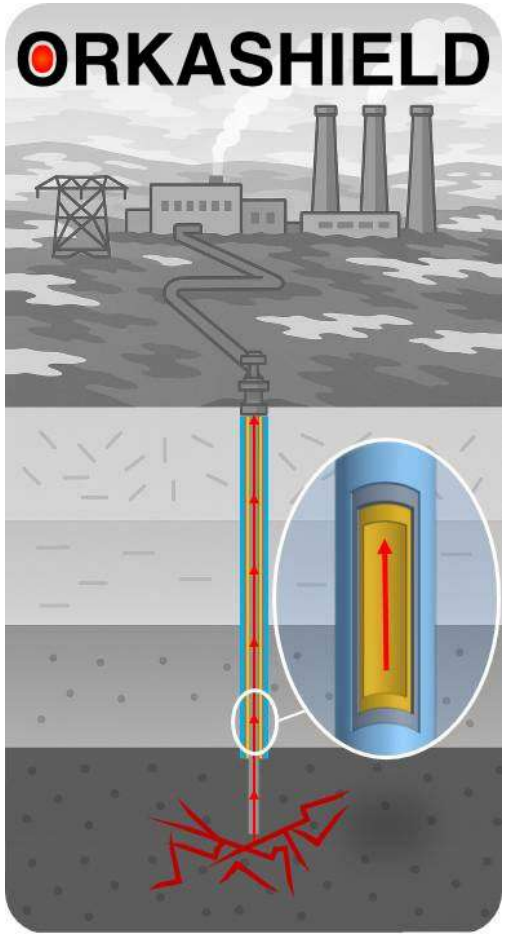


TRI4 Project: ORKASHIELD

OrkaShield: Protective and Innovative Technology for Geothermal Wells

Protective and Innovative Technology for Geothermal Wells

Maximizing geothermal well performance and output

(Heating and Cooling program, Transition Initiative 4)

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OrkaShield: Protective and Innovative Technology for Geothermal Wells

Geothermal energy expansion

- Around 25 % of geothermal wells experience malfunction and low energy output
- These issues create significant operational and maintenance costs for energy companies.
- **OrkaShield** provides a corrosion-resistant solution with enhanced heat extraction capabilities, helping extend geothermal equipment lifetime and improve performance.



Examples of geothermal well defects

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Consortium



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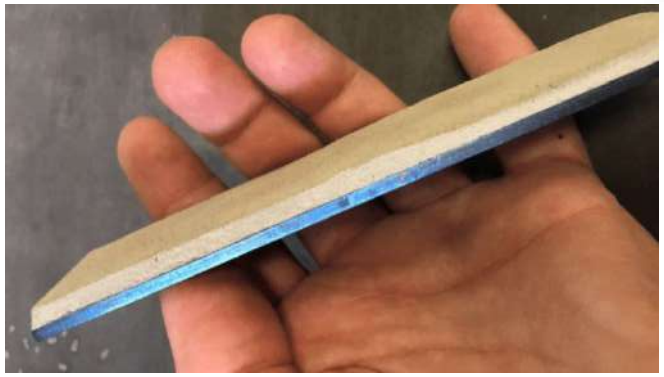
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Backround

PROCASE

ProCase: Development of a composite casing for HT geothermal wells. Protection against corrosion and high thermal stresses due to thermal expansion effects.





Outer thermal insulating component to avoid strength reduction of outer casings and thermal cycling effects.

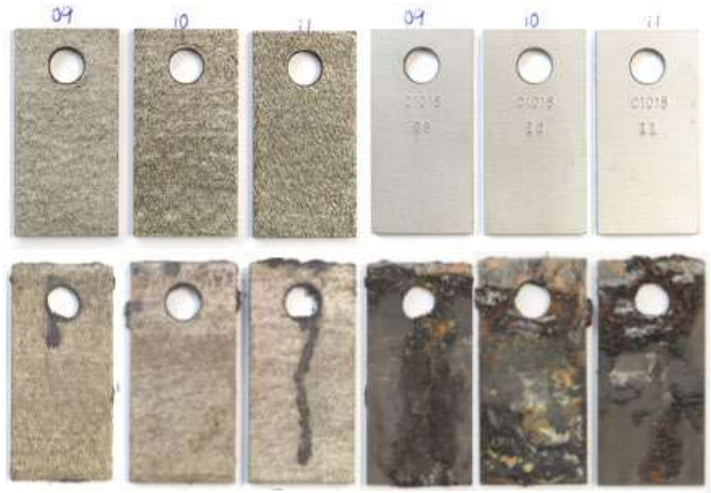
ORKADUCT

Well Technology for European Low Temperature Geothermal Fields

OrkaDuct: Development of corrosion resistant HEA coatings for LT geothermal wells. Cost-effective alternative to corrosion resistant alloys.



