An Australian Government Initiative

Regional Development Australia
GIPPSLAND

Geothermal Investment Prospectus

VICTORIA
State Government

Geothermal energy in Gippsland

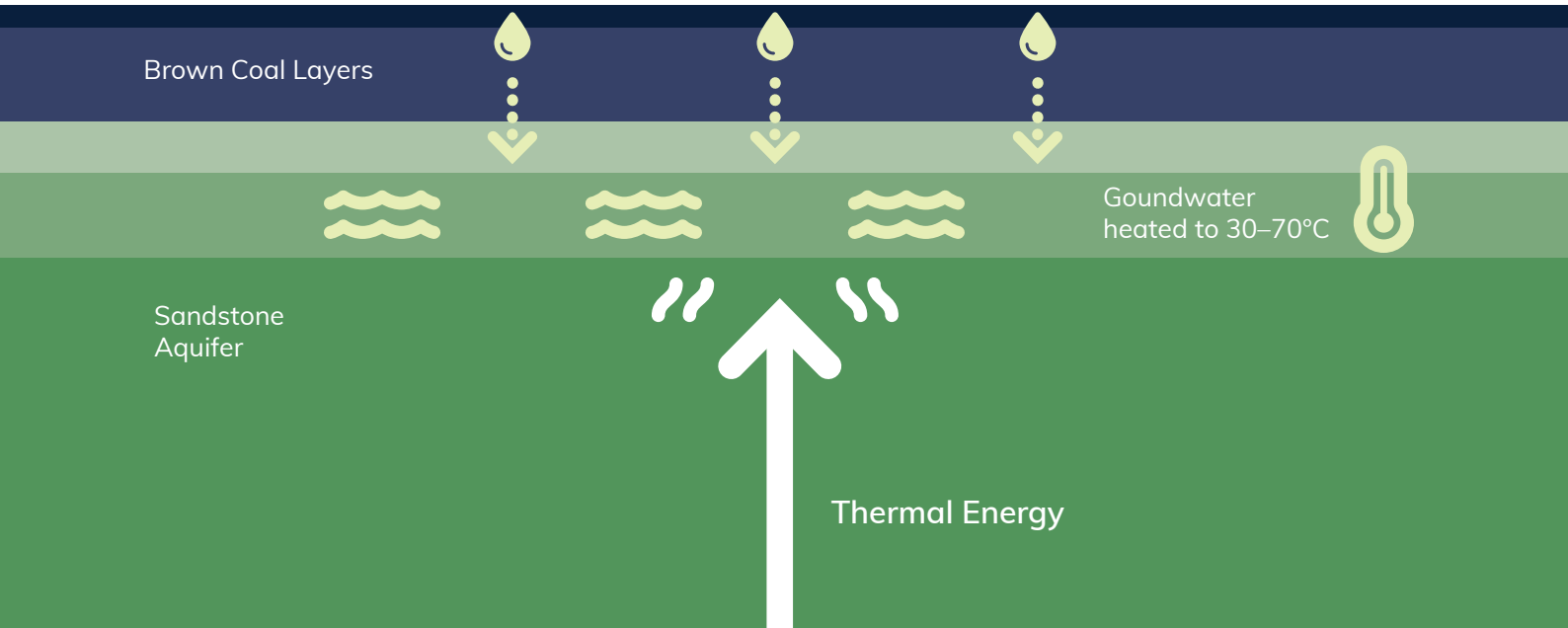
Gippsland's unique geology offers local business and industry a powerful opportunity to reduce energy costs and carbon emissions through geothermal heating. Beneath the region lies a vast network of warm sandstone aquifers, naturally insulated by coal seams, delivering consistent water temperatures between 30–70°C. This makes them ideal for low-emission heating and cooling systems.

With rising energy costs and growing demand for sustainable practices, geothermal technology presents a reliable, cost-effective solution for industries, agriculture, and commercial facilities. Investing in geothermal means future-proofing your business while contributing to Gippsland's clean energy future.

1. What is geothermal energy?

Geothermal energy is the natural heat of the Earth's interior that we can use as a renewable energy source. The heat originates mostly from the slow decay of natural radioactive materials found in rocks kilometres beneath the surface. In some circumstances the geothermal energy can be brought efficiently to the Earth's surface as hot water, providing a natural, renewable, low-emissions alternative to natural gas for industrial heat applications. The best sources of geothermal energy for this purpose in Gippsland are sandstone 'Hot Sedimentary Aquifers' (HSAs), particularly the 'Lower Tertiary Aquifer' (LTA). Over geological time, thick coal layers above the LTA have acted as a thermal blanket to trap heat in the underlying groundwater aquifers, causing the temperature of the groundwater to naturally rise to 30–70°C at depths often less than 1000 metres. The LTA in Gippsland is a world-class HSA geothermal energy resource.

