
# GeoLi 2022

## Dr Isabela Alves de Castro & Dr Campbell McNicoll

## A greener future relies upon sustainable future mineral technologies.


Geo40 develops unique, innovative technologies for mineral recovery from underground fluids...
...for deployment at scale in the global transition towards cleaner energy and greener critical minerals.

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# The Geo40 Journey

## A compelling idea
## 2010

### From hard rock to brine

A group of successful copper hard-rock miners sees potential to sustainably recover strategic minerals such as lithium & caesium from geothermal fluids.

## Silica first
## 2014 – 2015

### Geothermal Silica tech

Most geothermal fluids contain high levels of silica which prevents recovery of other minerals. Technology for silica removal developed & tested in NZ & Japan.

## Si opportunity + Li
## 2016 – 2017

### White gold in geothermal Silica recognised

Silica recognised as a major problem in geothermal power generation and the role of silica in nano-technology acknowledged.

Work on Lithium commences.

## Si demo + B
## 2017 – 2018

### Silica demo plant

Silica recovery demo plant commissioned near Taupo, NZ, producing 500tpa commercial product.

Boron recovery process documented.

## Silica-at-scale
## 2019 – 2021

### World-first scale Si plant

World-first 5000 tpa large-scale silica-from-geothermal-fluid plant built & commissioned.

Global sales book build.

Low carbon footprint quantified.

## Si: enabling tech
## 2021 – 2022

### Adding further value

Adding further value Silica recovery permits new value capture in geothermal systems.

Potential license partners identified.

## Driving Lithium
## Early 2022

### Completing the tech

Lab work complete, materials handling complete, global resources study complete.

Focus is to map technology to brine types.

Pushing role of silica in low carbon concrete.

## Global Reach
## 2022 –

### Li + Si offshore

Global brine piloting. Validate DLE tech reach and address ability.

Advance first offshore DLE plant.

Advance next Si plant.

Play major role in low carbon concrete.

# Technology Proven at Scale

## From lab to commercial production – not just a concept

Great technology is one thing; being able to scale it up is quite another. Geo40 now has a demonstrated track record in the design, staged build and operation of sustainable mineral-recovery plants.

