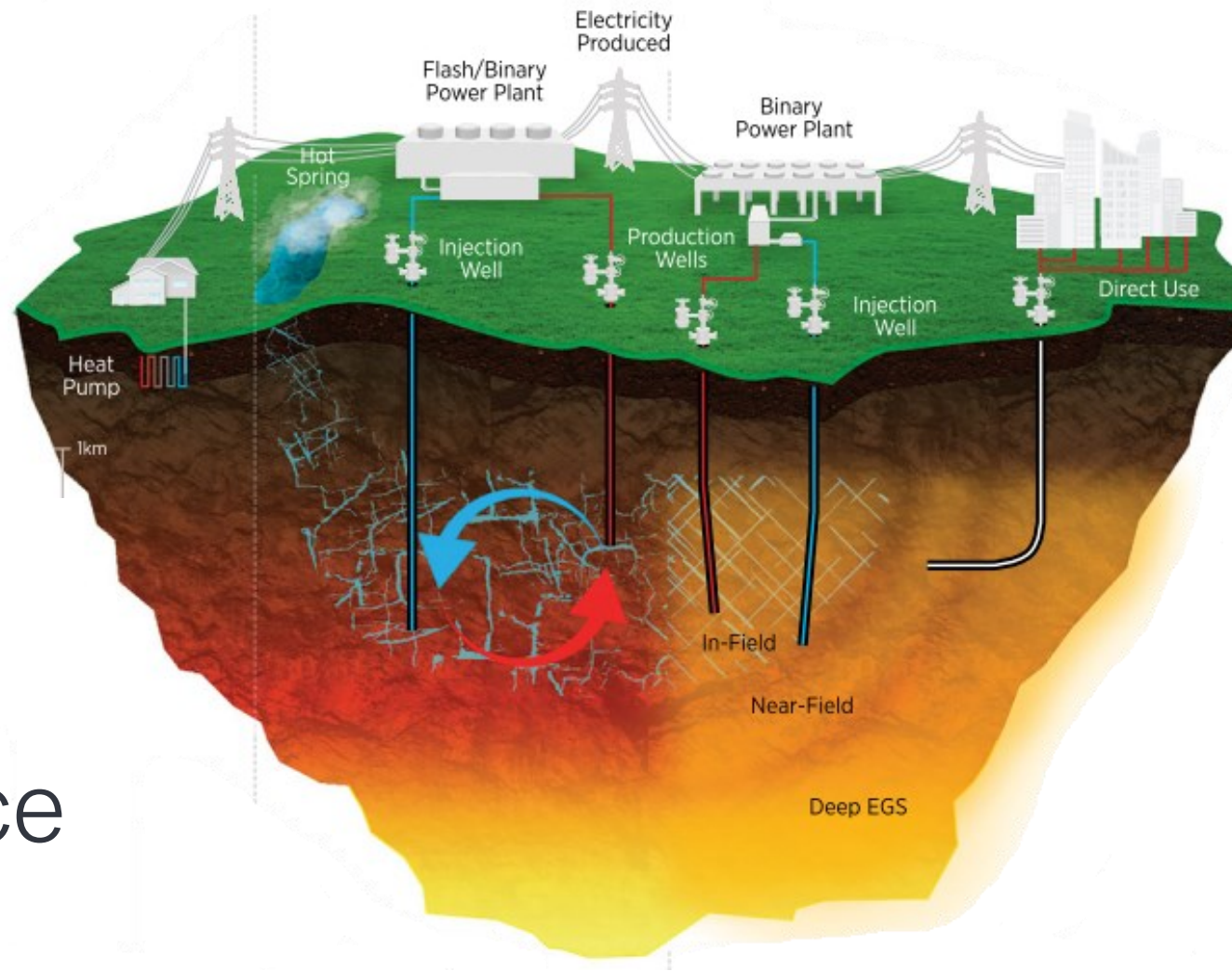

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Fig. 1 | Location of geothermal power plants per region in Europe

■ Existing plants (size = MWe installed) ■ Planned or in development (size = number of projects)

Source: EGEC Market report 2021

Company Profile

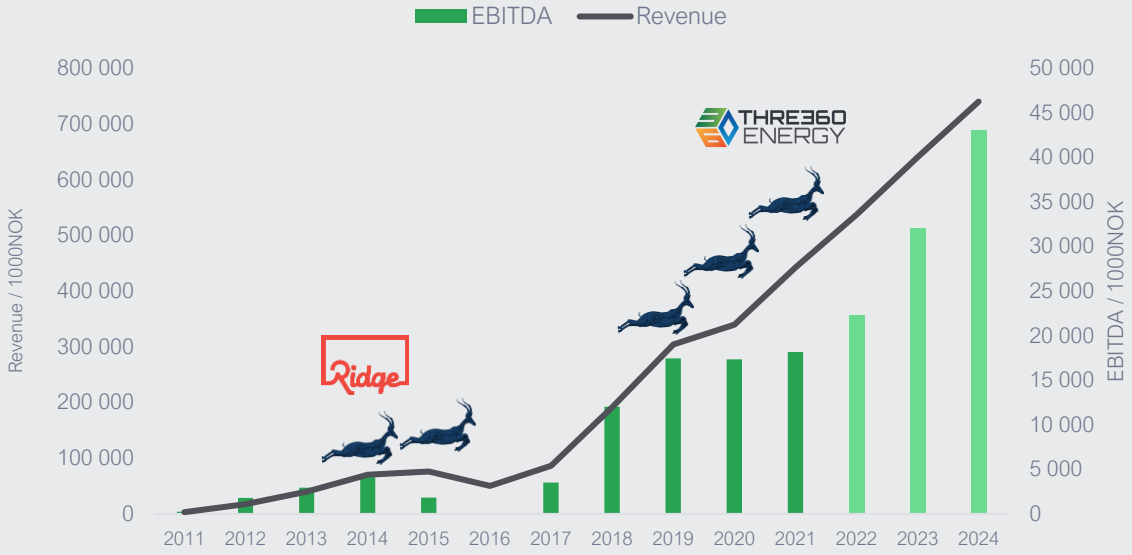
THREE60 Energy Norway AS

Established in 2011 and private owned joint stock company and part of:
THREE60 Energy Group Ltd.

