

A LOOK INTO SINGAPORE GEOTHERMAL POTENTIAL

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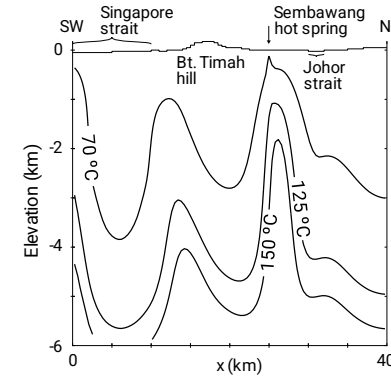
Intermittent geothermal research in Singapore

THE STRAITS TIMES

15th Aug 2009

Energy capacity to 'power 50,000 homes'

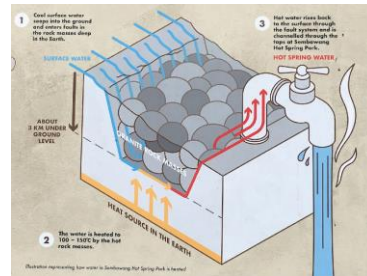
Geothermal study by NUS team, led by Prof Andrew Palmer



Geothermal research stopped

Geothermal research stopped

First major study on Sembawang hot spring by Prof. Zhao Jian



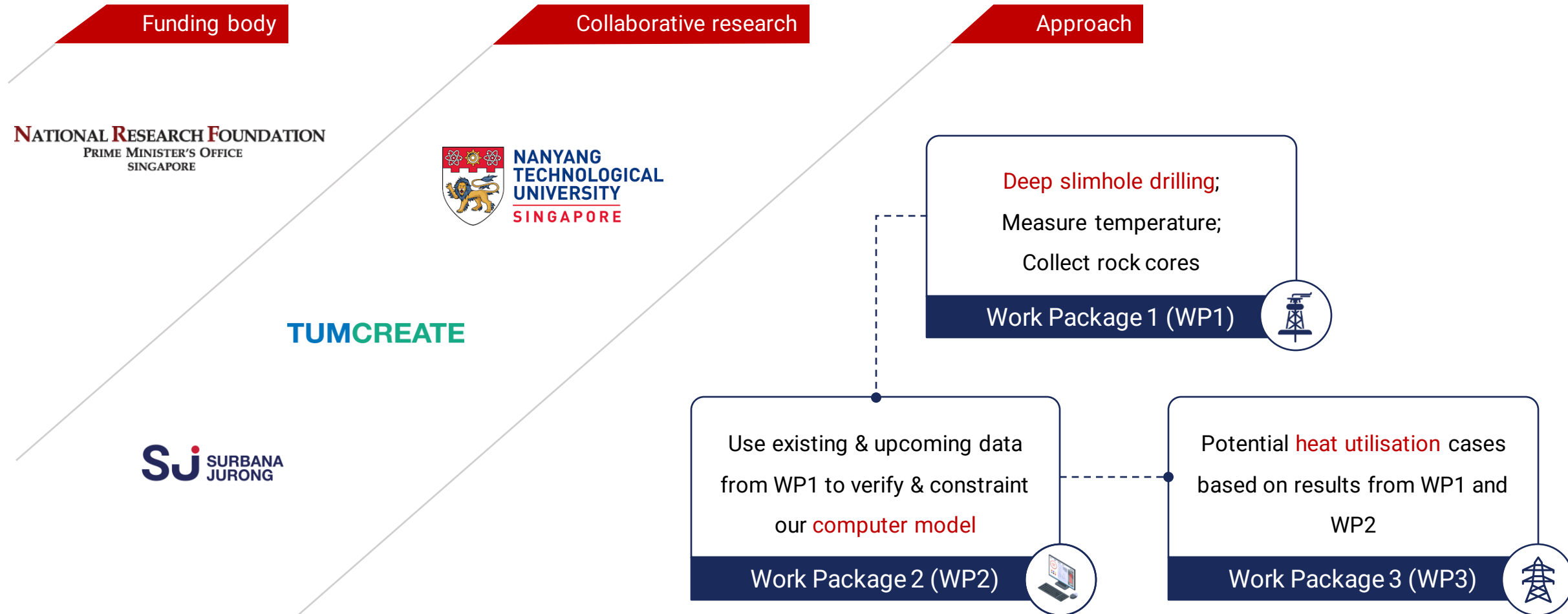
NRF research grant on Singapore geothermal potential, including temperature measurement to 1.5km deep



