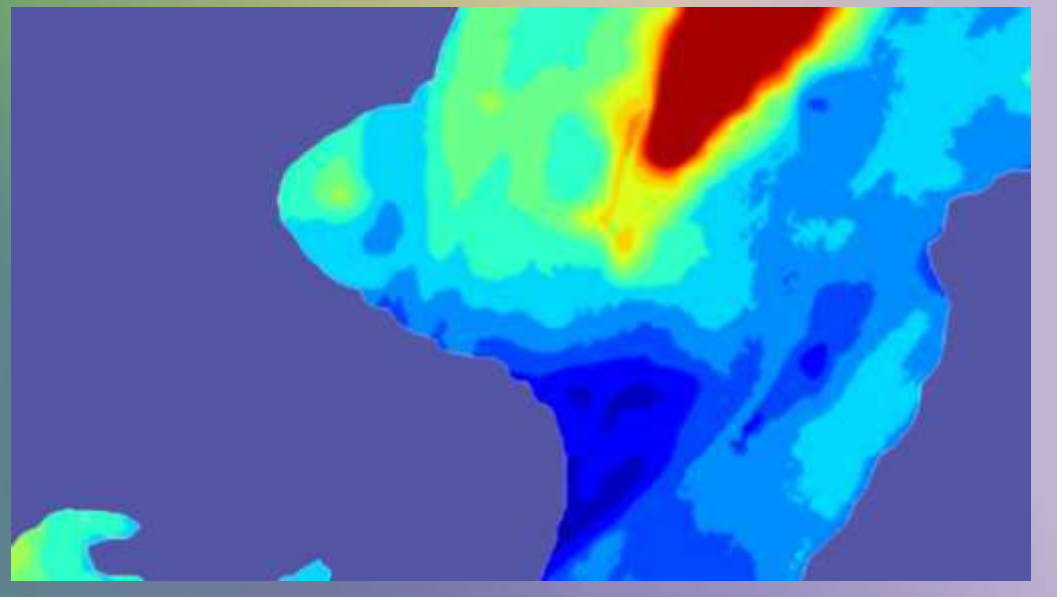
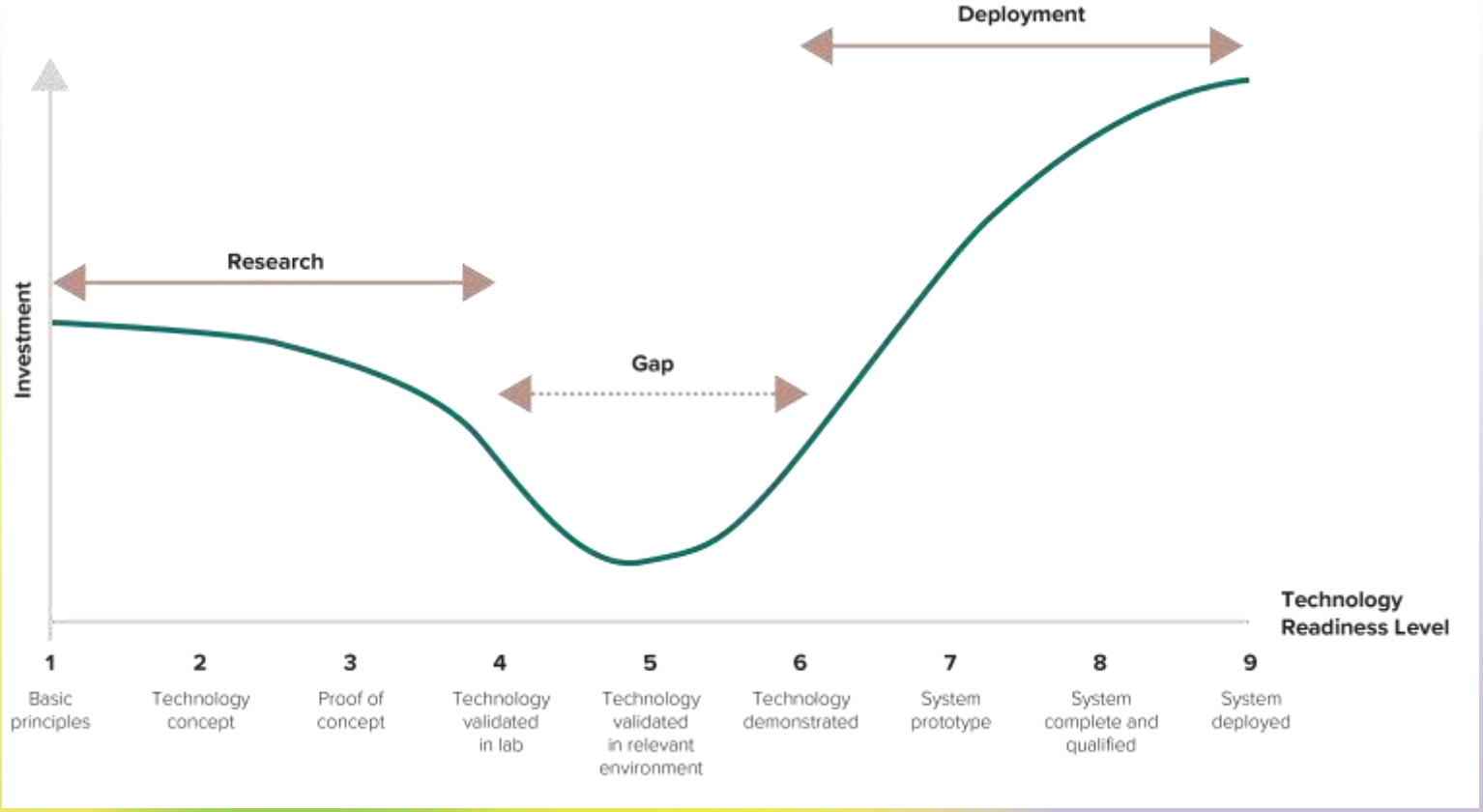
Taranaki Geoheat Discovery Challenge: *Assessing geoheat potential in legacy petroleum assets*