Office Locations:
Bergen, Stavanger, Oslo

2022

People:	Revenue Target:	EBITDA:
250 +	500+ MNOK	20+ MNOK



Inspired **Searching** **Objective**

"We are a company that prides itself in safely and passionately delivering, where challenge is not only welcomed but thrived upon, and our reward is based on delivering aligned customer value."

Company Profile

THREE60 Energy Group

"A leading independent energy service company offering complete asset life cycle expertise."

Worldwide footprint!

Our Key Differentiators:

PEOPLE

Highly experienced, industry experts. Flat organisation which allows for quick & quality decisions which adds value to our customers.

LEAN SOLUTIONS

Processes, procedures and workflows based on lean principles to allow low cost and accelerated schedules. Nimble and flexible.

TECHNOLOGY

Technology led to bring accurate and efficient solutions which provide exceptional cost performance and add value.

CUSTOMER FIRST

Proactive, first class customer service with attention from all directors. Outwardly focussed with little bureaucracy.

Commitment

“Earn and maintain the support of Customers and society through corporate social responsible, and sustainable operations.

ENVIRONMENT

- Protect the environment
- Actively striving to reduce our own and our Customers’ environmental impact
- Optimise resource utilisation

SOCIAL

- Act as a responsible employer
- Contribute to improved social progress within the geographies the company operates in
- Contribute to learning and distribution of knowledge

GOVERNANCE

- Strive for a stable and profitable progress over time
- Apply good business practice and integrity
- Comply with all applicable regulatory requirements and Customer requirements.

> Our strategic priorities also clearly state our ambitions in regards to ESG.

Group Capability

THRE360 ENERGY

SUBSURFACE

- > Exploration and new ventures
- > Reservoir studies and field development planning
- > Advisory, asset valuation & transaction
- > Production optimisation, EOR
- > Marine geoscience and operations
- > Technology services

WELLS

- > Complex well designs, subsea and HPHT
- > Well integrity management
- > Well design and modelling
- > Well Intervention
- > Production chemistry
- > Well Integrity assessment

ENGINEERING

- > Front end engineering & pre FEED
- > Brownfield engineering minor scope & mods
- > Topsides & flowlines
- > Fixed price delivery on engineering & procurement
- > Integrity scopes
- > Project management

CONSTRUCTION & COMMISSIONNG

- > Construction & commissioning management
- > Constructability & Mechanical handling
- > Completions management
- > Pre-commissioning, dynamic commissioning & handover
- > Shutdown management

OPERATIONS

- > Operations and maintenance
- > Project management
- > Logistics
- > Safety management
- > Maintenance programs
- > Campaign maintenance
- > Decommissioning management

A total of 500+ technical experts accessible across all functional disciplines

THROUGHOUT THE E&P LIFECYCLE

EXPLORE → APPRAISE → DEVELOP → OPERATE → ABANDON

Energy Transition – Deep Geothermal

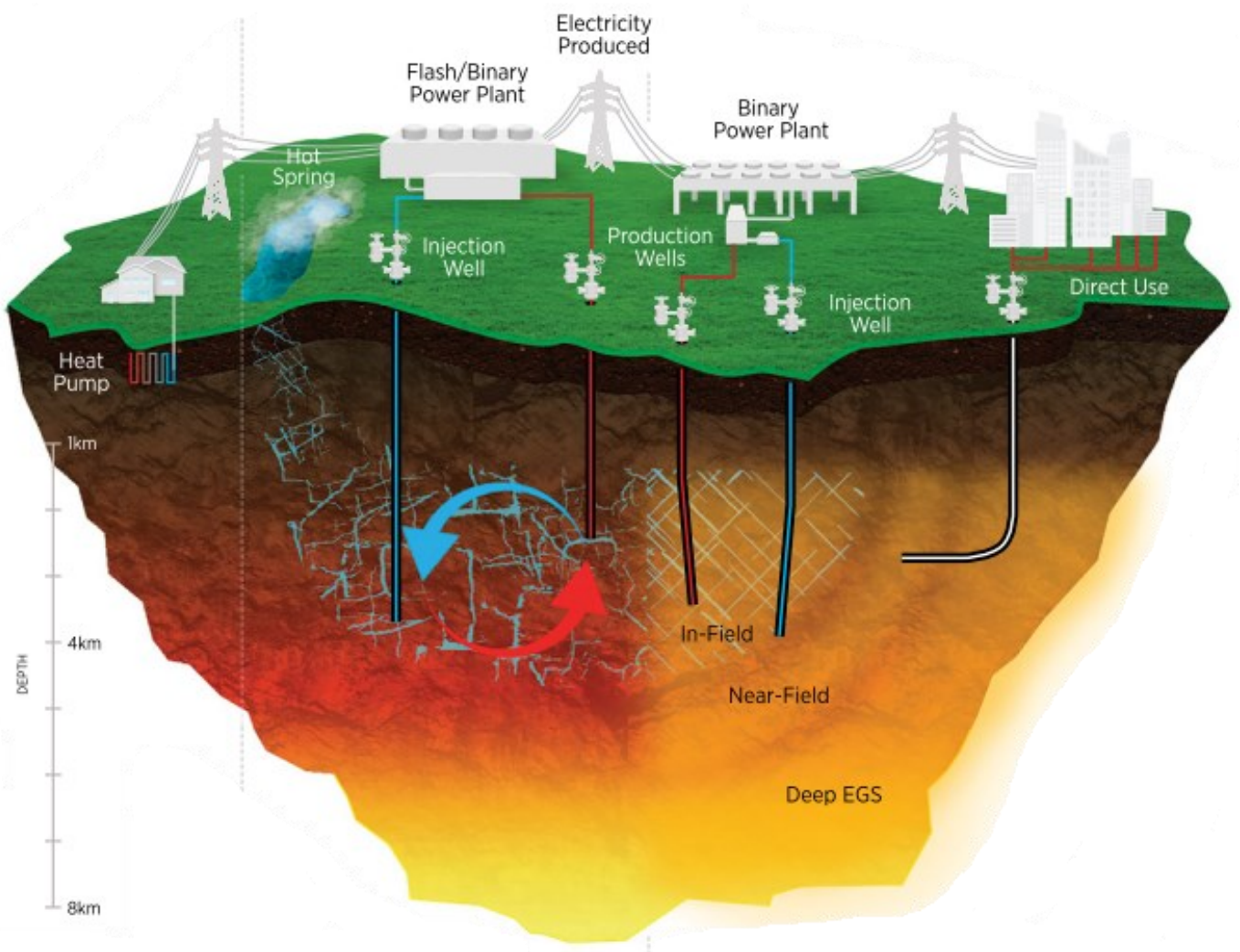


Image source: Geothermal Technologies Office, US DOE. *GeoVision: Harnessing the Heat Beneath Our Feet - Analysis Inputs and Results*. United States. https://doi.org/10.15121/1572361

operations

- Onshore & Offshore O&M - C
- Ops Pipeline Management - E
- Ops Optimisation - E