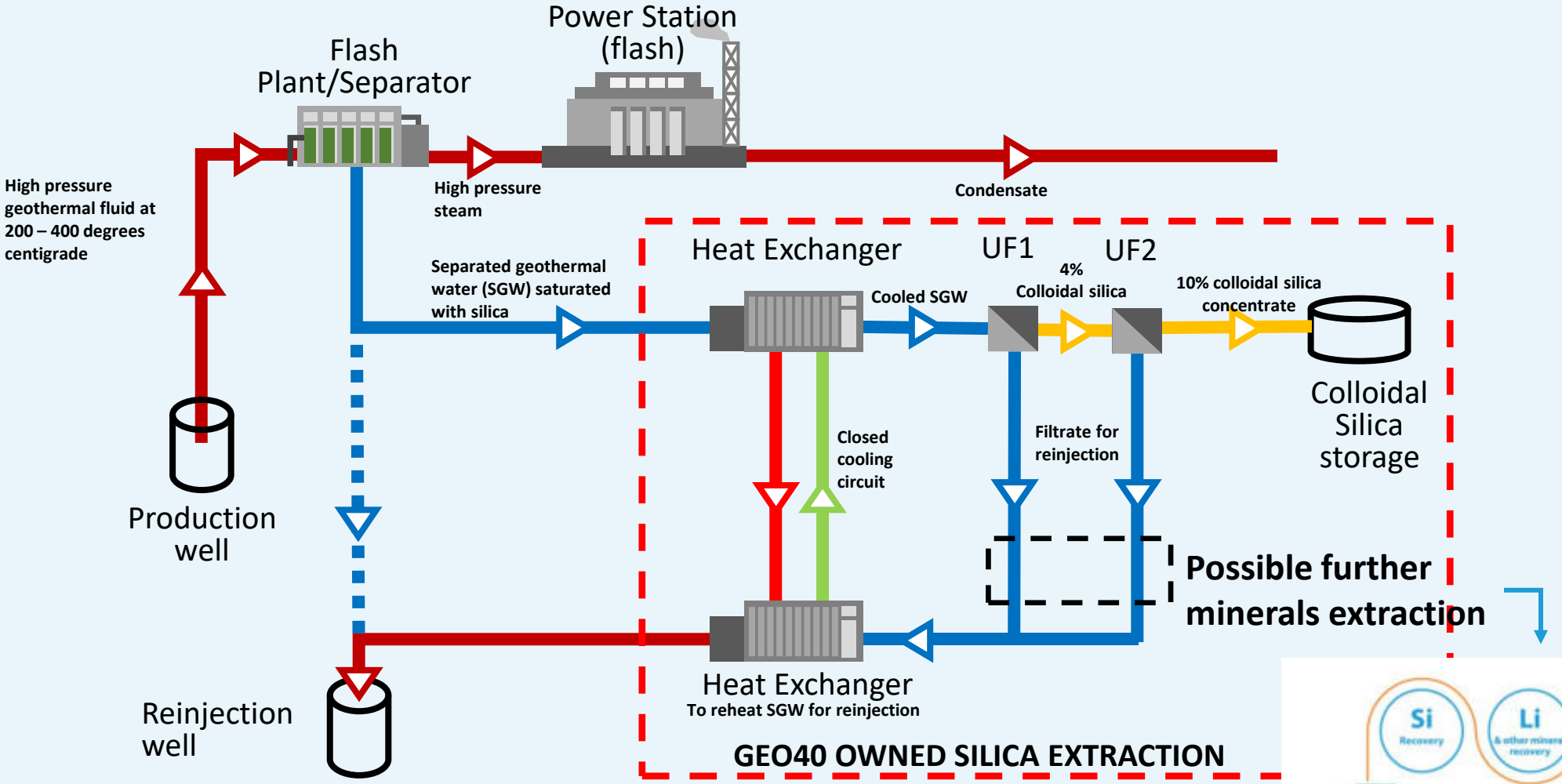
We've completed the full journey in silica recovery; we are now doing the same in lithium. In time, we will repeat this journey in boron, caesium, antimony and so on.

Geo40 Containerised Silica Pilot Plants – NZ (4 Sites) & Japan

Geo40 Demonstration Silica Plant, New Zealand

Geo40 Commercial Silica Plant, New Zealand

# Silica Process Overview




# Unique technology with global reach

# 2021: Full scale silica plant commissioned

**Sustainable low-carbon colloidal silica from geothermal fluid; a genuine world first**

**The plant:**

**Located on the Ohaaki geothermal field Taupo**

**Contact Energy site**

**Processing 8,000 tpd of brine**

**Producing 5,000 tpa of 30wt% colloidal silica**

**Si Plant has been operating for 18 months**

**Unique technology and IP developed in New Zealand now ready for global rollout**

# GeoSilica

## We supply customised low-carbon silica solutions

Our Colloidal silica is the first commercially produced directly from geothermal fluids in an environmentally sustainable manner and with a much lower carbon footprint than industry norms.

Coatings and Adhesives

Earth and Mineral Industries

Foundry and Precision Investment Casting

Pulp and Paper

Rubber and Latex

Waste Management

Building and Construction

Chemical Manufacturing

Civil Development

### The conventional alternative; silica-by-blast-furnace:

- Quartz-rich sands mined then melted at 1600$^{0}$C in a blast furnace
- Chemical extraction back-end processing to strip gangue minerals
- Furnaces typically coal powered
- Silicas produced typically have very high carbon footprint

# Silica Scale a Real Problem for Generation

## Key operating and financial metrics

- Northern Plant services 20MW of generation, generating 2022 profit.
- The Northern plant has been re-injecting into the same well for 18 months with no decline in performance
- GNS working on showing silica depleted fluid actually cleans scaled pipes
- Targeting future plants at 5x this scale, ie. 100MW+
- Added value from reduced power station opex, waste heat utilisation and $CO_2$ sequestration

Cross sectional view of a geothermal reinjection pipe showing heavy silica scaling.