Prolonged research hiatus for at least 14 out of 21 years

Breaking the trend

Our ongoing research on the Singapore geothermal potential – first systematic investigation



Introduction

Our people

PRINCIPAL INVESTIGATORS



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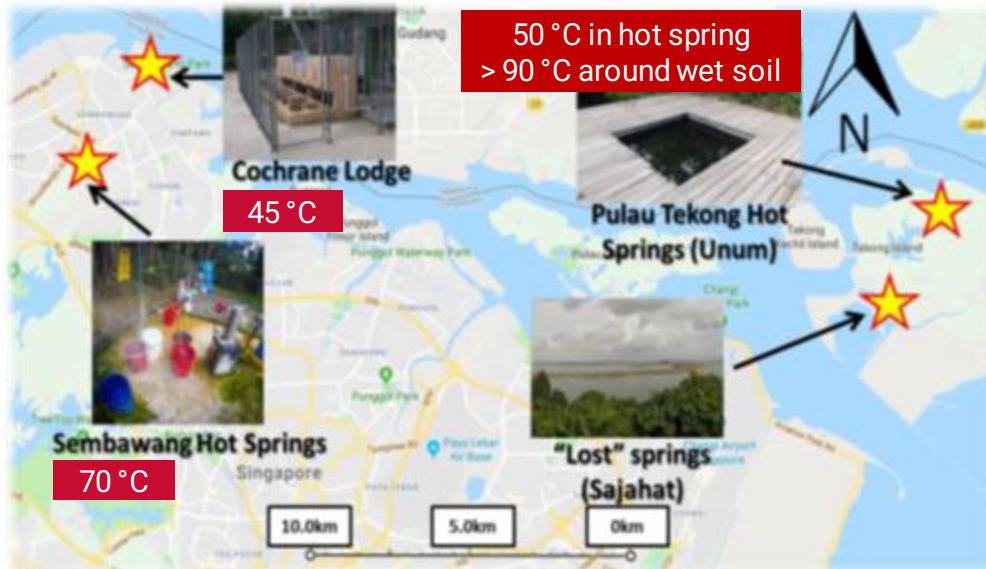
Mr Balaganesha B. V.

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Key features indicating geothermal energy potential in Singapore