EPCC

- Multi -discipline Engineering Support - E

wells

- well and completions design and planning-C
- closed loop well design-C
- Well flow assurance-C
- Flow modelling-C
- Casing damage analysis-C
- Hydraulic stimulation analysis and studies-C

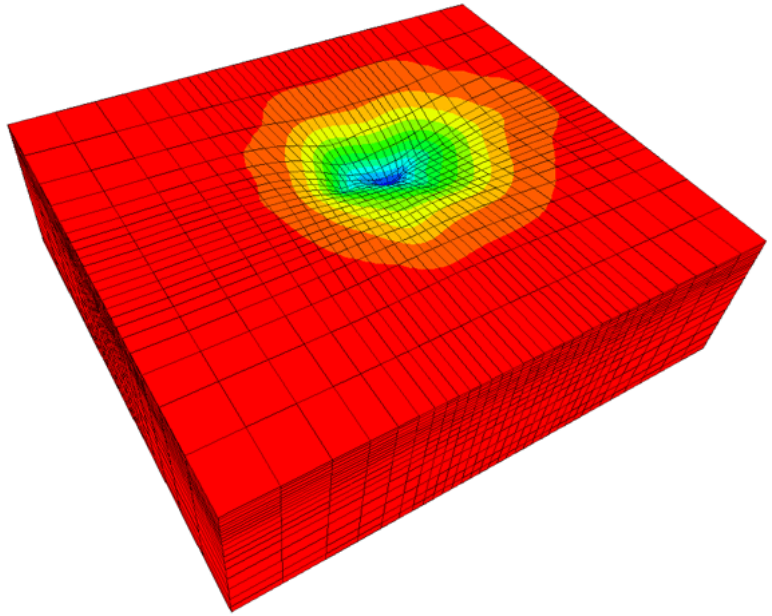
subsurface

- integrated heat to power assessment - E
- district heating potential - E
- prospectivity assessment - E
- resource assessment - E
- independent reporting and certification - E
- reservoir characterisation - C
- 1D-4D geomechanical modelling - C
- Cap Rock integrity studies - C
- Fault stability studies - C
- Compaction / surface deformation studies - C
- Reservoir characterization - C
- Sanding prediction - C

Geothermal Competence

10+ Engineers with direct experience in geothermal projects

- Dong Energy, Margretheholm / FCC Malmö
- Wireline engineer on multiple geothermal projects in Germany
- Instrumenting geothermal wells in Iceland
- Exploration geophysicist (mainly grav-mag, seismic methods) and data interpretation, mapping – Tuscany geothermal research
- Amager Danske Fjernvarme , planning and execution of the recompletion of a geothermal well in Copenhagen
- Induced seismicity risk estimation and evaluation in geothermal fields
- Surface deformation modelling,
- Fault re-activation analysis



HPHT experience - samples

	General Challenges	THREE60 Solutions
Well & Completion Design	Complex P&T conditions during lifetime of well	Consider modelling exercises as a minimum: Temperature Modelling, Multi-String Modelling, Tube Movement, Well Control, Casing Wear, Casing Design

HPHT experience - samples

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Well & Completion Design	Formation damage	Right scoping - evaluate alternatives based on various factors (Risk, cost, technical objectives, well deliverability, HS&E and life-of-well issues)

HPHT experience - samples

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Well & Completion Design	Formation damage	Right scoping - evaluate alternatives based on various factors (Risk, cost, technical objectives, well deliverability, HS&E and life-of-well issues)
Drilling Practices	Narrow mud windows	Wellbore Stability (Pre-drill, Real-time, Post-drill)

Energy Transition – Ideas Norway

1. **Make district heating carbon emission free**

Consumption of fuel used for gross production of district heating. GWh

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total	**6 577.2**	**6 904.0**	**6 679.4**	**7 277.8**	**7 640.3**	**7 737.1**	**8 226.7**	**8 259.1**	**7 767.4**	**9 205.8**
Gas-/diesel oils, heavy fuel oils	185.6	164.2	106.8	99.6	112.4	70.1	65.8	49.7	24.2	88.5
Bark, wood chips and wood[1]	1 591.2	1 573.4	1 522.0	1 879.6	2 104.1	2 133.3	2 354.5	2 509.4	2 211.1	3 074.9
Bio fuel	..	79.0	38.0	35.2	56.5	40.1	90.0	69.5	34.3	215.5
Waste	3 223.4	3 559.3	3 554.4	3 835.9	3 724.6	3 831.4	3 972.9	3 966.3	3 904.4	3 987.2
Electricity	927.8	884.3	823.6	842.4	965.0	976.0	952.5	868.3	953.2	1 032.9
Waste heat	202.5	206.4	200.7	181.1	184.0	178.8	198.0	212.0	209.9	277.0
Fossil gas[2]	250.2	227.1	190.1	177.2	251.3	255.7	312.8	298.3	158.5	277.0
Biogas[3]	26.5	24.5	49.1	28.7	38.2	27.1	40.0	48.8	44.2	41.2
Coal	170.0	185.8	194.8	198.0	204.2	224.5	240.2	236.9	227.6	211.6
Geothermal										???
Memo: Heat not distributed	873.0	841.1	1 199.6	1 031.0	1 101.8	1 136.2	1 070.4	984.8	1 115.1	924.8

[1] Bio fuel was included in wood chips, wood and bark up to and including 2012.