Evelien Wallace
26th May 2026

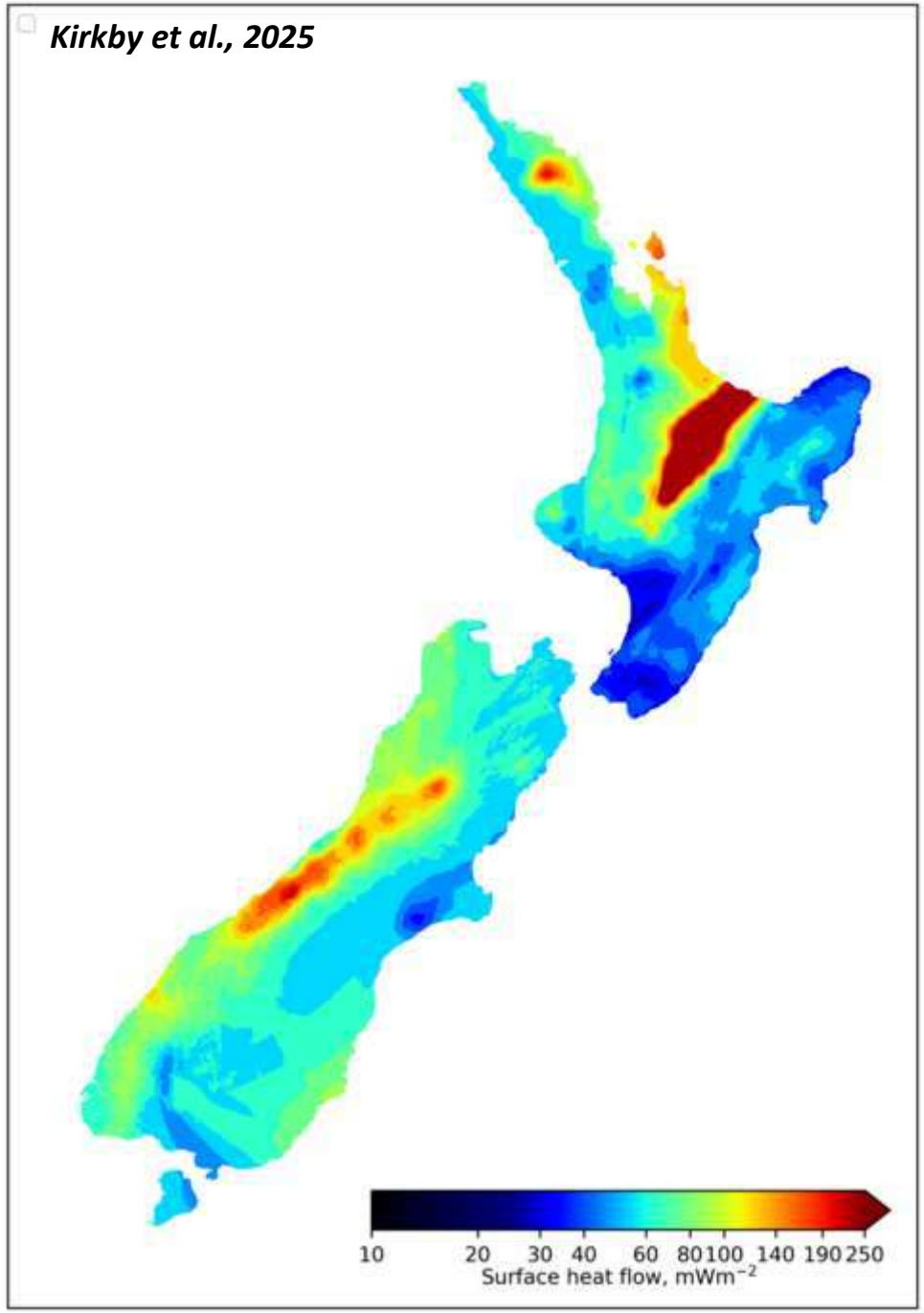
Ara Ake: New Zealand's energy innovation center

We exist to accelerate the demonstration, commercialisation, and deployment of energy innovations that support Aotearoa New Zealand's transition to a more sustainable, resilient and equitable energy system



New Zealand's Geoheat Resource

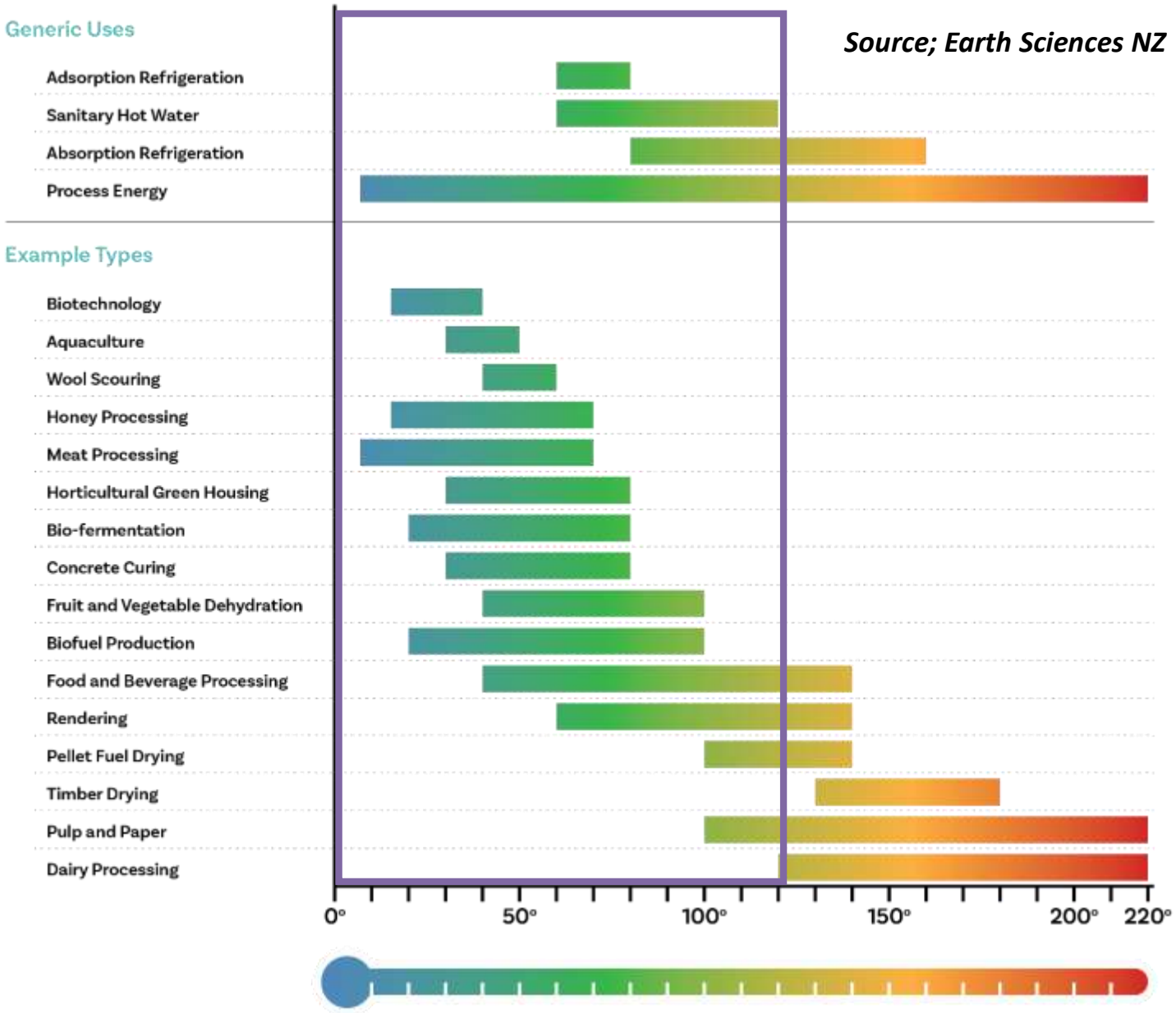
- Well known is our 'traditional' geothermal resource; located in the Taupō Volcanic Zone (TVZ), hot (150°C+), and used for electricity generation
- What many don't realise is that there is usable geoheat throughout NZ's subsurface
- Generally low-to-mid temperature (<120°C), sitting below the electricity generation threshold but still useful for direct heating applications
- This is our geoheat resource



Taranaki's Geoheat

Reachable Taranaki geoheat resource may be up to 120°C (purple box)

- Industrial process heat, direct or paired with a ground-sourced heat pump
- Space heating for factories, offices, public spaces or homes
- District heating schemes for industrial or residential areas
- Swimming pools and spas
- Greenhouses and horticulture



