PROVINCIAL DEVELOPMENT UNIT
New Zealand Government

COVER SHEET

3.3. Sustainable Minerals Extraction Project PGF Application		For: Approve	
Tier:	**2 - Sectors**	**Sector:**	**Energy**
Background & context:		**Recommendation(s):**	

Applicant Organisation:

- Geo40 Limited

Location:

- Taupo, Bay of Plenty

Proposal:

- To build and operate a silica removal plant (using proprietary innovative technology) at the Ohaaki geothermal site in Taupo. The Ohaaki geothermal plant is operated by Contact Energy and the land is owned by the Ngati Tahu Tribal Lands Trust (NTTLT).
- The removed silica will be exported to be used in different industrial products.

Funding Sought:

- Total project value: $Commercial Info
- PGF Funding: $Commercial Info (CAPEX)
- Commercial Information

Background:

- Geo40 has an agreement with Contact Energy and NTTLT to prove its technology through the completion of two final milestones:
  - Construction and successful running of a Commercial Demonstration (Ngawha) Plant (completed); and
  - Successful construction and running of the Northern Plant (for which PGF funding is required).
- Commercial Information

We recommend that the IAP:

a) **Discuss** the Sustainable Minerals Extraction application.

b) Consider the following funding options and **recommend one of the three options**:

i. A $Commercial Information (**PDU prefers this option**); or
ii. A $Commercial Information
iii. A $Commercial Information for the feasibility study.

c) **PDU recommends** that

i. Any PGF loan option Commercial Information

ii. If the preferred option is equity then PGF will have Commercial Information

- Commercial Information

- The first milestone of the project has been fully funded by Geo40 and successfully completed and the Project is now de-risked.

- Geo40 will undertake a feasibility study and detailed design to finalise the actual build costs followed by procurement, construction and commissioning.

- Following the completion of the Northern Plant, it is planned that operations on the site will be expanded to include a Southern Plant. Due to economies of scale and ability to share the fixed operating costs over a doubling of production, the inclusion of the Southern Plant will significantly improve financial performance as operating overheads and existing infrastructure will then be able to be spread over the Ngawha Plant, Northern Plant and the Southern Plant. Due to this, the Southern Plant will be able to be funded through a mixture of debt and equity (IPO or private placement).

- Geo40 has an agreement with Mercury's Kawerau field for a similar project to produce silica and other minerals.

- Silica scaling of geothermal power station pipelines and the reinjection wells that the pipelines feed is a significant cost for geothermal power generators. The patent pending Geo40 silica extraction technology is a world first and has applications in the global geothermal power generation industry.

- Silica has wider industrial applications in paper making, paint, concrete and other binding materials.

- Future production includes other minerals such as lithium and boron.

- Geo40 has raised $Commercial from friends, family and high net worth individuals to fund this

Commercial Information

d) **PDU recommends** a stage gate approach to funding with a stop/go decision based on the outcomes of the feasibility study that will be undertaken prior to the substantive build.

e) **Note** the applicant has requested a grant of $Com Comm and a loan of $Commercial Inform at the current OCR.

f) **Note** PDU supports this application because:

i. This project will create high skilled jobs in the region;
ii. Enable higher returns for Maori owned land; and
iii. Enhanced sustainability of natural resources.

g) **Note** MBIE's Energy & Resource Markets team is supportive of this application.

h) **Note** this is the first silica extraction technology (patent pending) from geothermal that has been demonstrated successfully to this level globally.

i) **Note** Commercial Information

j) **Note** there is also potential to extract lithium (used for battery manufacturing) and other minerals from geothermal fluids.