[2] Natural gas, LPG and blast furnace gas.

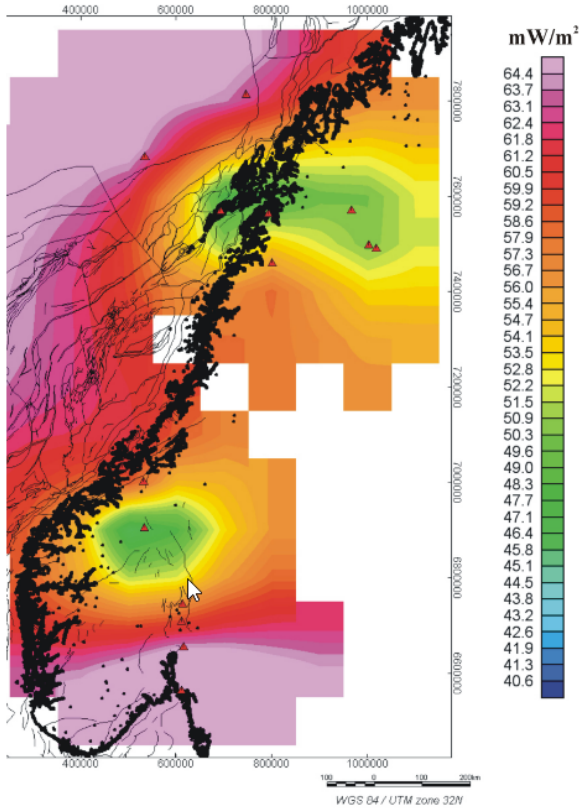
[3] Biogas includes landfillgas. Biogas is included in "fossil gas" for the years before 2010.

The figure for waste and "Memo: Heat not distributed" was corrected for 2021 on 30 May 2022.

https://www.ssb.no/en/energi-og-industri/energi/statistikk/fjernvarme-og-fjernkjoling

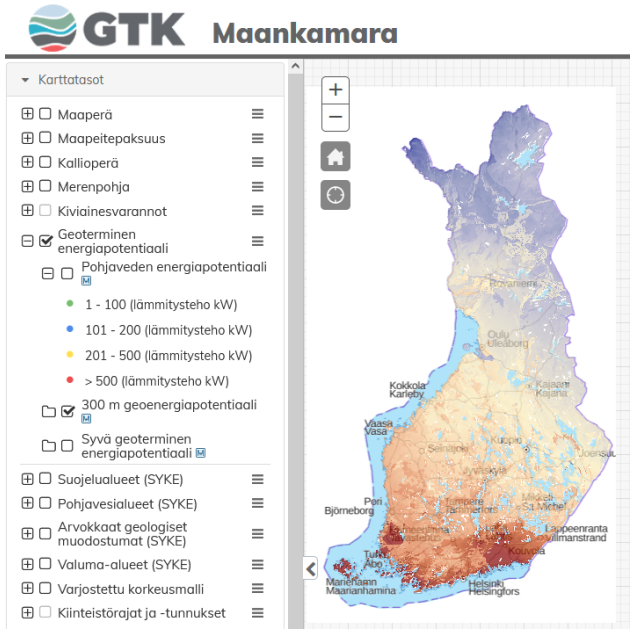
Energy Transition – Ideas Norway

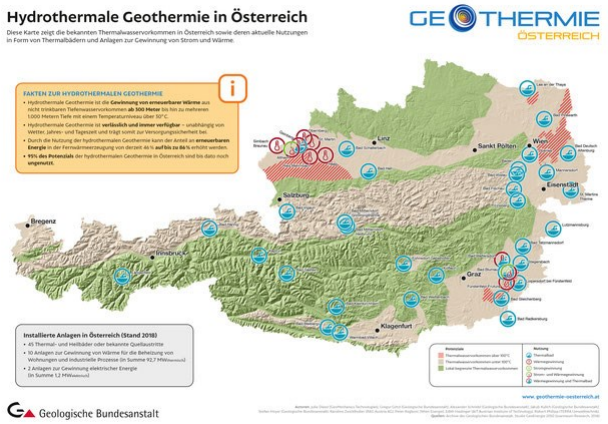
1. **Energy map online for geothermal potential in Norway**



Source: Pascal, 2010

Figure 2: Modern heat flow map of Norway. Note that the newly determined heat flow values exceed by 10 to 20 mW/m² the previously ones (Fig. 1).