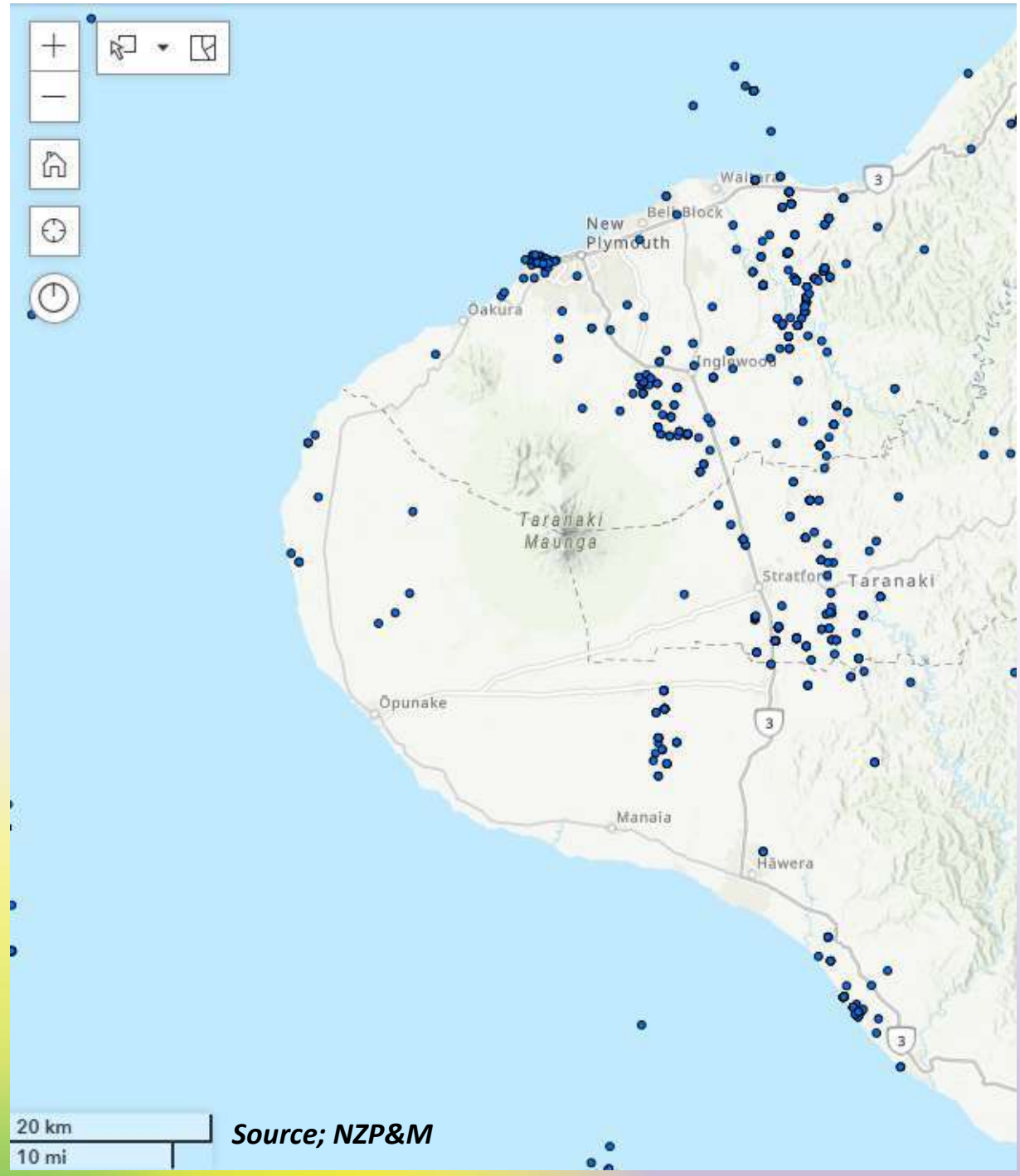
Source; Earth Sciences NZ

Taranaki's advantage: A long petroleum legacy

Developing geoheat in a new region comes with key unknowns:

- Heat flow
- Subsurface geology
- Hydrogeology

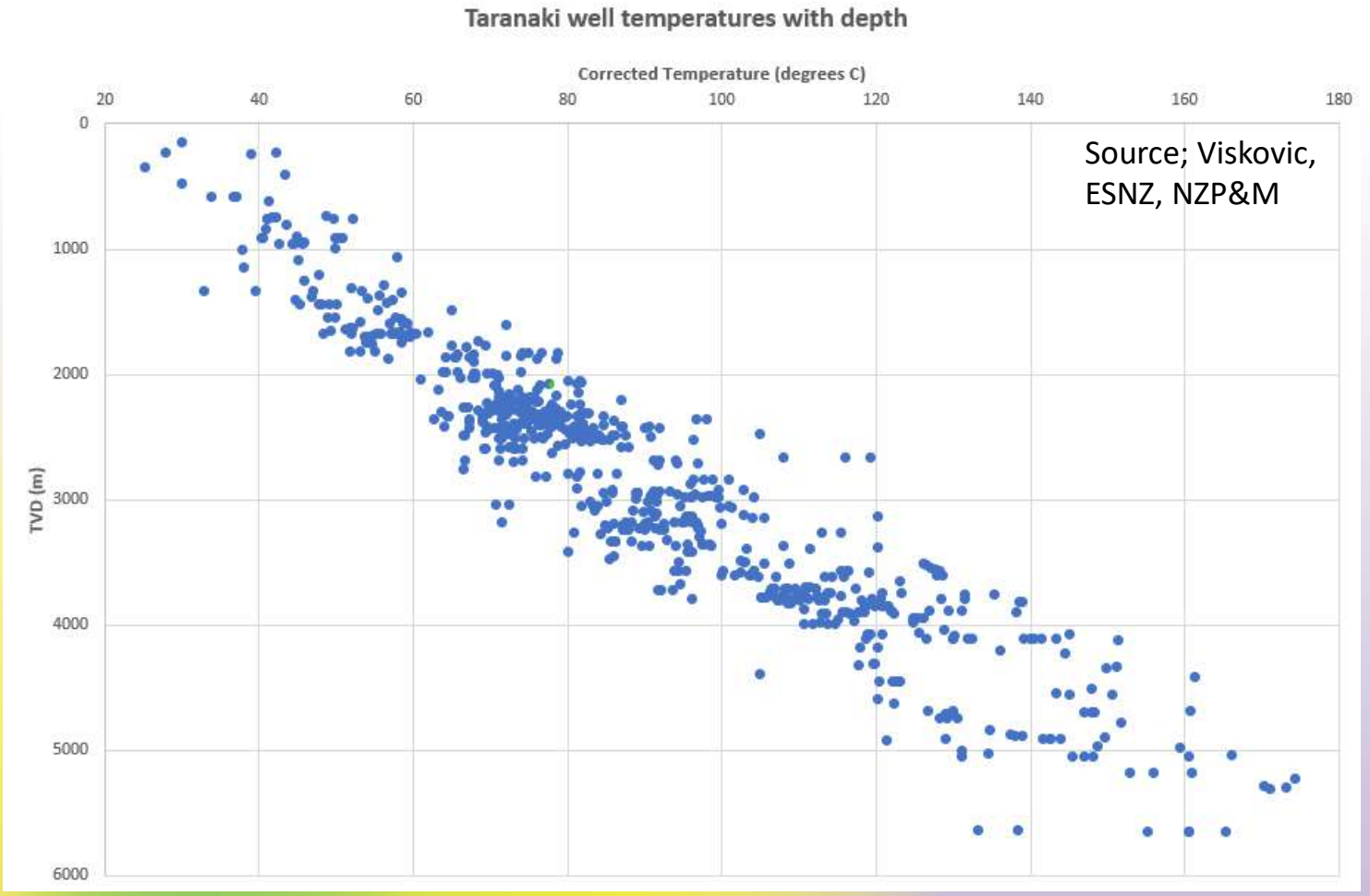
Taranaki has a 60 year petroleum exploration and production legacy with ~450 onshore wells