**Over 45 global geothermal operators with scaling issues visited our Ngawha Demonstration Plant; due to COVID-19, few have seen us operating at scale at the Northern Plant yet.**

# ESG is key

## ESG is at our core, not something pasted on retrospectively.

Environment: Sustainable strategic minerals & environmental excellence

Social: Genuine practice of the Māori concepts of kaitiakitanga and kotahitanga,

Governance: Public Company quality governance and reporting

**Being very much ‘made of New Zealand’ is a defining attribute.**

# Beyond silica: Lithium

**DLE technology to address a wide range of lithium brine resources.**

Three diverse brine types (including very low grade fluids) processed in 2021:

- New Zealand, 10ppm Li
- Europe x 2, 45ppm & 120ppm
- Argentina, 700ppm
- USA, 300ppm

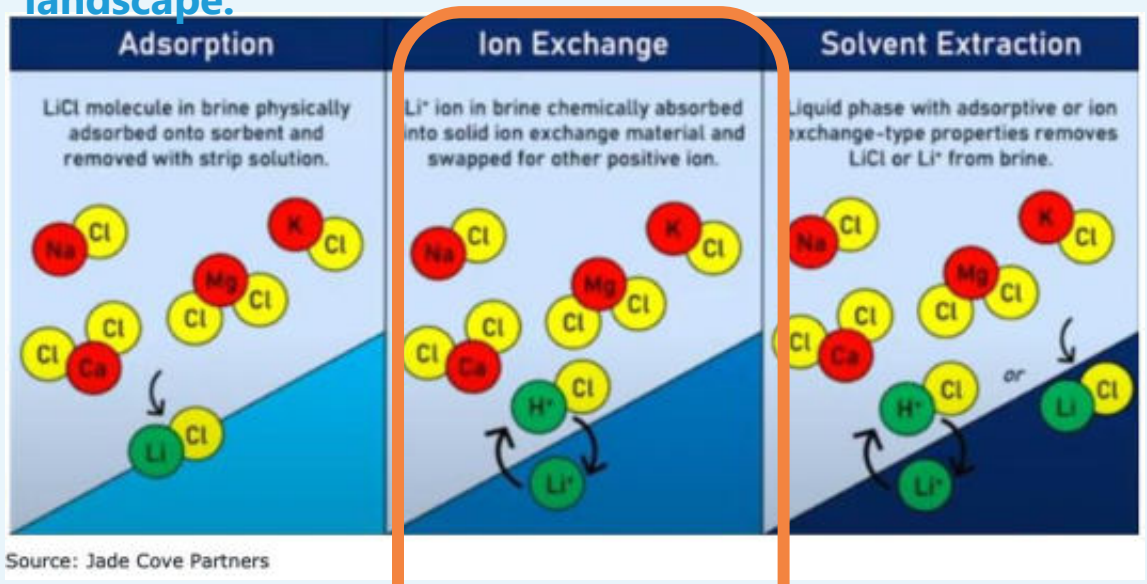

- **Over 90% Li recovery achieved, opening up low-grade brine resources where others can't succeed.**

Our DLE technology:

- **Is highly selective**, working as low as 30ppm Li
- Produces a **very pure** lithium concentrate

**Our tech uses basic ion-exchange chemistry but with a differing physical approach than standard ion-exchange columns.**

**The Direct Lithium Extraction technology landscape:**



# Pilot Plant in New Zealand

# What's next?

## 2023/24, shipping a Demonstration Plant

- 500tpa Lithium Carbonate (min)
- $20m build
- USA or Argentina/Chile

**About proving our sustainable direct lithium recovery process beyond doubt, so we can scale rapidly.**

# How?

**We will deploy where brines are “recovery-ready:”**


- Holes in the ground
- Infrastructure in place
- Strong policy support
- Minimal new consenting required