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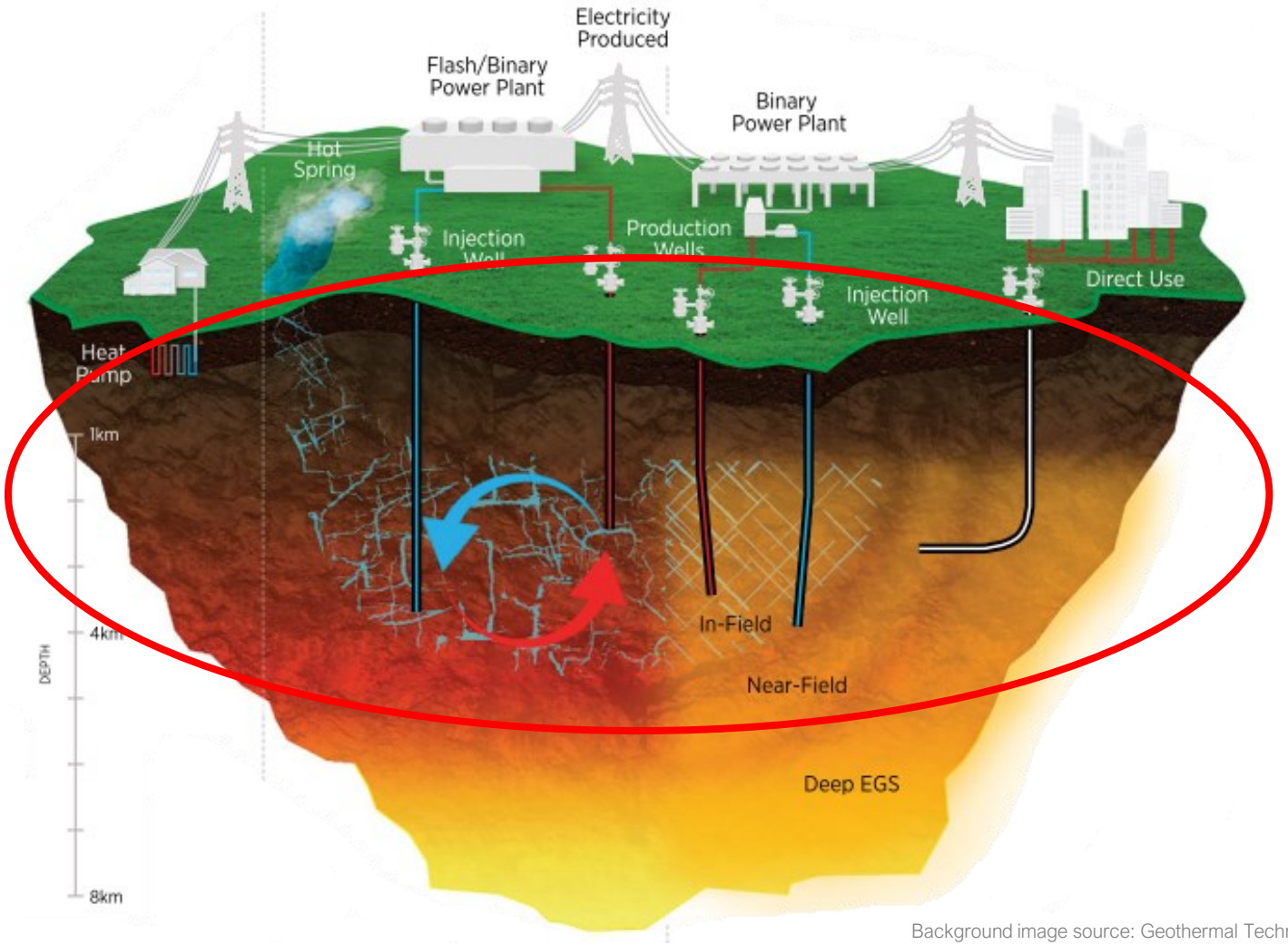
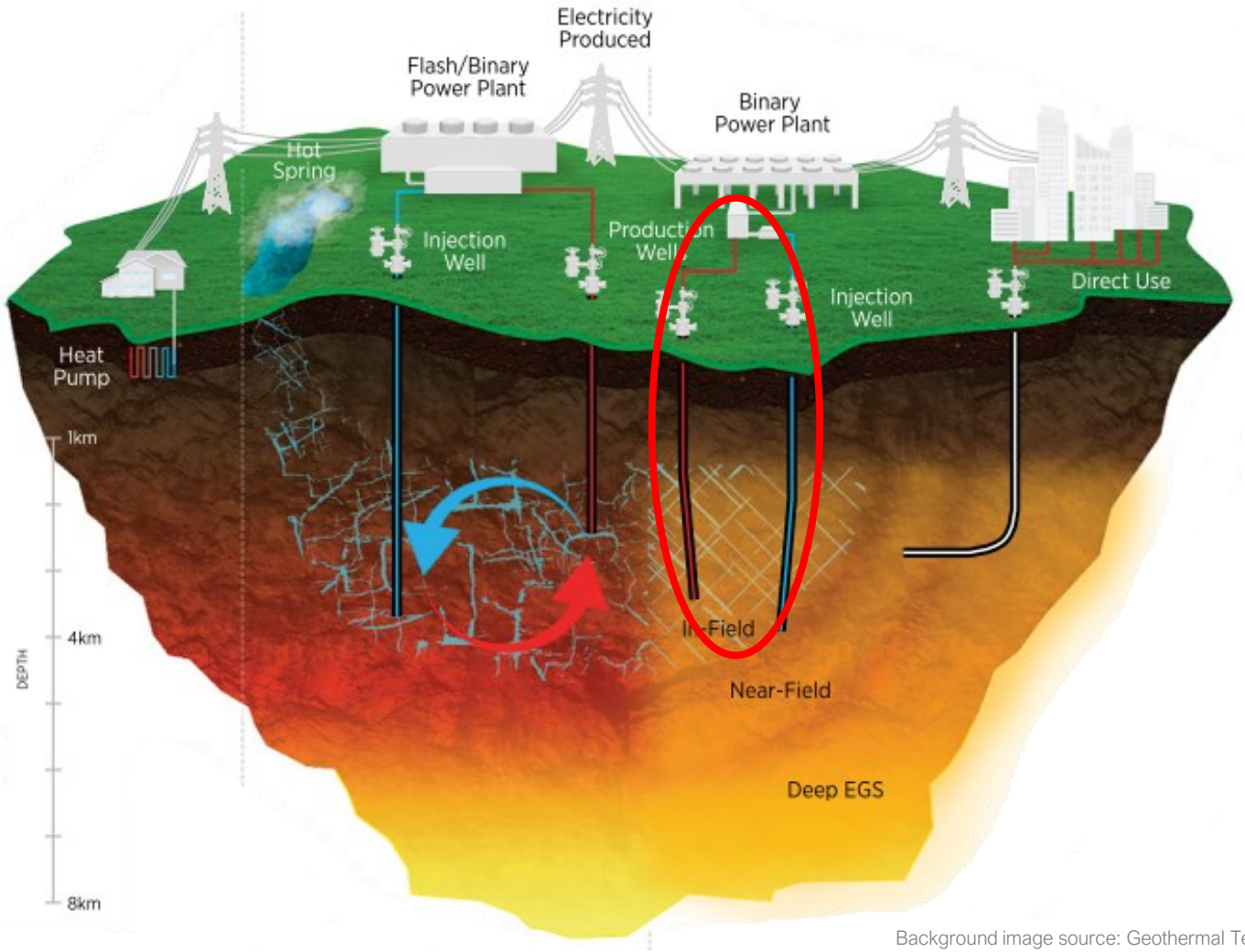
Energy Transition – Deep Geothermal



- **Subsurface**
  - Reservoir Characterization
  - Well Targeting
  - Reservoir Modelling
  - Geomechanical modelling
    - Stimulation
    - Fault reactivation
    - Surface Deformation