development to date and also received Commercial Information		
PGF criteria that this proposal supports:		
PGF Criteria	**Assessment Commentary**	**Rating (1✓ to 5✓)**
Link with fund and government outcomes		
Creates permanent jobs	• Comme FTEs after the completion of Ohaaki and Kawerau projects, mostly technical (chemical and process engineers) and high skilled jobs. • PGF funding would enable current Comm contract jobs to become permanent, including Con technical operators from Ngati Tahu. • Silica exports would also create additional jobs (logistics) in the region. • Geo40 currently employs Com PhD graduate and would employ more when Geo40 will establish a research and development facility to support ongoing development	✓✓✓✓
Delivers benefit to the community	• High skilled jobs and export earnings from silica will have a flow on effect on the local economy which would benefit local communities.	✓✓✓
Increased utilisation and returns of Maori asset base	• NTTLT owns the land and currently receives payments for land lease and processing of geothermal water. This money is used by them to develop tourism and other projects. • The first plant already constructed on the Ohaaki site (Ngawha Plant) has resolved a long-standing disagreement between NTTLT and the Government over the local Ngawha which has now been restored to its historical clean appearance. • NTTLT has shown interest in investing in the future stage of this project and may get good financial returns.	✓✓✓✓
Enhanced sustainability of natural assets	• Sustainable extraction of silica and potentially lithium and boron. • Silica produced in this process comes from a renewable (geothermal fluid) source and requires lower amount of energy to produce than conventional silica. • Improves the life and efficiency of geothermal power generation plants.	✓✓✓✓
Mitigation of climate change	• Silica with lower carbon footprints can be used in	✓✓✓

effects	New Zealand for industrial applications. • Globally, this disruptive technology to produce silica with low environmental effects will fetch a premium price and help industrial users of silica to manage their carbon footprints.	
Additionality		
Adding value by building on what is already there	• New Zealand is seen as a leader in geothermal space and this technology will further strengthen the position. • Geo40 can easily expand its operation in New Zealand with existing geothermal plants.	✓✓✓✓
Acts as a catalyst for productivity potential in the region	• The Bay of Plenty region has a strong presence of geothermal industry and innovative technologies like this proposed project would certainly act as a catalyst for further innovation in geothermal space. • Operationally, this technology will improve production efficiency of geothermal operators.	✓✓✓✓
Connected to regional stakeholders and frameworks		
Alignment with regional priorities	• Geothermal is a priority sector for the Bay of Plenty regional council.	✓✓✓
Support from local governance groups (inc. Councils, Iwi/Hapu)	• Taupo District Council has provided a support letter as geothermal energy is a significant contributor to Taupo's economy.	✓✓✓
Governance, risk management and project execution		
Robust project management and governance systems	• Plant will be project managed by Geo40. • External consults will be used for engineering, procurement and construction management. • Geo40 has a board of five directors who would provide project governance.	✓✓✓✓
Risk management approach	• Risk register is provided with mitigation approaches. • Availability of funding to build the plant is the single largest risk. In the event of no funding available, applicant may move to the US or Japan with their technology.	✓✓✓
Future ownership / operational management	• Plant will be owned and managed by Geo40.	✓✓✓
The purpose of this briefing is to consider recommending PGF funds to Sustainable Minerals Extraction Project.		

Risks Issues:

- Plant may take longer to commission
  Mitigation: Geo40 has a very experienced team who are capable of managing a project like this.

- Plant may not perform to expectations
  Mitigation: Geo40 will use the learnings from the Ngawha plant to ensure that the Northern plant met performance standards.

Eligibility points of note:

- *Due diligence:-* Full due diligence is to be completed. It is a condition of approval that due diligence is to be to the satisfaction of the Head of PDU Investment team.
- *Conflict(s) of interest:-* Based on the information provided no conflict of interest is evident noting that full due diligence will inform this item further.
- *Illegal Activity:-* Based on the application information provided and feedback from other agencies there is no indication that the applicant or project has been involved in, or associated with illegal activity.
- *Alignment with Regional development plans:-* Aligns with the Bay of Connections strategic priorities.
- *Commercial funding availability:-* Given the nature of the project which is to fund a high risk project access to commercial funding is not considered a feasible option.

Consultation undertaken or implications:

Legal	N/A	**HR**	N/A	**Finance**	N/A	**MBIE policy**	Yes	**Other**	

Officials from the Energy & Resource Markets branch of MBIE visited the plant to learn about the silica filtration process and future business plans of Geo40. They are supportive of this proposal.

Supporting proposal:	Yes
Appendices:	Yes - Applications and supporting letters are as annexes
Sponsor(s):	N/A
Manager/Author of paper:	DG Investment Team