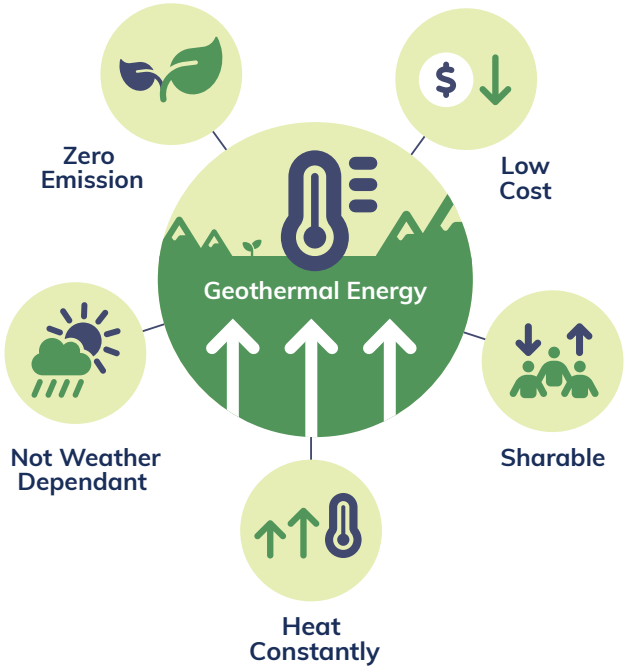
In practice, geothermal energy from hot sedimentary aquifers is used by pumping the hot groundwater from a bore to the surface, extracting heat from the water using a heat exchanger or heat pump, and returning the cool water back into the aquifer through a second (injection) bore. With heat pump technology the temperature range for applications can reach as high as to 120°C.



2. Why consider geothermal energy?

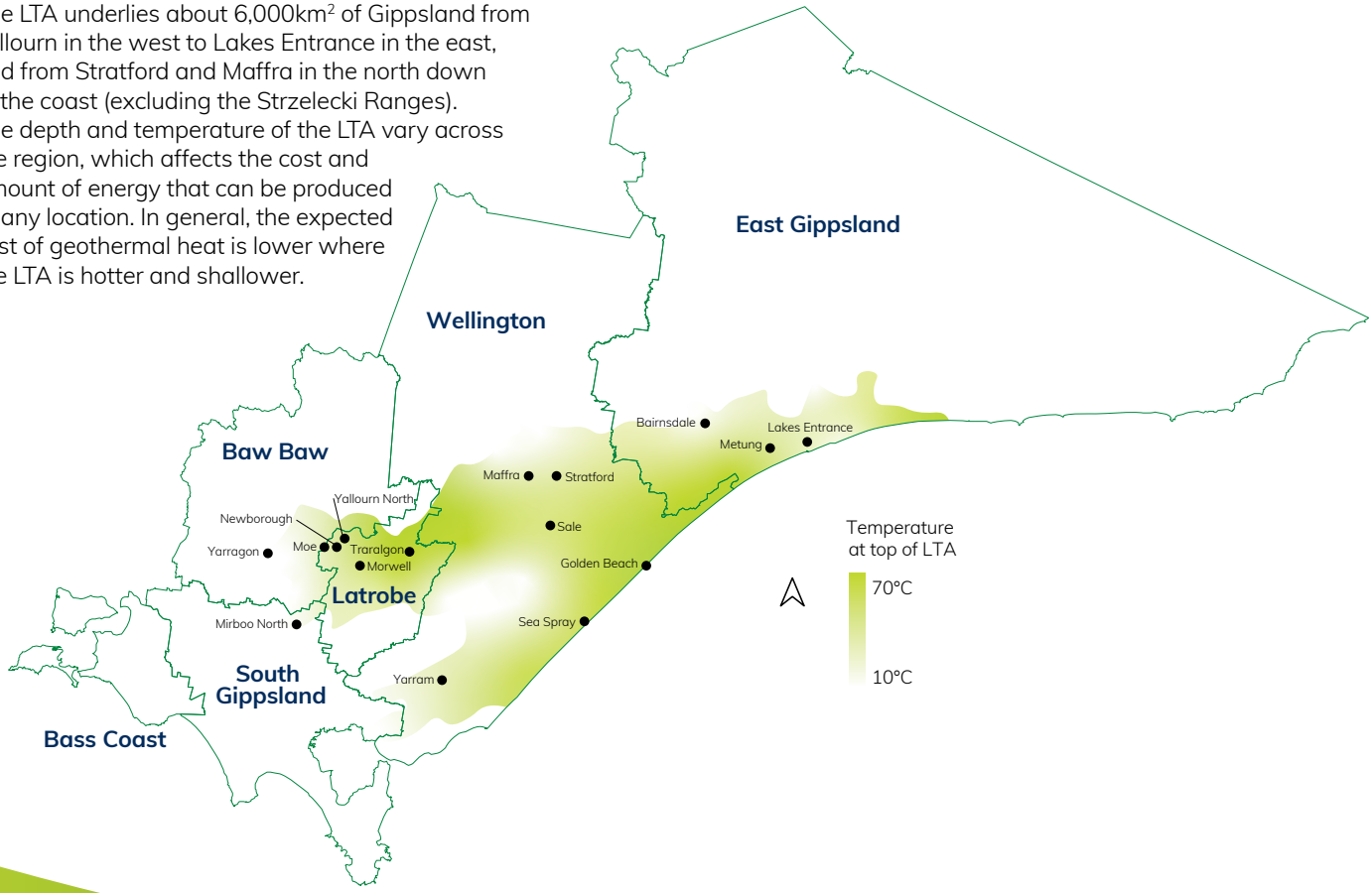
Geothermal energy is one of very few sources of zero emission, renewable industrial heat. The natural heat of the Earth is perfectly suited to some applications and has significant benefits compared to other sources of industrial heat. Geothermal energy systems:

- have a small surface footprint;
- can produce heat constantly or follow the heat demand of the user;
- are a sustainable and near zero-emission energy source;
- have very low running costs;
- can be shared across different users;
- do not depend on the weather or the season;
- have been demonstrated to have significantly cheaper lifetime costs than natural gas systems in the Latrobe Valley;
- can be combined with heat pumps to provide heat at higher temperatures than the aquifer itself.



3. Where is geothermal energy in Gippsland?

The LTA underlies about 6,000km^2 of Gippsland from Yallourn in the west to Lakes Entrance in the east, and from Stratford and Maffra in the north down to the coast (excluding the Strzelecki Ranges). The depth and temperature of the LTA vary across the region, which affects the cost and amount of energy that can be produced at any location. In general, the expected cost of geothermal heat is lower where the LTA is hotter and shallower.

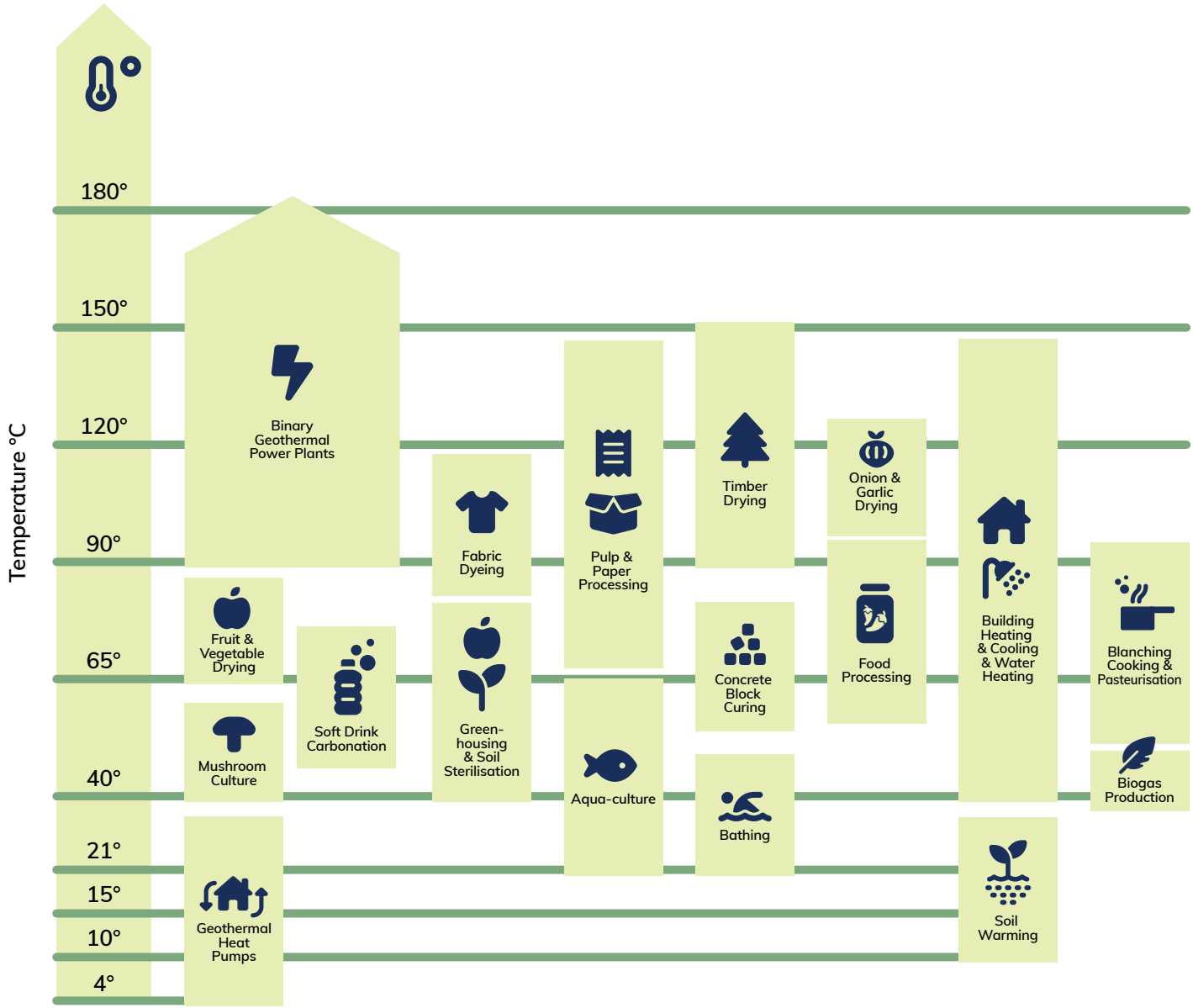


4. How can geothermal energy be used?

This widespread, accessible heat from the LTA offers a significant opportunity for existing or new businesses thinking to relocate to Gippsland to transition away from natural gas for their heating needs. It is not possible to list all the different ways that businesses use heat in their operations, but 'low-grade' heat (typically less than 100°C) is used for applications like heating public swimming pools, hotels, aged care facilities, greenhouses, poultry sheds and other spaces; aquaculture, food processing, drying, sterilisation, soil warming; and geothermal energy can be integrated with bio-reactors for efficient operation.

Geothermal energy systems usually only use the heat from the groundwater, returning the water itself to the aquifer where it can continue to be available for other purposes.

The Gippsland Regional Aquatic Centre (GRAC) in Traralgon is the first aquatic centre in Victoria to use a deep bore geothermal heating system with full reinjection of the cooled water back into the aquifer. The GRAC's geothermal heating system cost $3.9 million but offset over $700,000 in natural gas consumption and avoided 914 tonnes of CO_2-equivalent greenhouse gas emissions in just its first year of operation, demonstrating a strong economic and environmental benefit. Metung Hot Springs is another local example using the natural hot water directly in a spa facility.