Background image source: Geothermal Technologies Office, US DOE. *GeoVision: Harnessing the Heat Beneath Our Feet - Analysis Inputs and Results*. United States. https://doi.org/10.15121/1572361

Energy Transition – Deep Geothermal



> **Wells**
  - > Complex well designs, subsea and HPHT
  - > Well integrity management
  - > Well design and modelling
  - > Well Intervention
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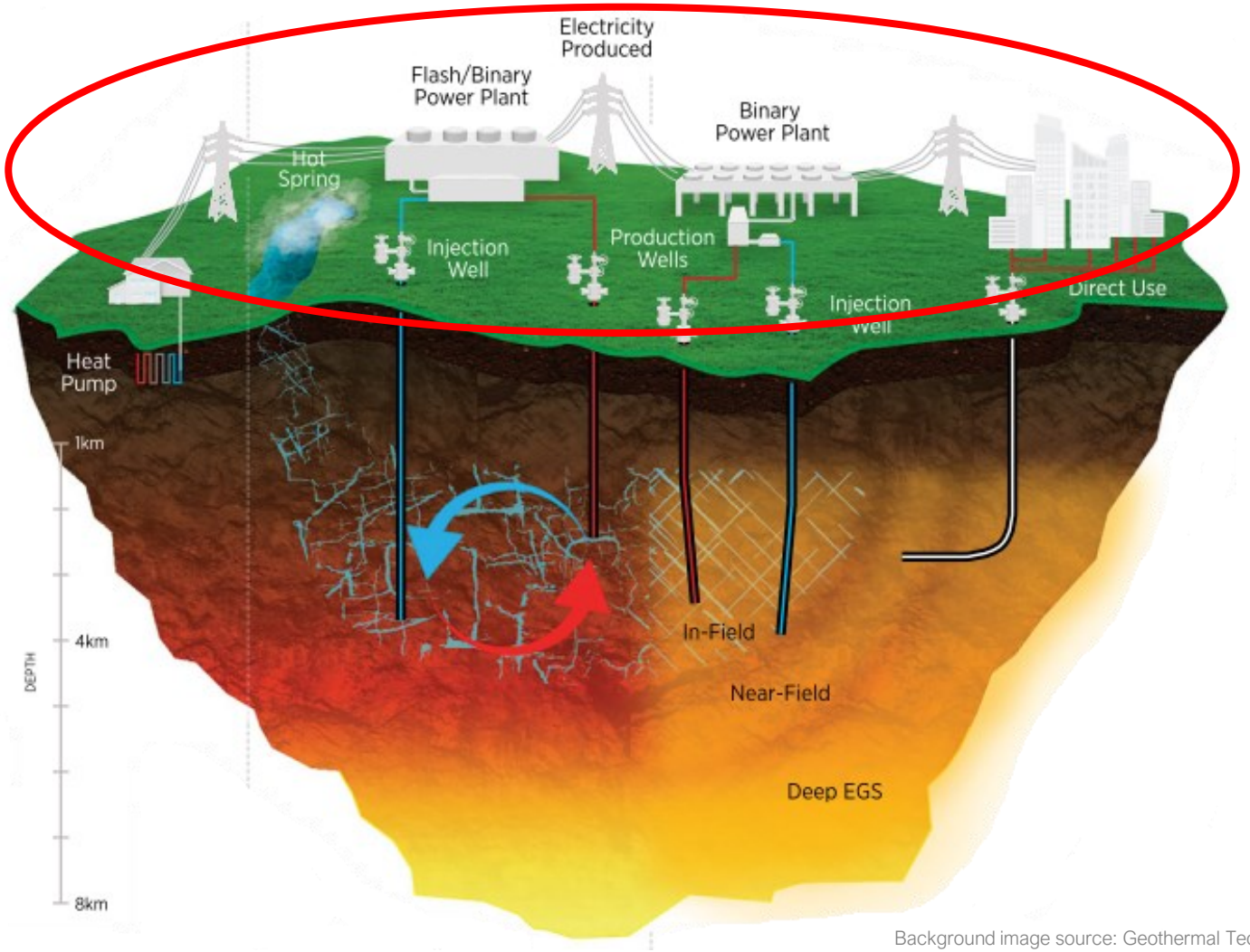
Energy Transition – Deep Geothermal



- **Construction & commissioning**
  - Construction & commissioning management
  - Facilities
  - Constructability & Mechanical handling
  - Completions management
  - Pre-commissioning, dynamic commissioning & handover
  - Shutdown management