Hot springs

- At surface



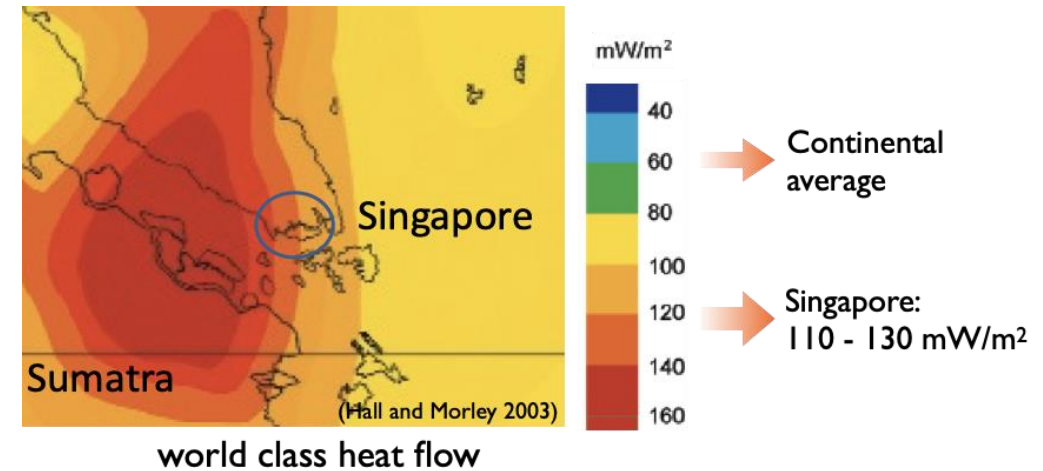
- At unknown depth

Na/K chemical geothermometer → 163 °C



Heat flow

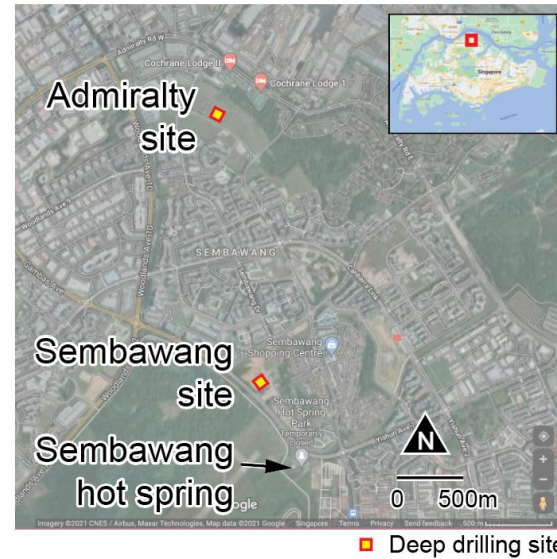
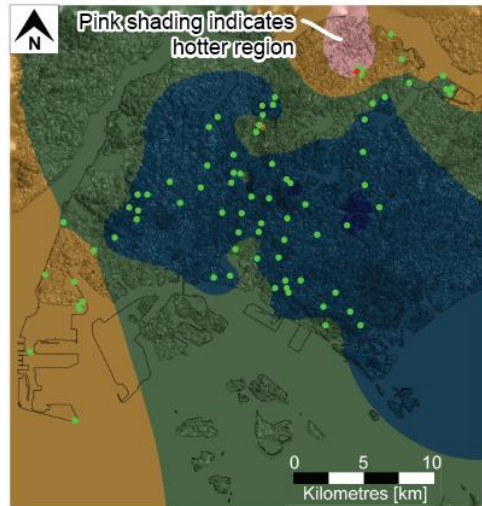
- Singapore's heat flow: 2 x continental average



- Cornubian geothermal province (SW England): 105-130 mW/m²



Deep Drilling: site selection



> Selected sites

Two slimhole drillings (1500m deep):
at Admiralty & Sembawang



Slimhole drilling

Collect 2-inch diameter rock core
Measure rock temperature

- Temperature [°C] 26 28 30 32 34
- Boreholes (up to 250m deep) with measured temperature along the borehole depth
- Sembawang hot spring

Near-surface temperature
A hotter region in the north

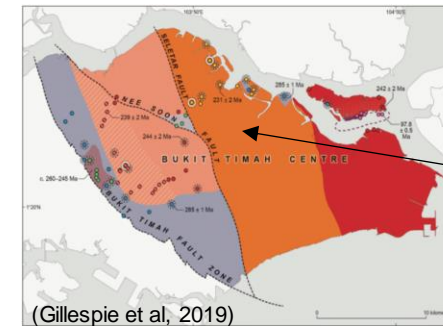
Other considerations
e.g. site availability, accessibility, proximity to hot spring, etc.

Deep Drilling: main activities



> X-Ray Fluorescence (XRF)

