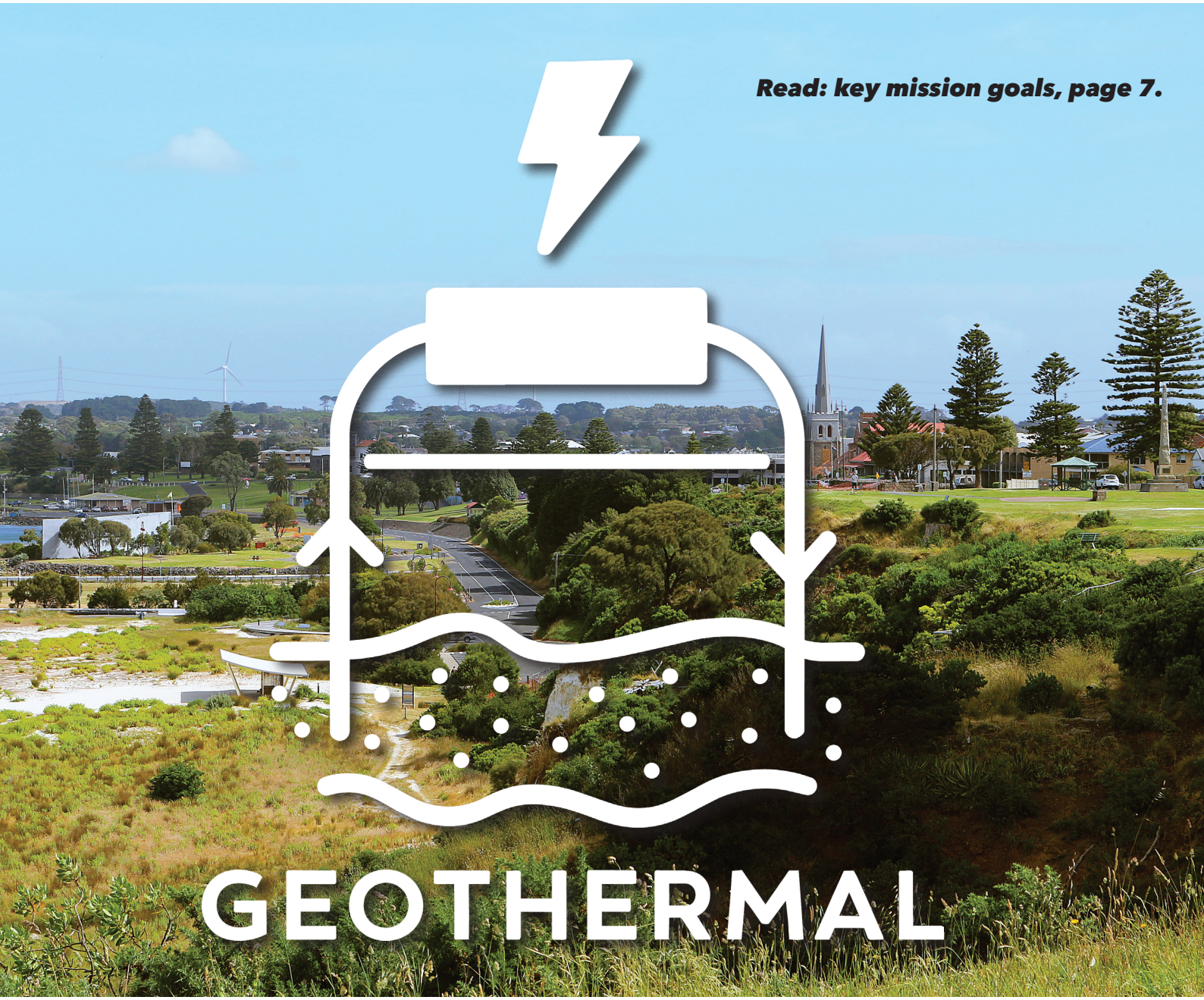
HEAT

TESTING THE WATERS

Portland's Geothermal Energy Research Project

Read: key mission goals, page 7.