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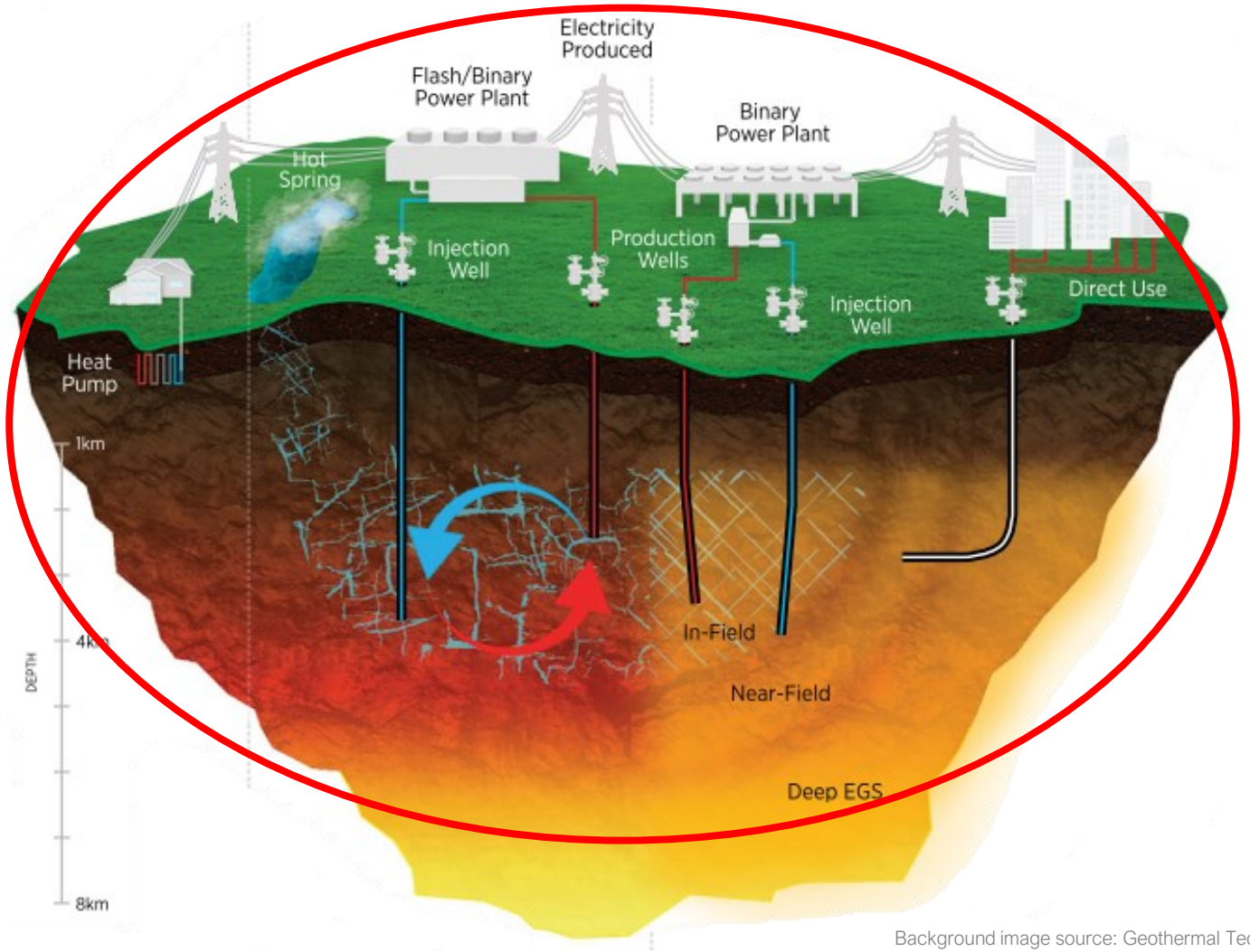
Energy Transition – Deep Geothermal



- **Operation**
  - Operations and maintenance
  - Project management
  - Logistics
  - Safety management
  - Maintenance programs
  - Campaign maintenance
  - Decommissioning management

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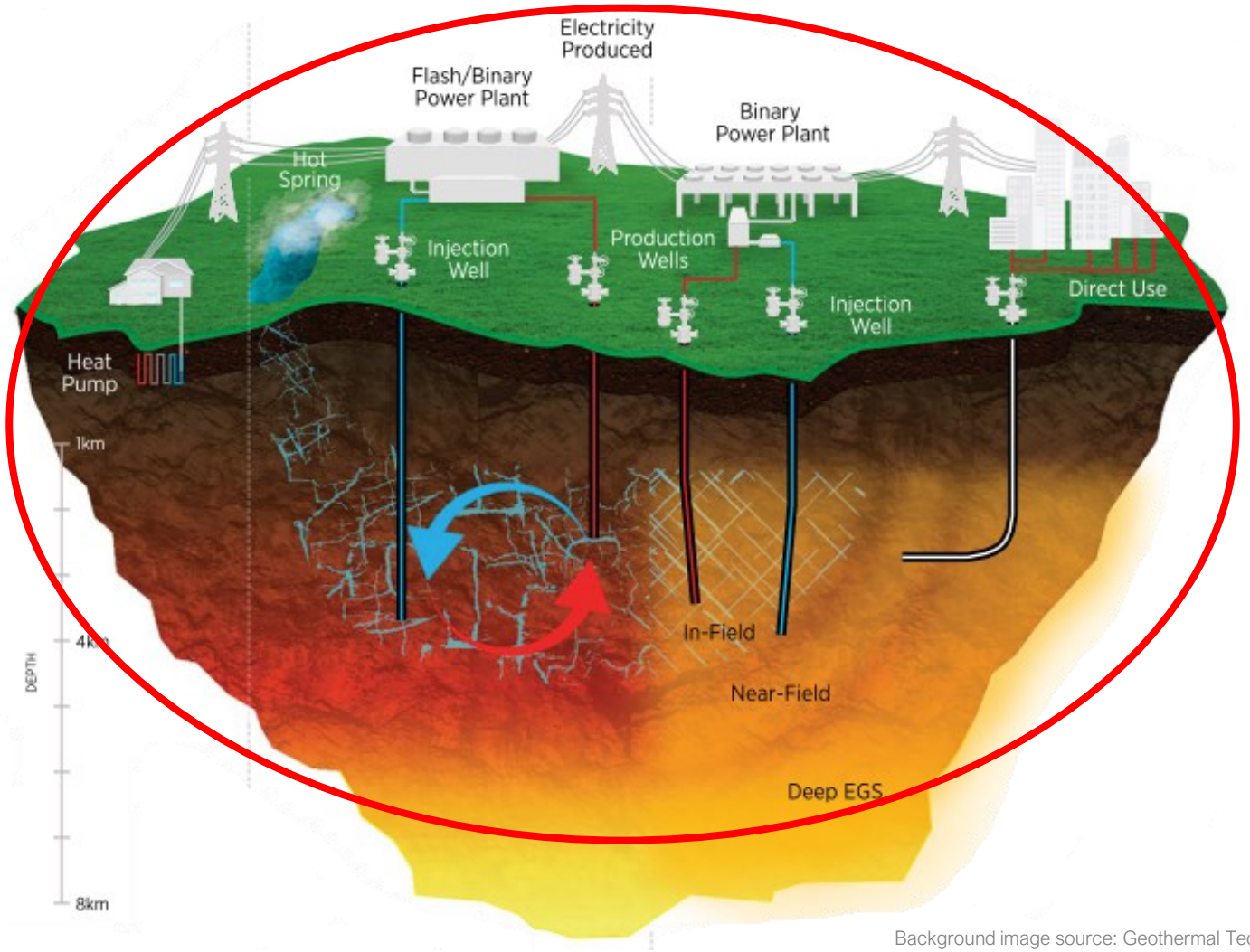

