Renewable energy: geothermal and biomass

Geothermal energy

Geothermal energy uses the earth's natural heat to generate energy. The main types of geothermal energy are to be found in hot dry rocks (HDR) and hydrothermal reservoirs (hot groundwater). Very little of Victoria's geothermal resource has been explored or used to date. However the recently enacted *Geothermal Energy Resources Act 2005* aims to facilitate commercial exploration and extraction of geothermal energy resources for power generation.

Harnessing geothermal energy[1]

Electric Power Distribution

Geothermal steam and hot water for electricity generation.

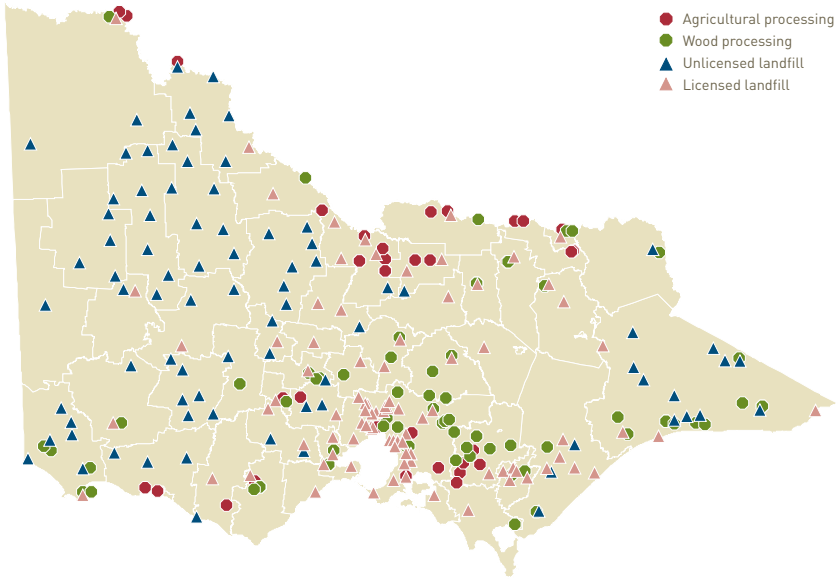
Direct Heating

Hot groundwater piped directly for heating, eg. greenhouses, fish farms, and municipal and residential buildings. Since 1983 Portland has used local geothermal water for heating public buildings and the municipal swimming pool.

Geothermal Heat Pumps

The earth maintains a stable underground temperature throughout the year. Heat pumps (or heat exchangers) use a system of pipes to sink heat into the ground during summer and bring heat to the surface in winter - effectively keeping a building the same temperature all year round.

Distribution of potential bioenergy production sites, 2004[2]



Bioenergy

Bioenergy refers to energy derived from plant material (biomass). This may include primary use of biomass through combustion (eg. burning of wood) or development of biofuels from crops (eg. ethanol from sugar cane or bio-diesel from crops like mustard and canola). Another way in which biomass can be used for energy generation is through extraction of methane which is emitted through biodegradation.

Firewood is a commonly used source of energy for domestic heating. Like other forms of biomass combustion it produces greenhouse gas emissions, mainly carbon dioxide, when burned. A key issue with firewood use is the potential threat to native bushland areas where unlicensed harvesting occurs. An estimated 14 million cubic metres of firewood is consumed annually by Victorians.

In Victoria trees and crops are not grown specifically for their energy-biomass. Rather, residue biomass is used from forestry or grain harvest, mainly for direct combustion. Municipal solid waste is also used for combustion and, to a lesser extent, for methane production. In 2005 Victoria consumed 35 petajoules of biomass compared to 260 petajoules of natural gas. Apart from domestic wood heating, biomass energy is relatively minor but the potential to expand this is considerable.[3]

Source [1]DPI Minerals and Petroleum Division "Geothermal Energy Resources" [2] BRS 2005 *Bioenergy Atlas of Australia* [3]SEAV 2004 *Annual Report*