

Energy & Minerals: A Match Made in Hades



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SLR

We provide an opportunity for great people to *partner* with great clients in a collaborative, respectful and entrepreneurial 'One Team' culture.



6 Regions

Projects on every continent



100+ Offices

In over 10 countries



2000+ Global Staff

A collaborative 'One Team' culture



30+ Technical Services

Environment, engineering, advisory

What can the Minerals Industry do?

1

Long Term Storage

Energy storage or CO₂ storage are both options

2

Essential Minerals

Old and 'new' materials

3

Heating/Cooling

Warm groundwater combined with heat pumps

Geothermal Heating & Cooling



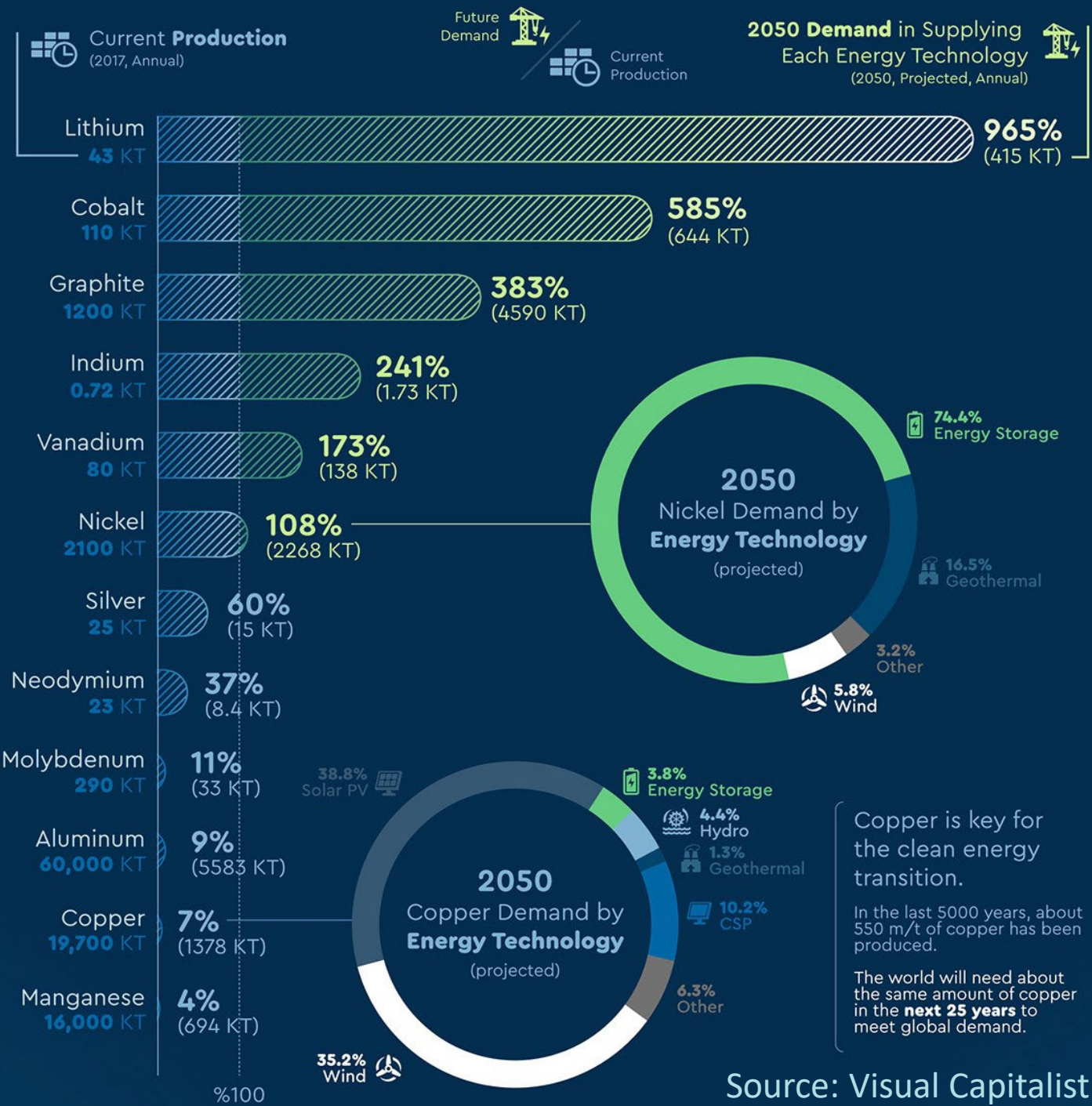
- 65% of Sweden’s residential heating comes from geothermal heat
- UK & Ireland have better potential than Sweden
- Temperatures of 20-40°C not unusual in underground mines
- Combined with heat pumps (driven by renewable energy) there is potential to provide district residential heating
- District heat pumps with COP of c. 3-7
- Possible to combine heating and cooling at the same time

Heat output (kW)	Electrical input (kW)	COP	Electrical input (%)	Notes
10	2.9	3.5	29%	Typical Residential
1200	273	4.4	23%	Bergheim - 2k residents
13200	4328	3.05	33%	Drammen - 63k residents

Essential Minerals



- Renewables far more metal-intensive than oil, gas & coal
- Copper – dispersed grid, electric cars, use in turbines
- Lithium, nickel & cobalt - batteries
- Neodymium – magnets
- Silicon, silver, cadmium, gallium & tellurium – solar PV
- Cement & aggregate for pads/roads



Copper is key for the clean energy transition.