- **Decommisioning**
  - Plug and Abandonment of wells

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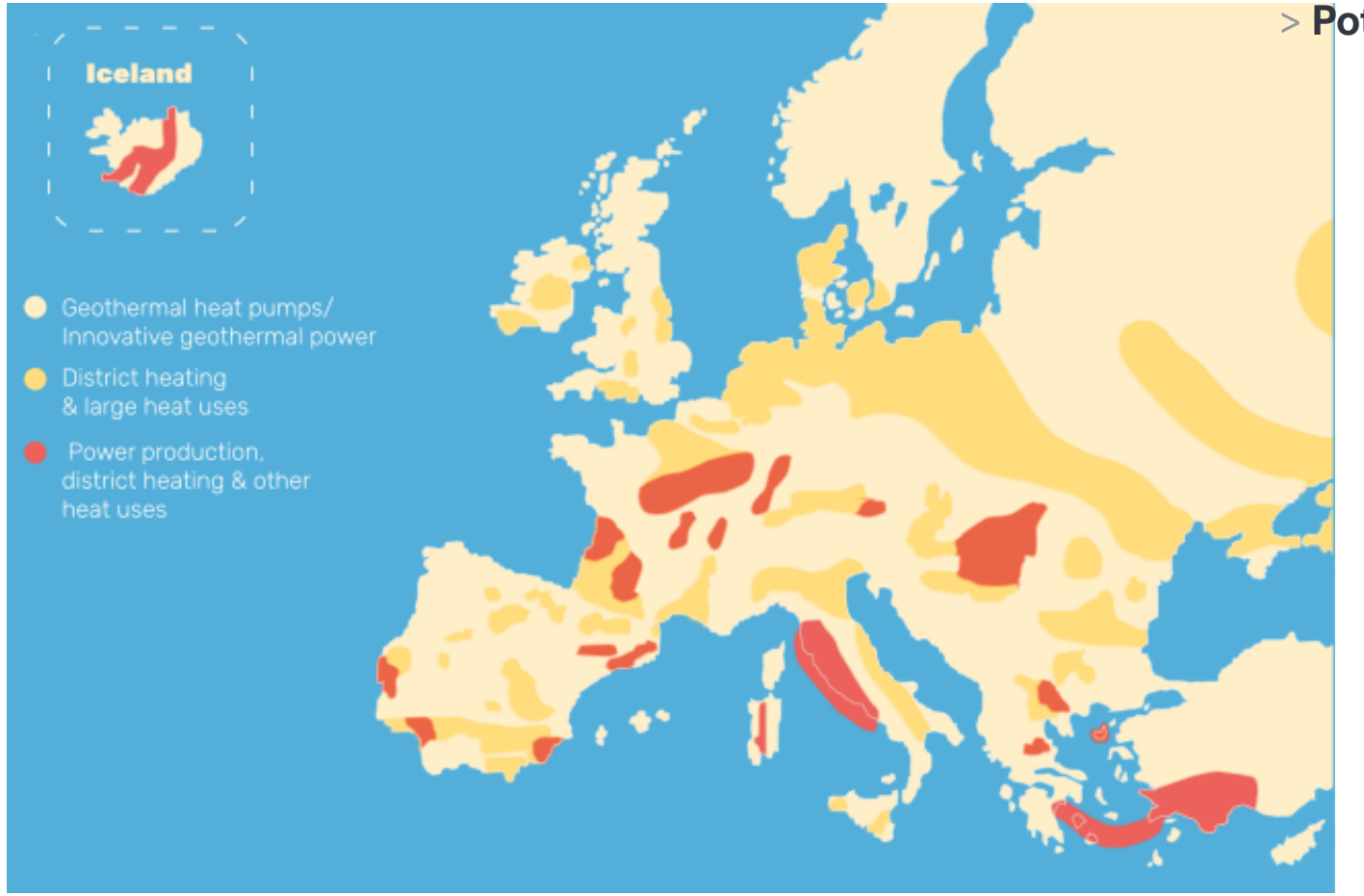
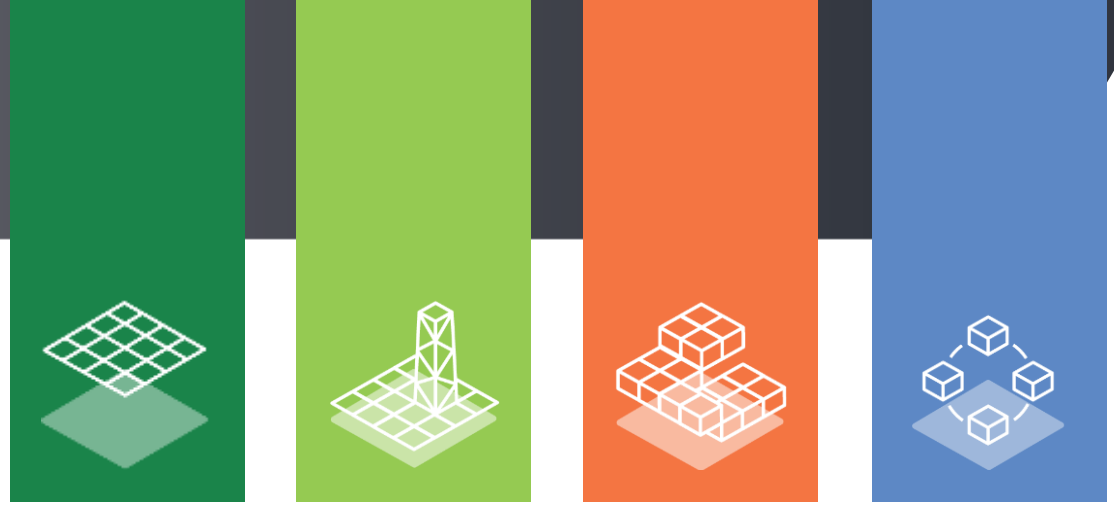
Deep geothermal energy



Source: EGEC Annual report 2021

- **Potential in Europe:**
  - Power production, district heating & other heat uses
  - District heating & large heat uses



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Covering all the angles

www.THREE60energy.com

SUBSURFACE / WELLS / EPCC / OPERATIONS