5. What are the steps to assess and develop a geothermal energy project?

The following steps can be followed to assess whether geothermal energy might be an attractive energy source for your particular use, and to move ahead to develop the geothermal heat supply if warranted.

Preparing

Quantify how much heat you use, when, and at what temperature you use it. If you are currently using natural gas, then your gas bill will give a very strong indication of your heat consumption at (usually) a monthly or quarterly scale. Ideally, though, understand how much heat you use on a daily, or even hourly, basis.

Compare your location to the maps of temperature and depth of the LTA for a first indication of the amount of drilling that might be needed to access the LTA, and the temperature of water that might be produced.

Calculate how much LTA groundwater would be needed, and when, to produce the heat you require.

Determine what additional equipment (pipes, pumps, heat pumps, heat exchangers, filters) would be needed to deliver the geothermal energy where and when it is needed.

Estimate the cost of building the system, and value of the offset energy savings.

Actioning

Apply for licences. Geothermal projects will generally require four licences or approvals; three managed by Southern Rural Water under the Water Act, and one managed by the Environment Protection Authority (EPA) under the Environment Protection Act. They are:

- Section 67 works licence to construct and operate production, injection ± monitoring bores;
- Section 51 take-and-use licence to extract water from the LTA, with conditions for the return of the water to the LTA after heat extraction;
- Section 76 approval for underground disposal of water via a bore;
- A18 permit (from the EPA) for discharge of waste to an aquifer.

Commission a drilling company, engineers and other service providers to construct the geothermal heating system.

6. More information

The University of Melbourne and Regional Development Victoria, supported by Regional Development Australia have developed a geothermal assessment and development workflow to assist organisations considering geothermal energy as an alternative to natural gas for industrial heat.

Further details can be found at:

physics.unimelb.edu.au/research/research-areas/geothermal-energy

or by contacting Regional Development Victoria at

rdv.gippsland@rdv.vic.gov.au

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