Source; NZP&M

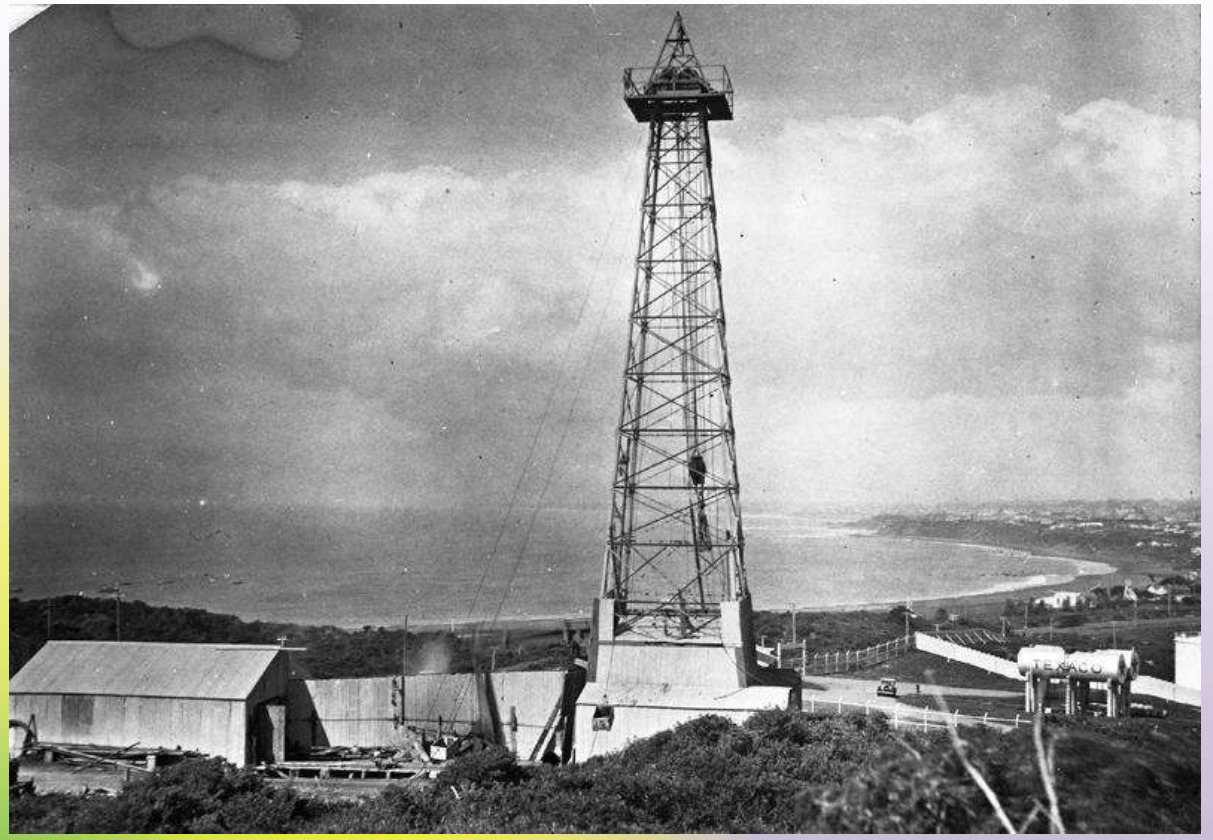
Taranaki's advantage: A long petroleum legacy

- These wells provide data critical to geoheat development
  - Temperature, water flow and subsurface geology
- Not in perfect format for geoheat development, but likely still useful (we're setting out to assess just how useful)
- Also extensive seismic data to define thickness and location of water-bearing units, and geological history affecting heat flow (e.g. uplift or volcanism)



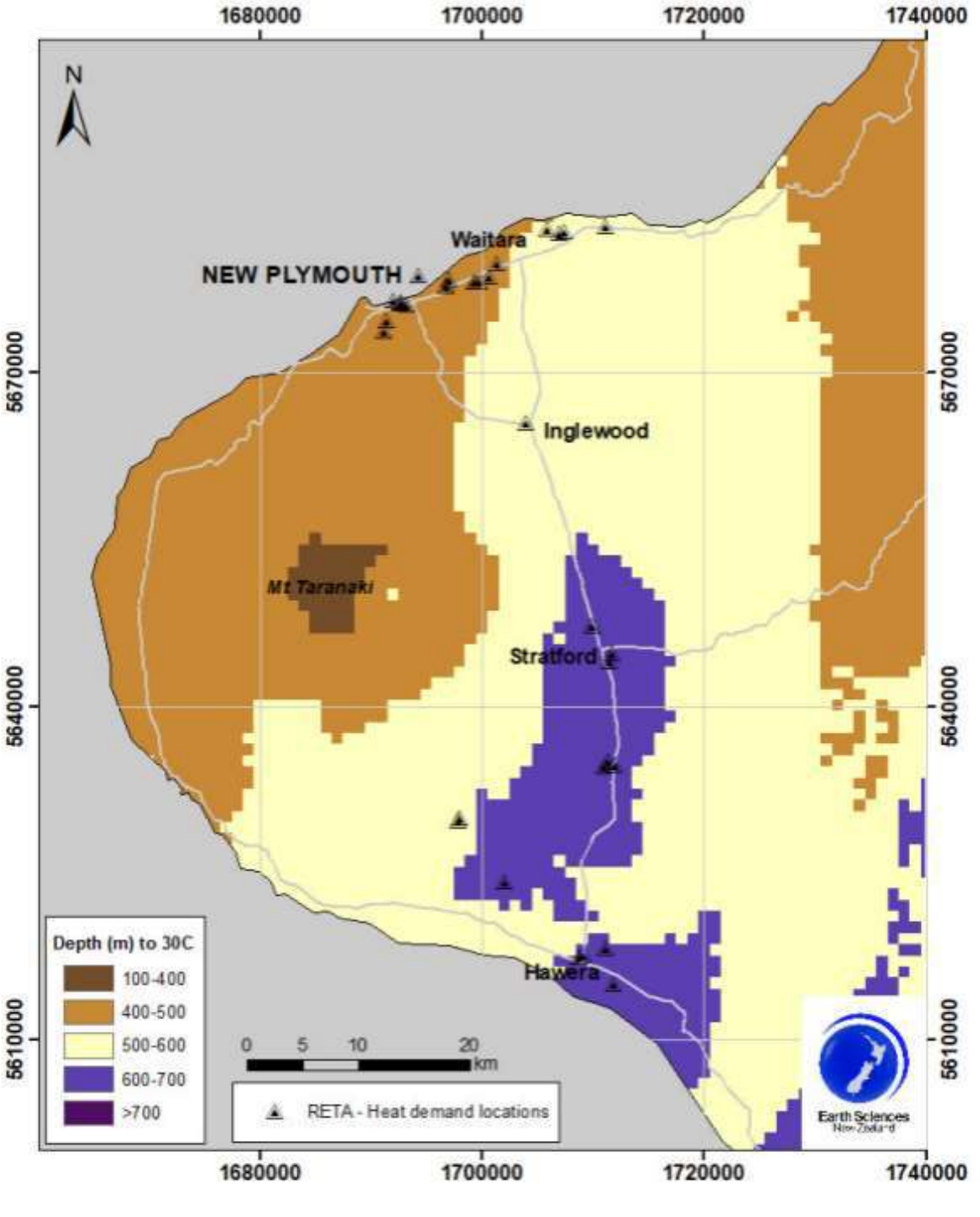
The Taranaki Geoheat Discovery Challenge

- We wanted to test; can value be leveraged from Taranaki's petroleum history?
- Innovation in both:
  - The way legacy assets are viewed
  - Innovative technology and applications
- Developed to:
  - Leverage nascent international knowledge base
  - Use local energy knowledge
  - Apply geoheat expertise
  - Align with NZ strategic priorities
- 18-24 month, phased project



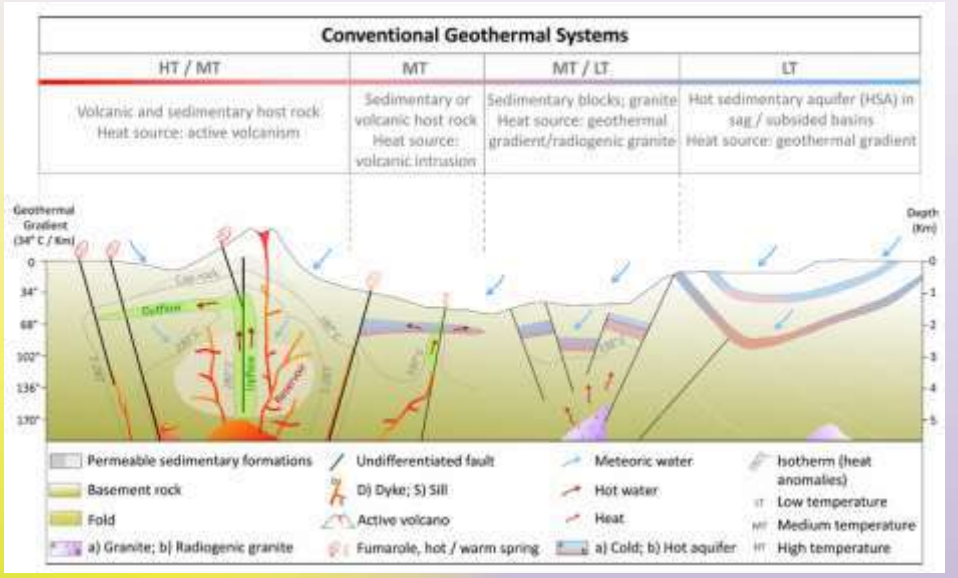
Foundational work: The Scoping Study

- ESNZ + GeoExchange
- Confirmed base assumptions:
  - There is a moderate geoheat resource in Taranaki
  - Modern technologies can help leverage this
  - The Basin's petroleum history may help develop this
  - There may be scope to re-deploy petroleum wells for geoheat development