Portland's Geothermal Energy Research Project

We are seeking community discussion and support to ask stakeholders to assist with funding, to obtain research to determine whether Portland should once again have geothermal energy on tap. Heating our homes and swimming pools, and possibly on an even bigger scale than before.

The model for the recent analyses is called Modular Anchored Geothermal Microgrid, or MAGM, which becomes an evidence-first, research study project, exploring how Portland's historical success with geothermal energy could anchor a modern microgrid.

The primary focus is geothermal energy. Modularity enables other stakeholders to join in the research phase, roll-out, or implement elements of the microgrid.

Modular simply means pieces that can be assembled, a bit like Lego blocks, but not as portable. Mostly, modules will only be linked by wires or pipes.

A simplified infographic appears in the centre pages, 4-5. This is an artist's impression of potential links and inclusion does not mean their endorsement.

The project's goals and mission priorities are listed on page 7

The good old days

by Darrell Morrison

The Portland Geothermal Heating Project c. 1983-2006

Portland's geothermal heating system was a pioneering Australian demonstration of direct-use municipal geothermal energy.

For more than two decades, this working district heat network utilised naturally warm groundwater from the Dilwyn Aquifer to heat civic and private buildings.

This short backgrounder outlines its operation, decommissioning, and the potential for a modern geothermal resurgence in the Glenelg Shire.

The project emerged from Portland's municipal water infrastructure. Historically, town water was drawn from deep bores intersecting the Dilwyn Formation, producing pristine groundwater at 56°C to 59°C. Before 1983, this water had to be mechanically cooled before entering the reticulated supply.

Recognising the value of this wasted thermal energy, the Town of Portland launched an integrated district heating project in 1983, driven by key figures including Municipal Engineer Neil Buckingham.

The system harnessed the Henty Park Bore, pumping 58°C water through a 1.7-kilometre reticulation loop.

Heat exchangers extracted energy to provide space and pool heating for nearly 19,000 square metres of infrastructure, including The system harnessed the Henty Park Bore (historically referenced near the Glenelg Street area and former Showgrounds), which reportedly produced water at around 58°C at a flow rate of 65 litres per second. Rather than cooling the water immediately, the system pumped it through a nearly 1.7-kilometre reticulation loop. Heat exchangers extracted the thermal energy to provide space and pool heating to a substantial corridor of civic and private infrastructure, which expanded over time to include:

- The Municipal Offices and Civic Hall
- The Arts and CEMA Complex
- Portland Library and History House
- Portland Leisure and Aquatic Centre (indoor pools)
- Portland and District Hospital
- The Police Station and • Tourist Information Office
- Private enterprise, notably the Richmond Henty Motel

Delivering an estimated 8,857 gigajoules of heat annually, it massively reduced the municipality's gas demand and yielded significant ratepayer savings.

The system's 2006 decommissioning resulted from changing institutional, environmental, and infrastructure landscapes, not a failing geothermal resource.

Firstly, the 1994 local government amalgamations formally separated water supply responsibilities from municipal functions, leaving the heating network as an orphaned council asset.

Secondly, environmental impacts became an issue. When the water authority stopped using the Henty Park Bore for town supply, the spent, low-salinity water was discharged into the Portland canal because there was no reinjection well.

This allegedly diluted the estuarine (Fawthrop Lagoon canal) salinity; according to one local fisher who claimed it affected his live lobster holding-well requiring seawater to keep catches healthy. An engineer said this was wholly unsubstantiated.

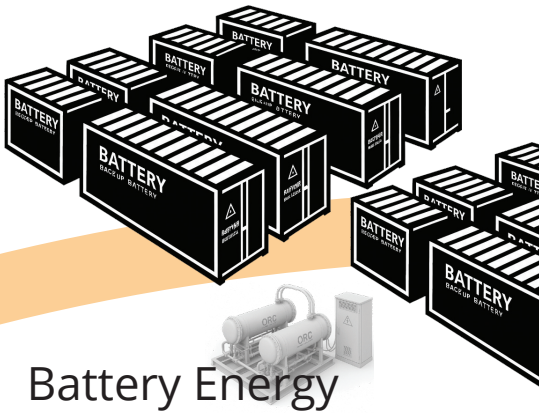
Finally, by 2006, the bore casing was aging. Repairing it or drilling a replacement carried severe risks due to Portland's complex limestone and karst geology.