The HPHT corrosion lab



Before and after exposure in simulated aggressive media

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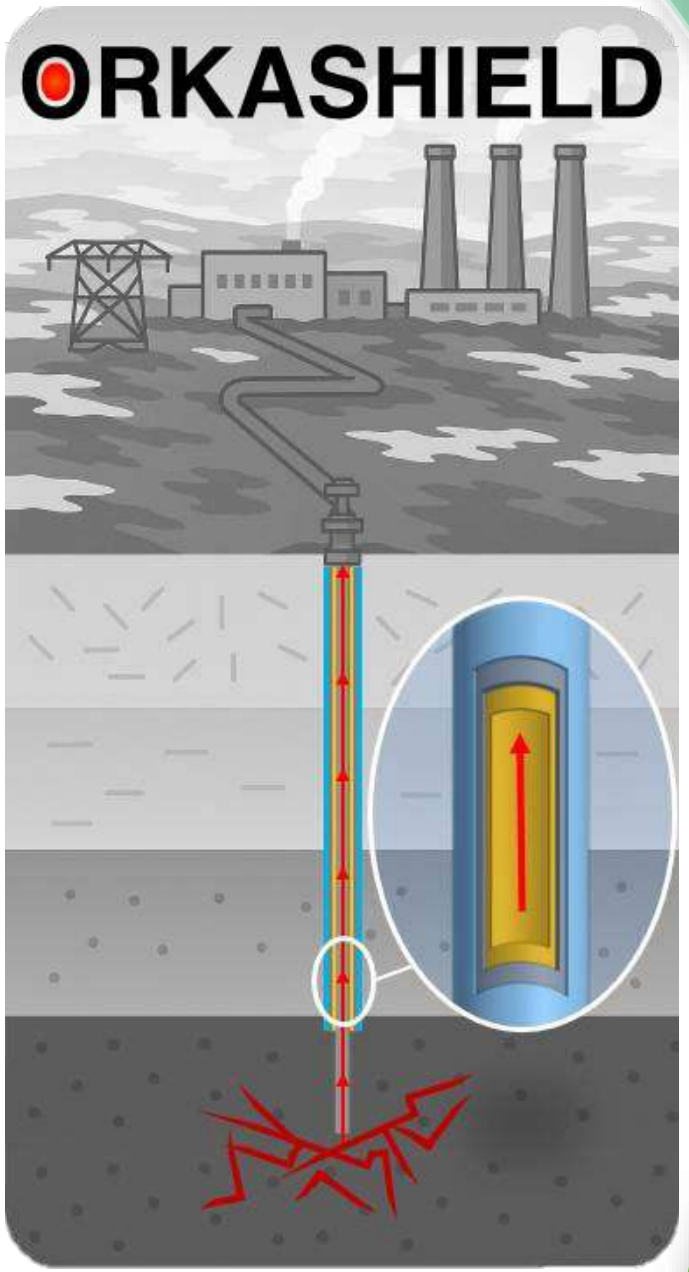
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Flexible geothermal solution

- Geothermal well technology with corrosion resistant casing and insulation (material selection based on reservoir conditions)
- Allows repair of existing wells
- Solution that is flexible: low + high T geothermal areas around Europe, closed loop + EGS, ORC heat exchangers
- Prototype test in a real geothermal environment.



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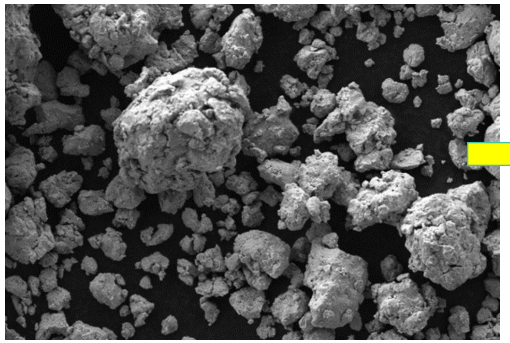
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Coating Development Process from High Entropy Alloys

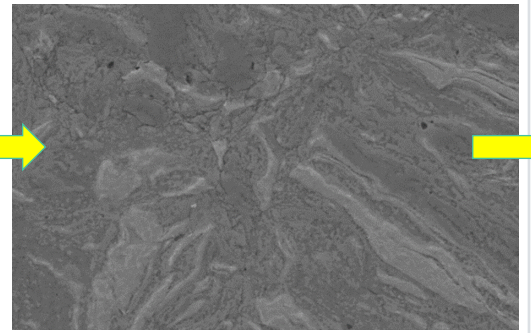
Mechanical Alloying







Spark Plasma Sintering





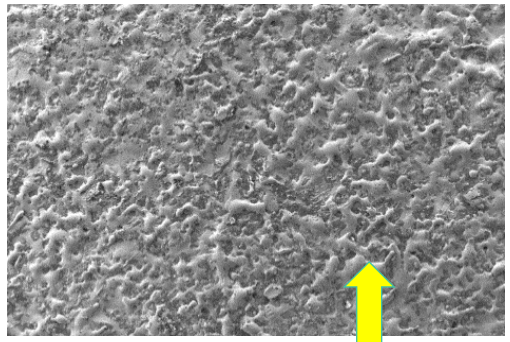






electrode

Electro Spark Deposition









Applications of Corrosion and Wear-Resistant HEAs in the Geothermal Environment

Pumps, valves and drilling components | Protection against corrosion–erosion | High-temperature, aggressive fluids