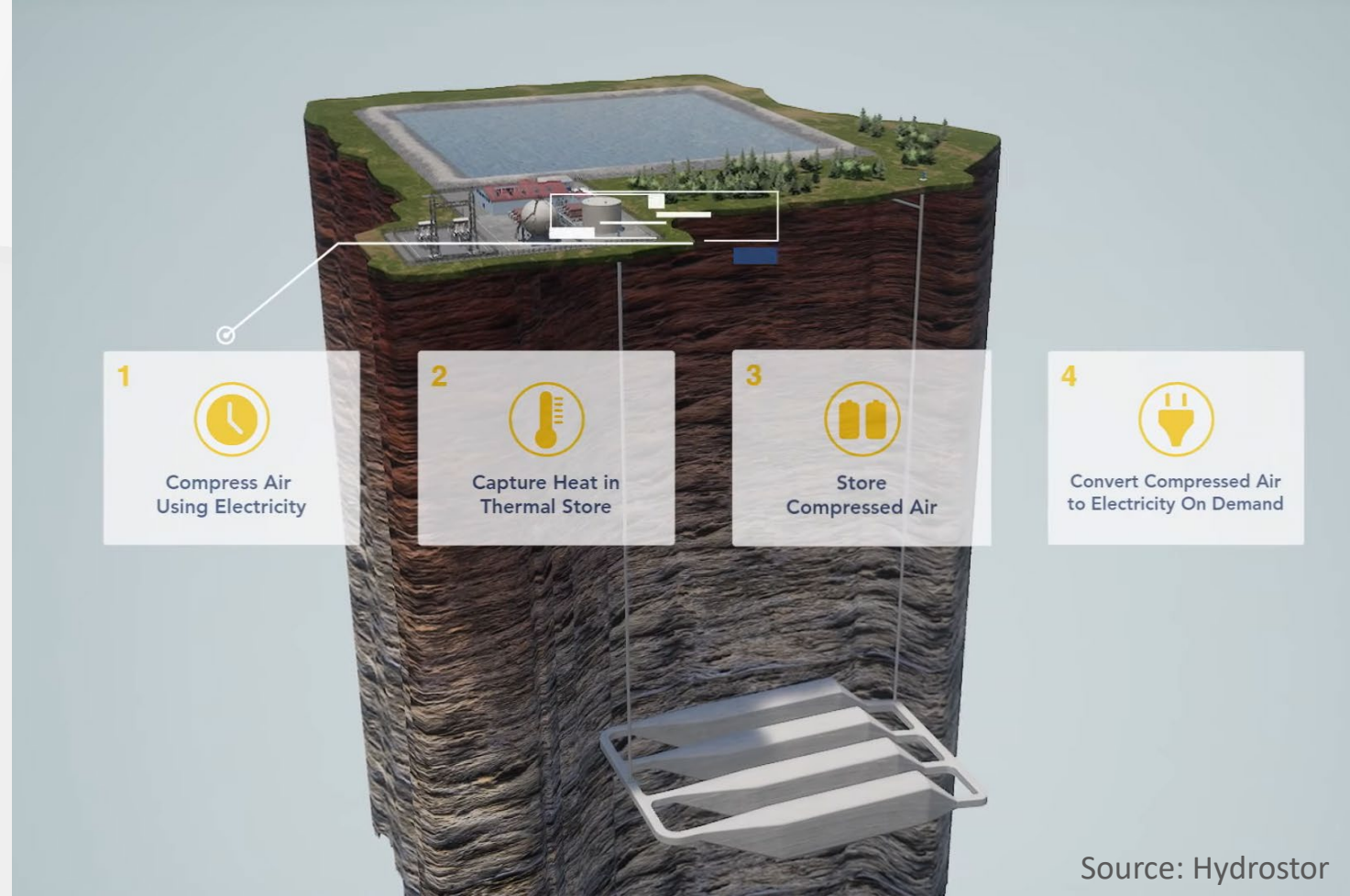
In the last 5000 years, about 550 m/t of copper has been produced.

The world will need about the same amount of copper in the **next 25 years** to meet global demand.

Geological Storage



- Hydrogen storage:
 - Depleted oil & gas Reservoirs
 - Deep saline aquifers
 - Old mines
- Compressed Air Energy Storage
 - Hydrostor (400MW & 500MW)
 - Salt mines/other mines
 - Shallow voids?
- CCUS
 - Depleted oil & gas Reservoirs
 - Deep saline aquifers
 - Old mines?



BUT, there is increasing competition for storage...

What next?

- Partnerships
 - Supply
 - Advocacy
- After mining – space enhancement
- Retrofit
- Design early
- Site selection/Co-location
- New technologies?
- What's stopping us?



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Thank you for listening.

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