Engineering assessments warned that deep drilling in that urban location risked ground, or rather bore collapse.

Without the funding or risk appetite for a modern replacement system, the network was decommissioned.

MODULAR ANCHORED GEOT

Morrison Model. BIZGEN® AUSTRALIA 2025

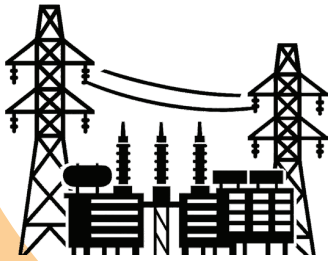


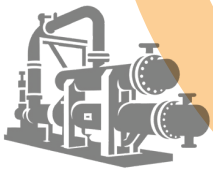
Battery Energy Storage Systems (BESS)

RENEWABLES

BOOSTED GEOTHERI
USING MAGM RANK

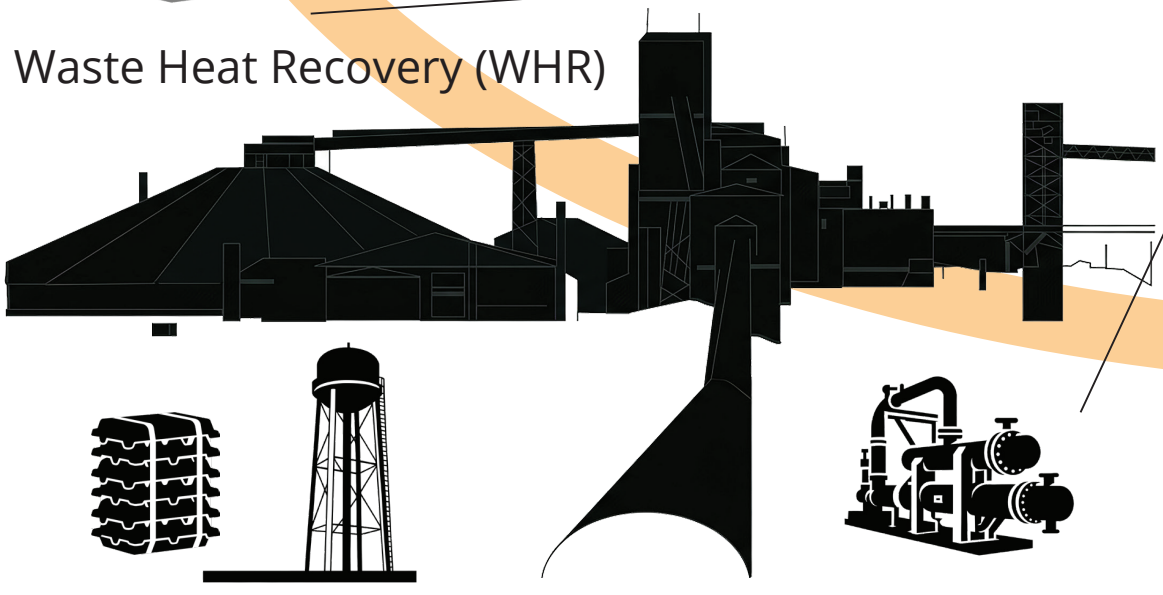
Smelter switchyard





Organic Rankine

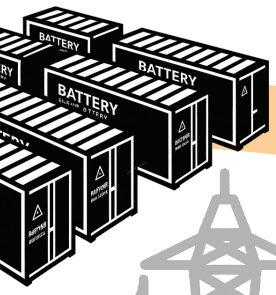
Waste Heat Recovery (WHR)