**We are a rapidly growing company – speed is everything!**

# Beyond silica: Boron

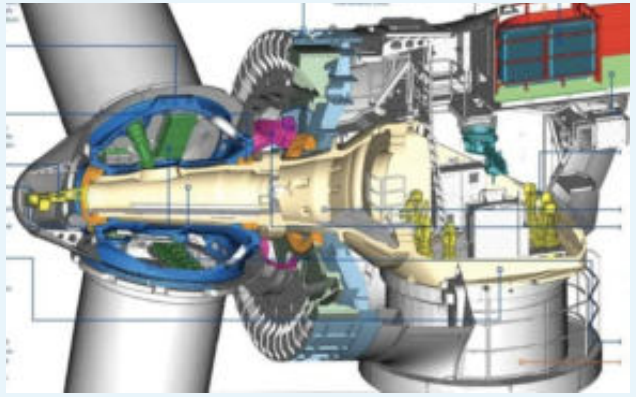
## Boron – the 5th element of decarbonization


Boron is an extremely versatile element and has long been used in applications such as buildings and industry, glass and agriculture. It is emerging as a critical component in the climate transition in areas such as EV batteries, high strength steels, solar PV modules, wind turbine drive trains and blades and in hydrogen fuel cells.

*Credit Suisse notes that "Demand is forecast to be 10x greater than supply by 2050, with 90% of demand coming from climate technologies." (December 2021)*

*The US Government recently designated American Pacific Borates' (ASX:ABR) Fort Cady Boron Facility as Critical Infrastructure.*

**Boron is present in geothermal fluids in high concentrations in a number of locations. We developed an elegant process for sustainable boron recovery from fluids in 2019.**



Boron used in wind turbine

**In anticipation of high forecast demand, we are planning to design, build and operate a boron pilot plant in New Zealand in 2022.**

# Corporate

**Geo40 is a privately held company with over 350 shareholders. It has a public-company quality board.**

Bill Turner AO, Chair
Bill is a geologist with over 35 years of international experience. He is a former President & CEO of Anvil Mining Limited, a company founded in 1993 and acquired in 2012 by Minmetals Resources Limited for US$1.3B.

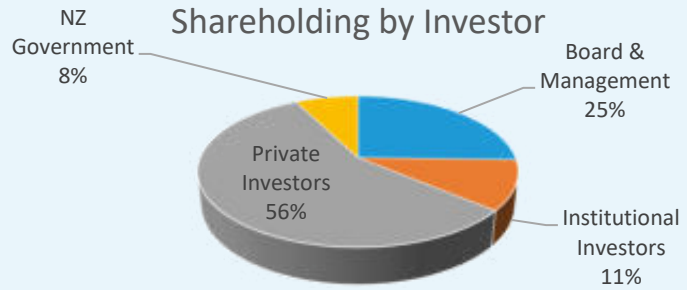
Peter Bradford, Director
Peter is a metallurgist with over 30 years experience in the minerals industry.
He is currently the CEO of Independence Group [ASX:IGO], a diversified mining and exploration company.

Joanne Warner, Director
Joanne has over 20 years' experience investing in natural resources and is former Head of Global Resources at Colonial First State. She is currently a director of First Quantum Minerals and ASX-listed Deterra Royalties Ltd.

Paul Smart, Director
Paul is a professional director and experienced finance professional. He is a Chartered Accountant and serves on the boards of Intercity Group, Argus Group and Mercer Group among others.

John Worth, Managing Director
John is an infrastructure development leader with over 25 years of experience in senior roles including in renewable energy and geothermal. John was previously CEO of an NZX-listed electricity generator.

As at 31 January 2022 a total of 75m shares were on issue. The top ten investors hold 52% of the Ordinary Shares in the company.




geo40
sustainable mineral recovery