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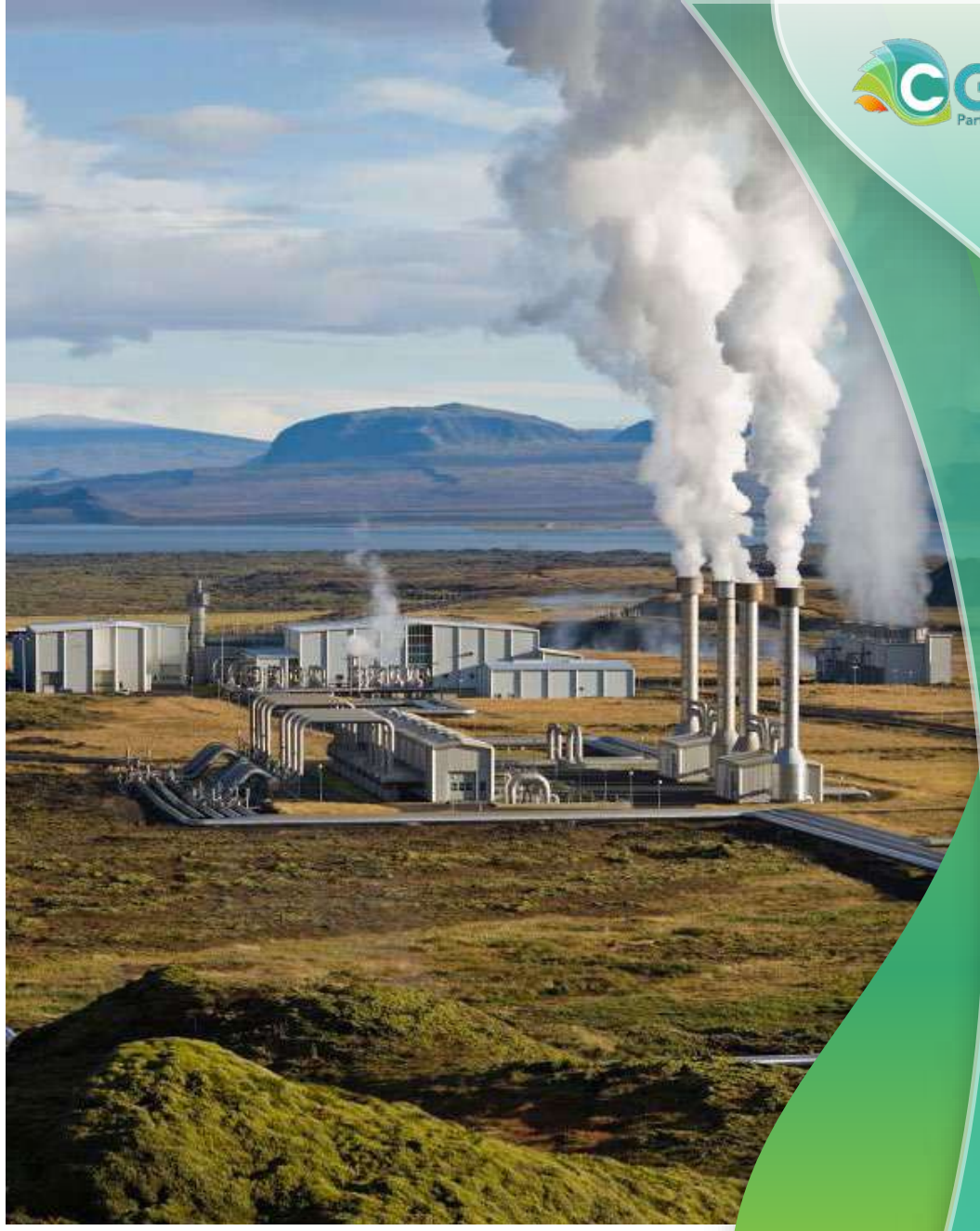
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Context

- **Orkashield** is contributing towards AccelerateEU plan (presented by EU Commision on 22 April 2026)
- **Geothermal energy must participate in strengthening the European Union's energy security and economic resilience, whilst also addressing the climate crisis.**
- **OrkaShield** enhances infrastructure durability, supporting reliable, locally produced renewable energy in Europe.

€340 billion	€24 billion	57% of energy
Import value of fossil fuels in 2025	Additional spending for fossil fuels since March 2026 (Middle East conflict)	Consumed in the EU is imported fossil fuel



cet Partnership

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