Foundational work: The Literature Review

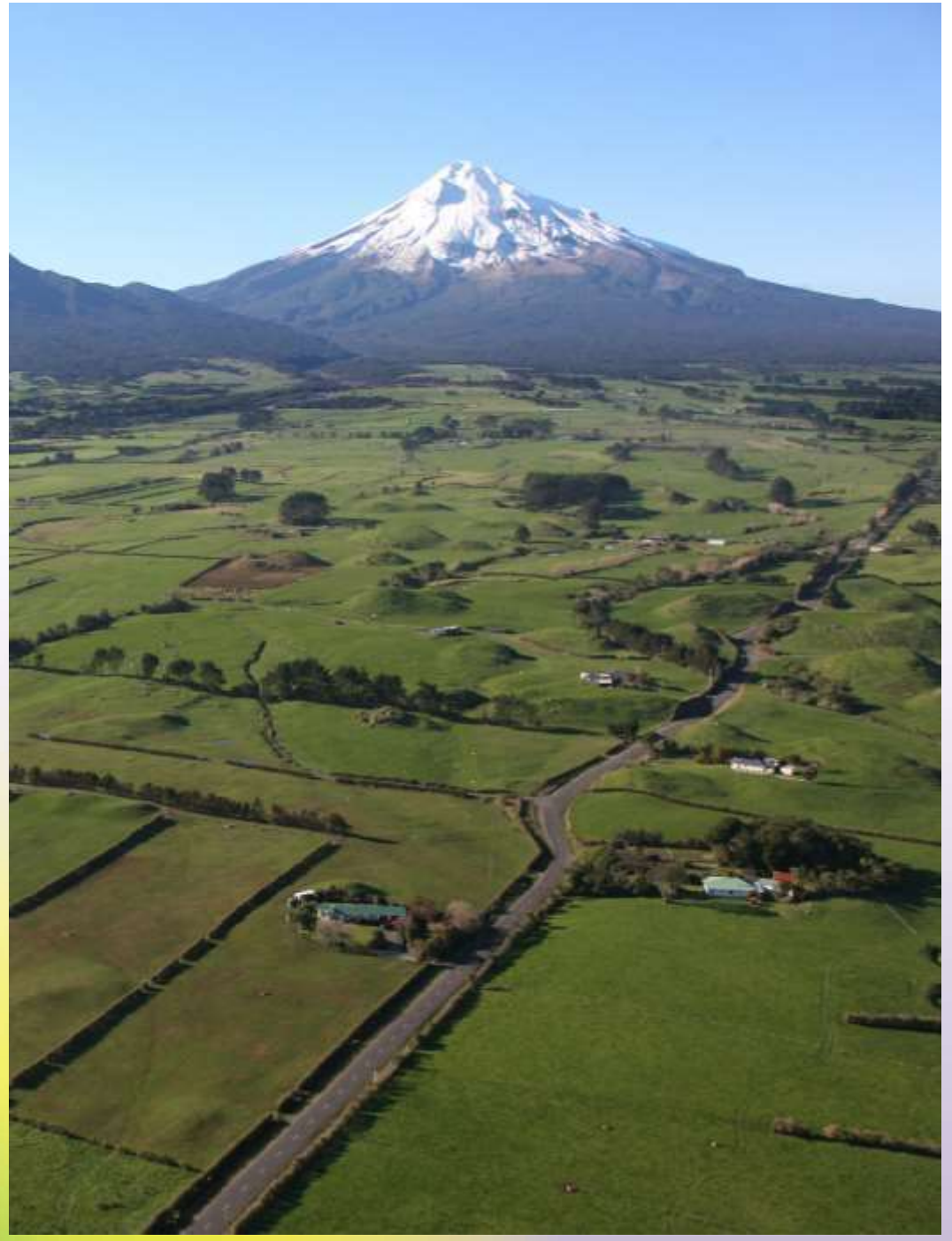
- GLS Consulting
- Focused on petroleum well redeployment; local and international literature and projects
- Overviewed NZ relevant:
  - Recompletion types
  - Challenges and opportunities
  - Overseas analogues
- Subsequent project development guided heavily by this



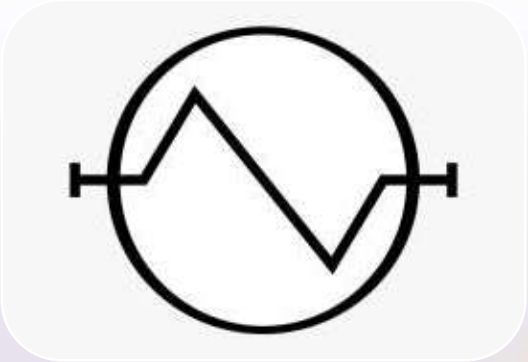
Other foundational work

Alongside the DUO work programmes, the Challenge will produce two other key reports:

- **Legal review:** An expert review of the legal and regulatory challenges and opportunities associated with repurposing petroleum wells, and potential pathways to address them.
- **Tangata whenua perspectives and recommendations:** An overview of cultural considerations, opportunities, and challenges linked to repurposing Taranaki wells for geoheat.



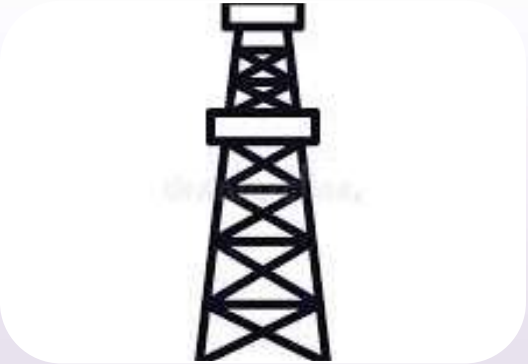
Development Use Opportunities (DUO) categories