Geothe

HERMAL MICROGRID

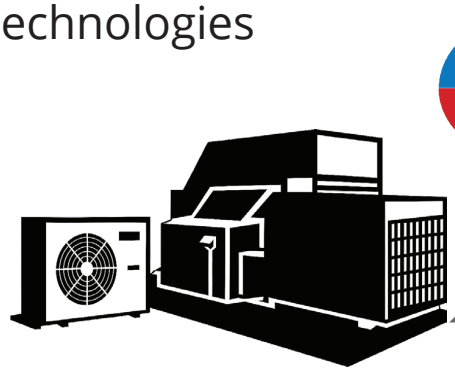
More info and downloads. https://bizgen.com.au/portland-geothermal/



CITY SWITCH-YARD

SMART GRID
Virtual Power Plant
(VPP) technologies

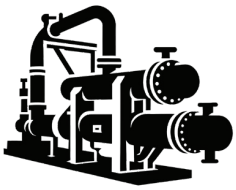
MAL ENERGY
ILIFT™ CYCLE



WYATT ST BORE

e Cycle (ORC) turbines

ermal bore



Preserve the aquifer using
doublets vs singles

Fifth-generation district heating
and cooling (5GDHC)

MAGM

Jargon buster

AQUIFER
A layer of permeable rock or sediment that stores and carries groundwater.

AUSTRALIAN RENEWABLE ENERGY AGENCY (ARENA)

An Australian Government agency that supports renewable-energy innovation, including research, development and demonstration projects.

BASELINE DATA

Measurements collected before testing begins. They provide a starting point for identifying later change.

BATTERY ENERGY STORAGE SYSTEM (BESS)

A large battery system that stores electricity and releases it later.

It does not store heat.

CLOSED-LOOP GEOTHERMAL

A system in which fluid circulates through sealed underground pipes and collects heat without pumping groundwater into the surface energy circuit.

DISTRICT ENERGY

A shared network that supplies heating, cooling or both to several buildings or users.

EMPIRICAL EVIDENCE

Evidence based on measurements and observations gathered in the field or laboratory, rather than assumptions alone.

FRACKING

High-pressure hydraulic fracturing of underground rock.

It is expressly excluded from MAGM design.

GEOTHERMAL ENERGY

Useful heat from beneath the Earth's surface.

HEAT EXCHANGER

Equipment that transfers heat between two fluids without allowing them to mix.

HEAT PUMP

Equipment that uses electricity to raise lower-temperature heat to a more useful temperature.

MEMORANDUM OF UNDERSTANDING (MOU)

A document recording shared intentions, roles and next steps. It is not the same as a construction contract.

MICROGRID

A local system that coordinates energy sources, storage, controls and users.

ORGANIC RANKINE CYCLE (ORC)

A system that uses a low-boiling fluid to convert moderate-temperature heat into electricity.

REINJECTION

Returning extracted groundwater to a suitable underground formation after useful heat has been removed. A two-well system is called a doublet.

THERMAL ENERGY STORAGE (TES)
Storing heat or cooling for later use, rather than storing electricity.

WASTE HEAT RECOVERY (WHR)

Capturing useful heat from an industrial or other process that would otherwise be released.

The public is not being asked to approve a plant.

This is your invitation to help shape the research.

Residents, Traditional Owners, community organisations, businesses, service providers, industry, researchers, utilities, government agencies and potential funders may all hold part of the picture.

Local knowledge matters.

So do concerns.

WE WANT TO HEAR ABOUT

Water and environmental priorities.

Potential heat, cooling or hot-water needs.

Existing energy data.

Possible research sites.

Historical records.

Technical expertise.

Research partnerships.

Governance and accountability.

Community benefits.

Funding or in-kind support.

Risks that require investigation.

Questions that have not yet been asked.

HOW TO PARTICIPATE

Talk about it to family, friends and employers. Learn more. Write to your councillors and members of parliament.