Measure radiogenic heat production, A , from rock cores

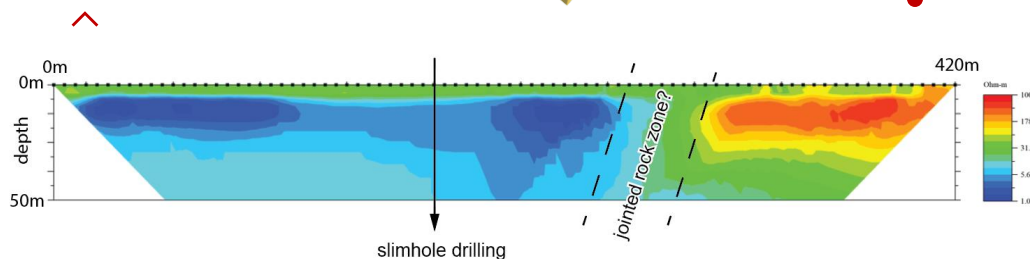


Simpang granite at 100-200m deep, $A \sim 7.8 \mu\text{W}/\text{m}^3$

✓
Admiralty site
Reached 1.1km depth in Q1 2023

Soil resistivity survey

The driller can use the data to plan a drilling strategy



Sembawang site

On-going: reach target depth by end of 2023

Other measurements

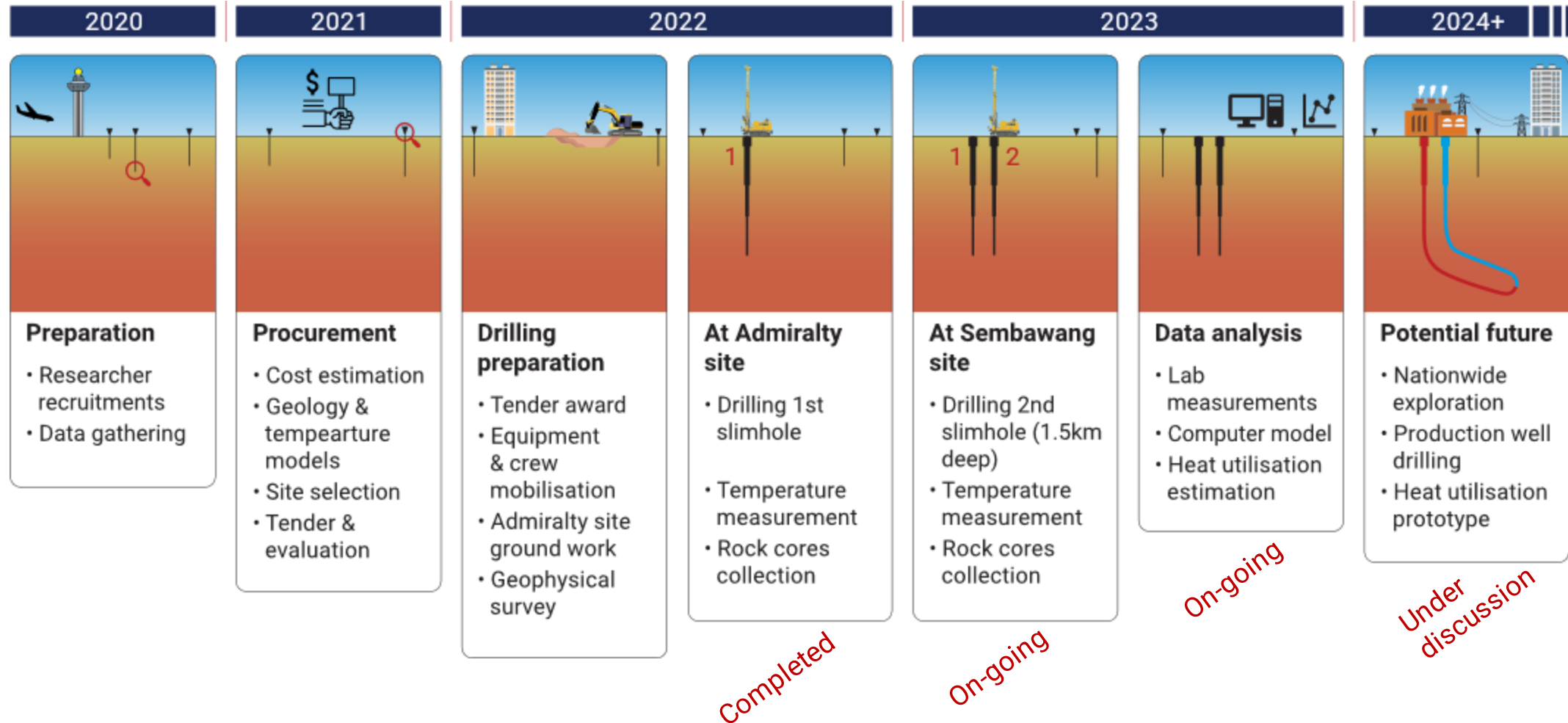
Rock core physical properties e.g. thermal conductivity

Data processing & analysis



Techno-economic evaluation of the best available utilization of Geothermal heat in Singapore

Project Development





Thank you!

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