DUO 1: Closed loop recompletion of a petroleum well for geoheat production

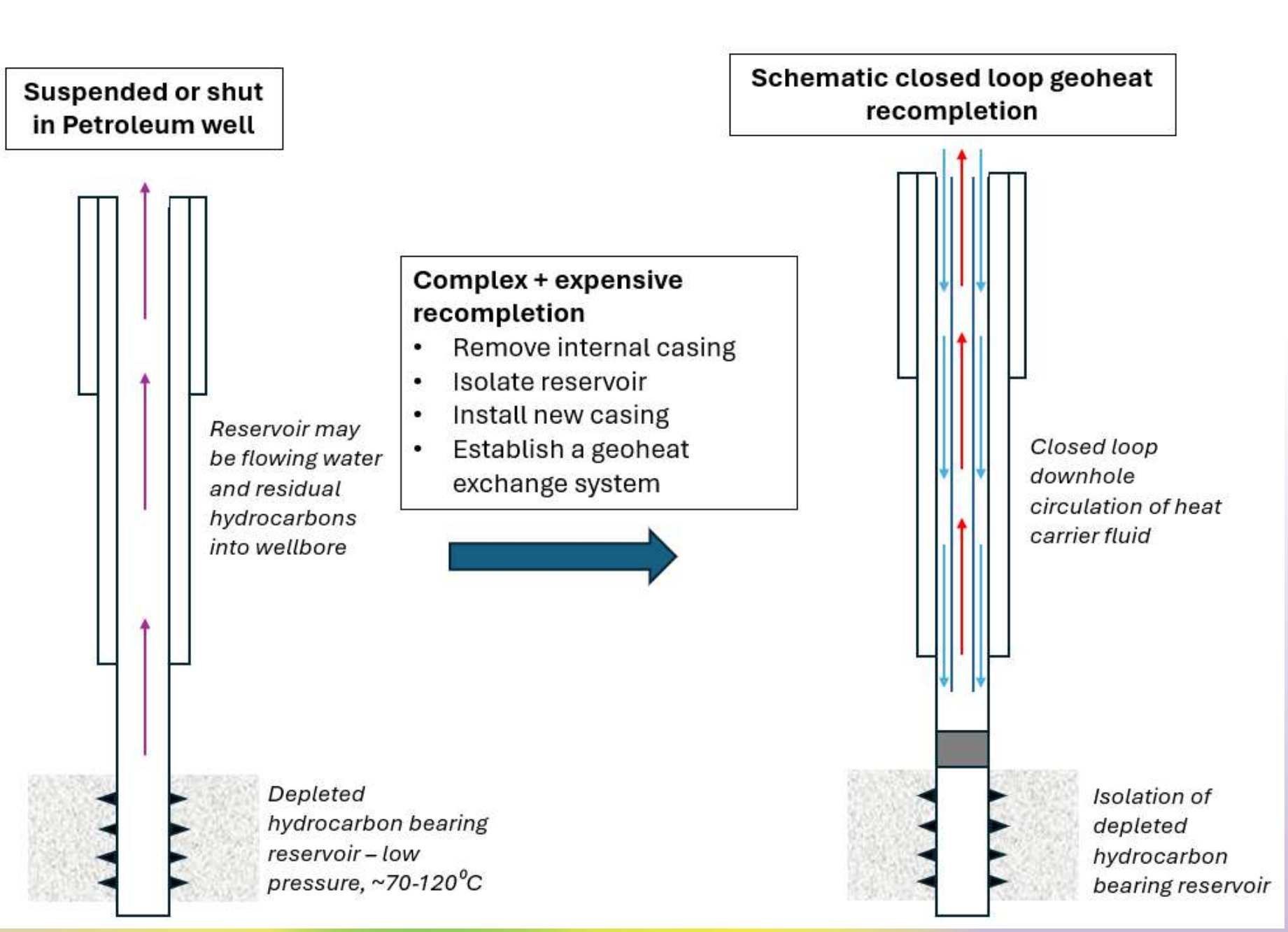
DUO 2: Open loop recompletion of a petroleum well for geoheat production

DUO 3: Co-production of geoheat at producing wellsites or a production stations



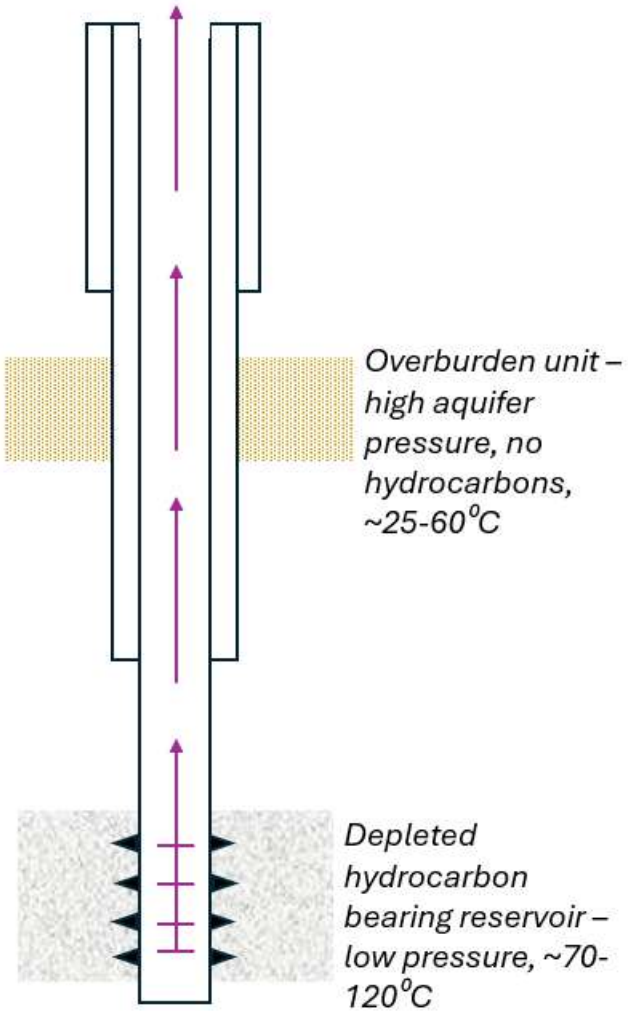
Duo 4: Greenfields geoheat development - informed by petroleum industry data

DUO 1: Closed loop recompletion of a petroleum well for geoheat production



DUO 2: Open loop recompletion of a petroleum well for geoheat production

Suspended or shut in Petroleum well

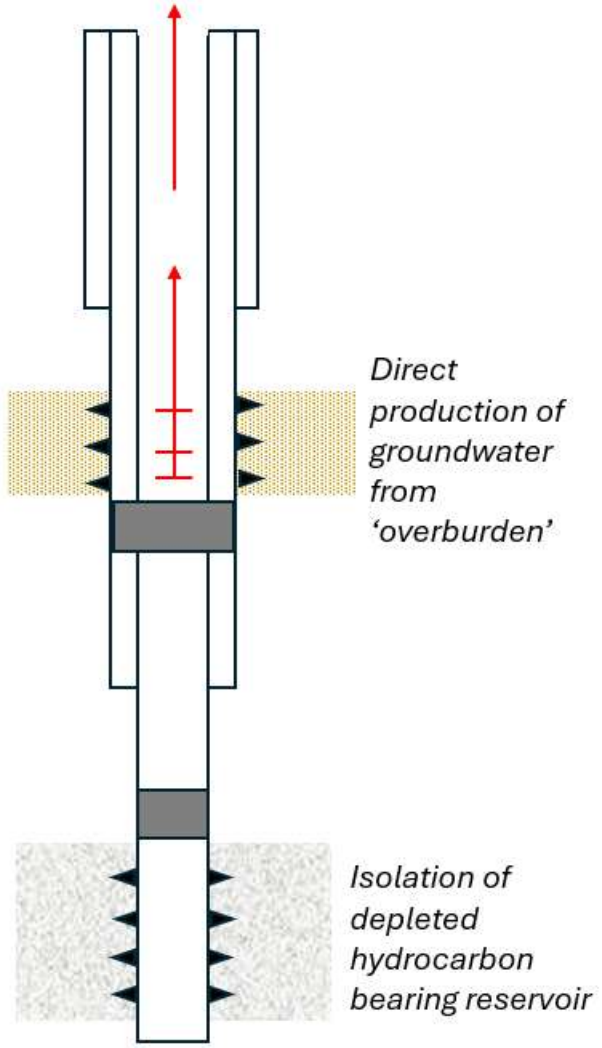


Simpler and cheaper recompletion:

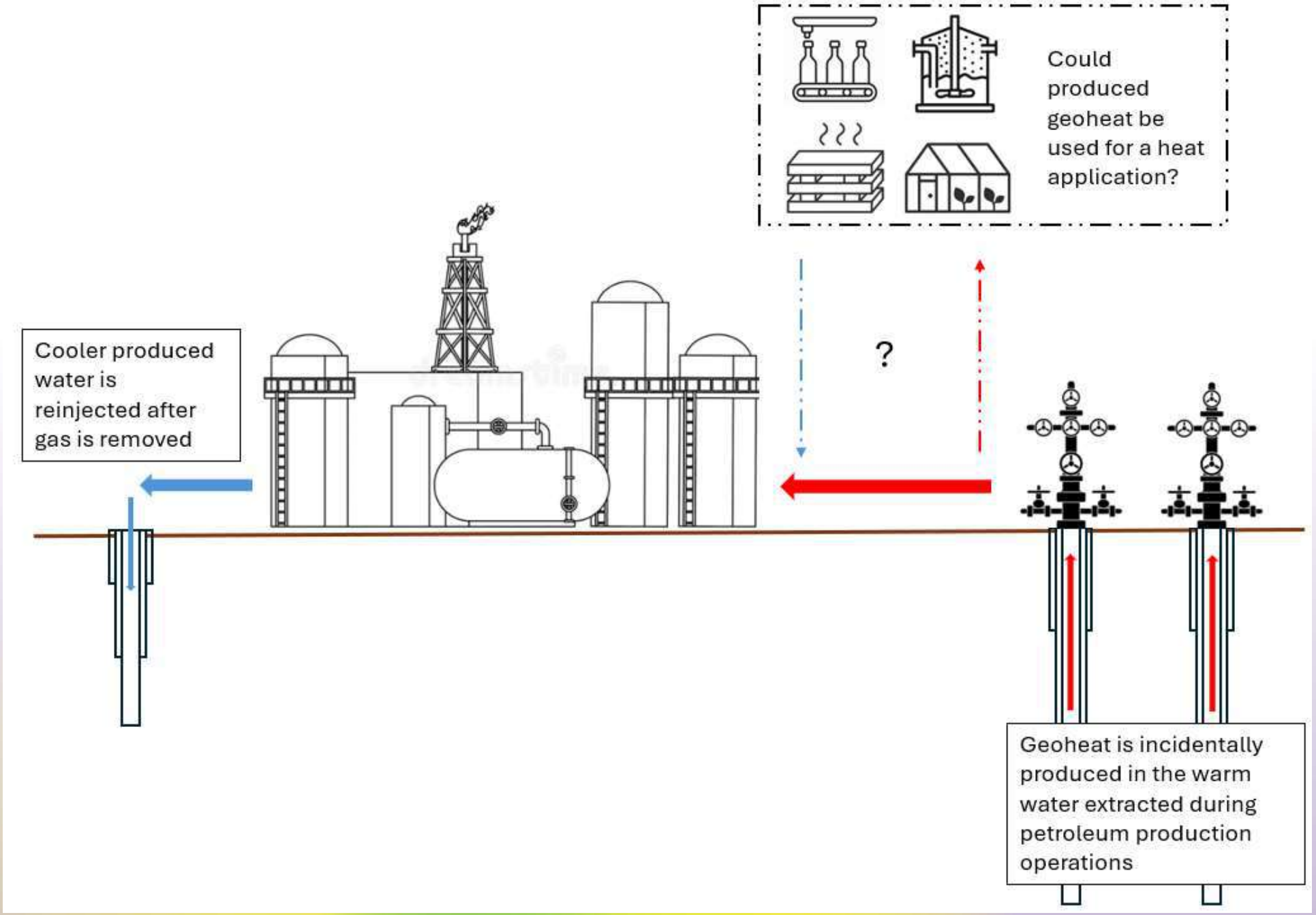
- Isolate reservoir
- Perforate overburden
- Produce water and extract its geoheat

Requires a water disposal mechanism (injection well?)

Schematic open loop geoheat recompletion

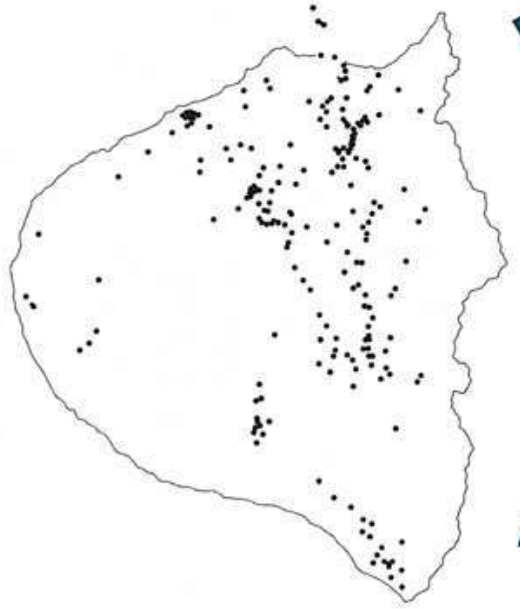


DUO 3: Co-production of geoheat at producing wellsite or a production station

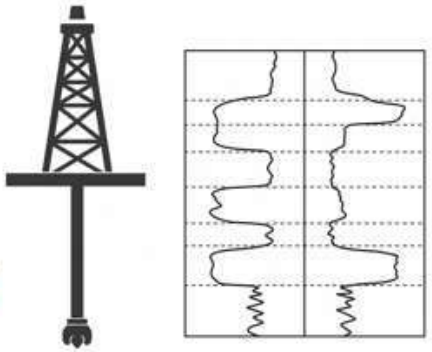


Duo 4: Greenfields geoheat development - informed by petroleum industry data

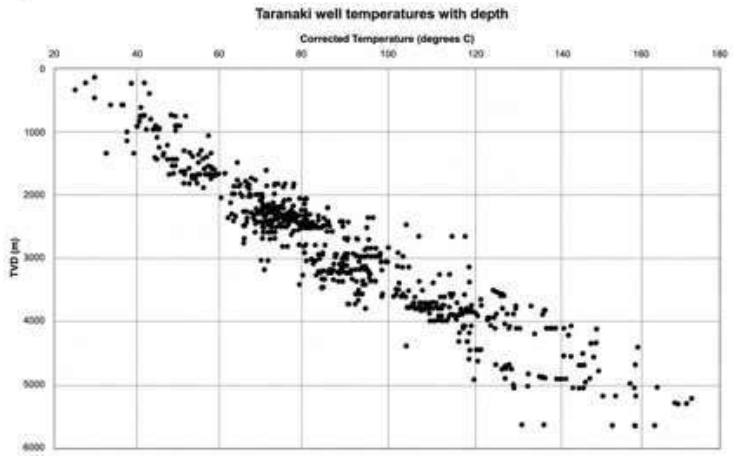
Legacy Petroleum data: wellbores and seismic