Write to magm@bizgen.com.au
Follow us on Facebook

ACKNOWLEDGMENT OF COUNTRY

We respectfully acknowledge the Gunditjmara, Boandik and Jardwadjali peoples as Traditional Owners of land and waters across the Glenelg Shire area, including Portland. We pay respect to Elders past and present and recognise continuing connection to Country, culture, waterways and community.

Any site-specific work should begin with early, separate and properly resourced engagement with the relevant Traditional Owner organisations and Aboriginal Corporations.

Geothermal research mission objectives

We have three mission objectives:

1) Conduct the current and proposed stakeholder processes,

2) Raise the estimated $600,000 to $1.4 million research budget target needed, and

3) Follow the four-stage pathway:

CO-DESIGN

As a person reading this, your opinion matters. You are a stakeholder. By living, working or investing in our community, you always have a say in how development is shaped.

Lead stakeholders will be First Nation Traditional Owners and environmental monitors attached to government by their mission and legislative purpose.

Business, commerce and industry.

Residents and ratepayers are all part of helping develop the scope of the research proposal.

COMMISSION

Memorandums of understanding (MOUs) would be sought from stakeholders.

All known stakeholders can help fund the research needed. A panel would write a scope document, and then put it out to tender, through specialist universities and experts.

This scope for the study can be designed with suitably qualified geologists, engineers, scientists, and actuaries.

The quality of the study will be determined by this scope, and it will also determine the budget and costs for the research.

TEST

A low-end study of $600K does not necessarily mean low quality. A lot of what we need to bring together for implementing renewed geothermal use has been done in Portland 1983-2006, and around the world. Geothermal technology has advanced considerably in 43 years.

Lab or bench testing might involve 'running the numbers', by looking at the geology under the ground, the Dilwyn Aquifer in the Otway Basin where our water comes from.

This will look at available heat and at what depths it can be obtained for optimum output.

Reinjection using a two-wellhead system is considered world's best practice.

Reinjection is completed via a 'doublet' (two well points) back into the aquifer where nature will reheat it. The water will be unharmed and safe to drink.

This all leads to environmental considerations, and the regulatory approval needed, should the projects go to the funding or implementation phases.

Research is vital. It will determine the resources available and examine the end-use opportunities identified in the research plan design, or scoping document.

DECIDE

Once we have the research updated and tied to our particular community, any hot prospects for geothermal uses can be presented in applications for federal and state funding that is available for projects that have demonstrated their capacity.

Funding and investment will only come from this research project's findings.

The est. $600K budget would reach in-house university and peer study. The greater amount might include field trials and small pilot holes testing for flow rates and accurate heat measurements.

DISCOVERING THE HEAT BENEATH OUR FEET...

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Portland has a rare combination of assets: a proven geothermal history, an established industrial base, strong wind resources, major grid infrastructure, battery development, port access and real local demand for heating, cooling and hot water.

The premise of Portland Geothermal Research Project/MAGM asks whether those assets can be tested and connected in stages. Let's join the dots! Make it happen.

Geothermal heat remains the anchor. Other modules would move forward only when the evidence, planning approvals, users, funding and approvals support them.

If the research succeeds, the result could be more than a renewed local heating system. Portland could become a practical demonstration of how a regional industrial community combines local heat, renewable electricity, thermal storage and recovered energy without betting everything on one technology.

That is the opportunity.

The immediate task is more modest, and more important.

Let us agree on the questions. Assemble the right expertise. Commission independent research. Then decide from the available evidence. Protect our water resources for generations to come.

EXPLORE PORTLAND'S GEOTHERMAL HISTORY

REGISTER YOUR STAKEHOLDER INTEREST

SUBMIT A QUESTION OR CONCERN

HOW TO PARTICIPATE

Talk about it to family, friends and employers. Learn more. Write to your councilors and members of parliament.

Write to magm@bizgen.com.au
Follow us on Facebook

https://bizgen.com.au/portland-geothermal/

The author and publisher (Darrell Morrison) is a citizen-scientist, and a community geothermal energy advocate.

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DARRELL MORRISON DM GRAPHIC DESIGN
Trading as bizgen Australia