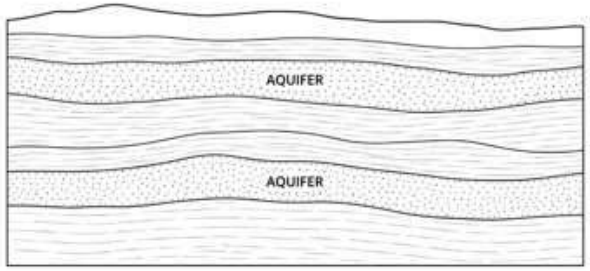
Subsurface geology



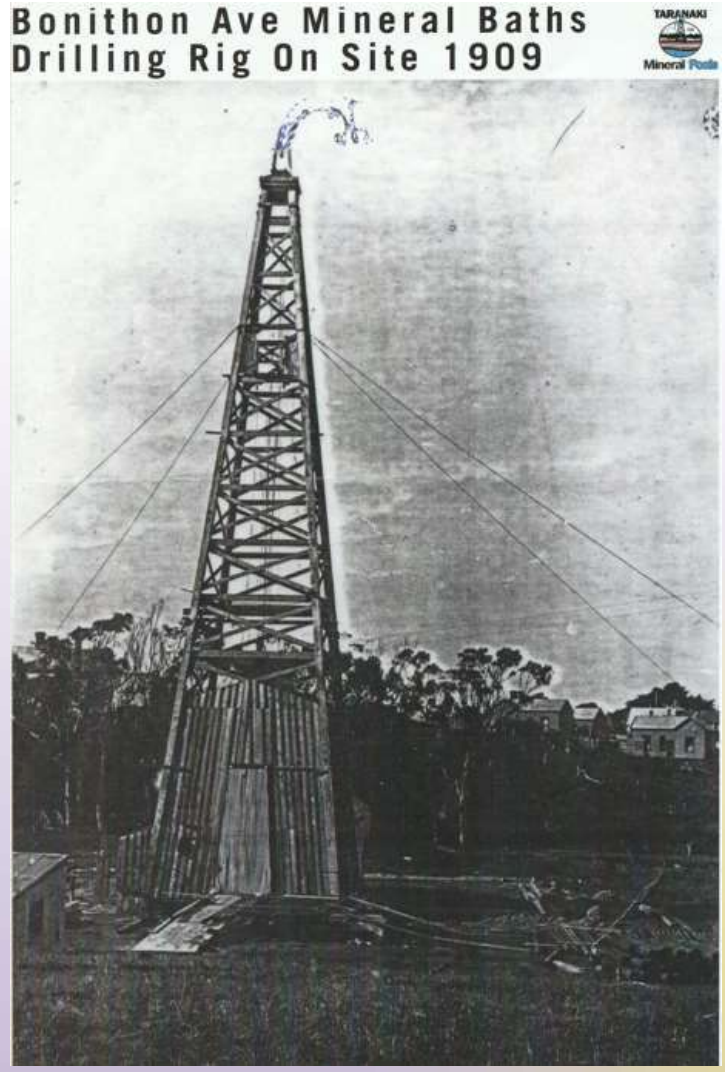
Subsurface temperatures



Ground water flows



Taranaki's Bonithon Hot pools



Phase 2: DUO stakeholder engagement

- Sharing ideas and info with key stakeholders
- End goal; developing DUO case studies, working groups and associated work programmes
- Stakeholders include:
  - Energy users
  - Land owners including Māori land trusts
  - Petroleum operators
  - Regulars and councils
  - Engineering and geoheat consultants

DUO 1: Closed loop recompletion

- Well screening + generating portfolio of candidate wells
- Recompletion cost vs. heat resource assessment (1-2 wells)
  - Located near industrial precincts, preexisting heat users or possible future greenfields developments
  - Assessment of integration with high temperature heat pumps
  - HSE and engineering assessment
- Subsurface studies using petroleum subsurface information to understand heating capacity of the Matemateāonga and Mangahewa Formations

DUO 2: Open loop recompletion

- Well screening + generating portfolio of candidate wells
- Recompletion cost vs. heat resource assessment (1-2 wells)
  - Located near industrial precincts, preexisting heat users or possible future greenfields developments
  - Assessment of cost water disposal methodology including possible reinjection into existing wells
  - HSE and engineering assessment
- Subsurface studies using petroleum subsurface information to understand heating capacity of the Matemateāonga and Mangahewa Formations

DUO 3: Co-production

- Estimating possible geoheat resource at production stations and/or producing wells, and assessing its possible use
  - Calculations of heat resource that may be available
  - Estimating heat need from user – nearby industry, possible new development
  - Assessment of possible use case matching
  - HSE and engineering studies
- Cost benefit assessment vs. new geoheat drilling

DUO 3: Petroleum data-driven greenfields development

- Development of a granular regional heat map using petroleum well and seismic data
- Development of possible case studies of local heat users who may want to convert to to geoheat
  - Summary of geological mapping and offset well assessments
  - Assessment of possible heat resource and how this may be developed (e.g. well design, HSE analysis)
  - Assessment of heat load
  - HSE and engineering assessments

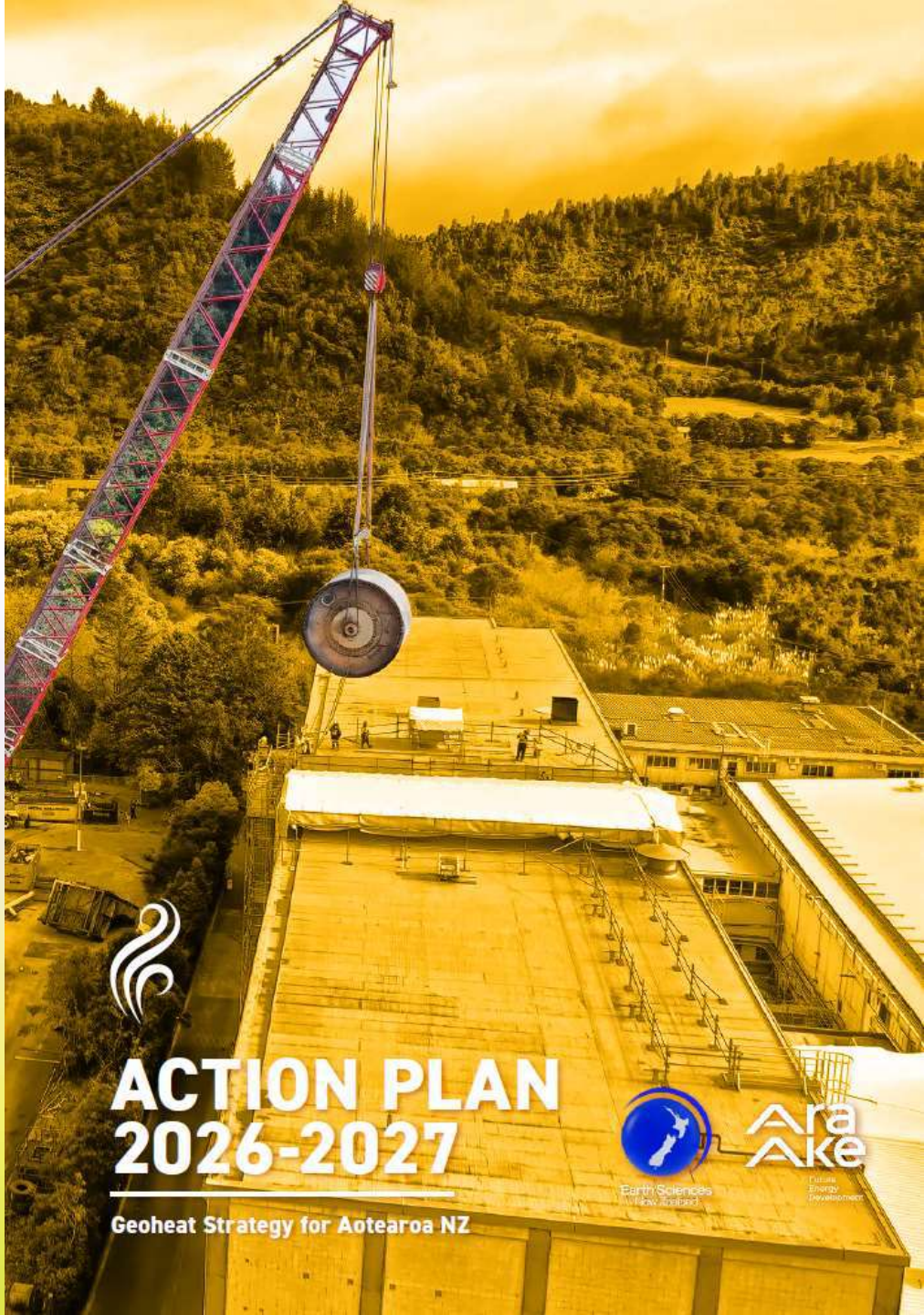
Next steps

- Selection of DUOs and development of work programmes
- Implementation of DUO work programmes and development of next steps
- Work programme completion:
  - ~18 months
  - Public summary report and workshop
  - Establishment of pilot projects

ThermBooster high temperature heat pump. Image courtesy of SPH Sustainable Process Heat GmbH.

2026-2027 Geoheat Action Plan

- Launched today
- Creates a shared national direction for geoheat development
- Designed to deliver facets of the ‘From the Ground Up’
- Focused on accelerating practical deployment of low-emissions geoheat across New Zealand
- Delivered through the Geoheat Action Group; A consortium of industry, government, science and regional stakeholders
- Builds on five previous Action Plans and strong delivery track record



Thank you