

**Senate Standing Committee on Economics**  
**ANSWERS TO QUESTIONS ON NOTICE**  
Innovation, Industry, Science and Research Portfolio  
Additional Estimates Hearing 2009-10  
10 February 2010

---

**AGENCY/DEPARTMENT:** COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION

**TOPIC:** Geothermal Energy

**REFERENCE:** Written Question –Senator Eggleston

**QUESTION No.:** AI-93

What is the progress of the geothermal air-conditioning plan for Perth?

Is there potential for Perth to be powered entirely by geothermal energy? What would the costs of such an exercise be? What other cities/towns could rely on geothermal energy?

**ANSWER**

**What is the progress of the geothermal air-conditioning plan for Perth?**

The geothermal air-conditioning plan for CSIRO operations in Perth is proposed in three steps :

- 1) ~1MW<sub>therm</sub> -scale geothermal UWA Campus district cooling project (co-funded through the 2<sup>nd</sup> round of the Federal Geothermal Drilling Program)
- 2) ~10 MW<sub>therm</sub> -scale Pawsey Supercomputer/ARRC geothermal cooling project (EIF bid submitted)
- 3) ~100MW<sub>therm</sub> –scale, district heating and cooling of new large scale developments around Perth (e.g. Alkimos, South Coogee etc.)

1) & 2) Progress on both the UWA campus demonstrator and the Pawsey/ARRC supercomputer are:

early 2009, a successful thermal exploration drillhole on UWA campus confirming a high geothermal gradient (UWA 1 gradient well, 36.0 °C/km in the top 200m )

mid 2009, thermal gradient measurement of an existing deep water monitoring bore near the proposed Pawsey/ARRC supercomputer site confirmed a high gradient (AM40 well, 38.5°C/km in the top 700m)

end 2009, analysis of the closest well to target depth (3049 m deep Cockburn 1 well ~20 km away from the proposed sites) confirmed sufficient temperature (~100°C) and high permeability in the target sediments

end 2009, EIF grant 2<sup>nd</sup> round submission for Pawsey Centre/ARRC 10 MW<sub>therm</sub> project

early 2010, \$7 million Federal Government geothermal drilling grant offered to Green Rock Energy Ltd. For the UWA campus production and injection drillhole targeted to commence in 2010-2011 financial year

early 2010, information session to aboriginal groups and noise vibration study for UWA production/injection drillholes successfully completed

- 3) Progress on the 100 MW<sub>therm</sub> scale district cooling/heating developments are:  
early 2009, information session to land developers organized by HASSEL  
mid – 2009, feasibility study for Alkimos commissioned by MIRVAC

### **Is there potential for Perth to be powered entirely by geothermal energy?**

The Perth sedimentary basin contains multiple hot aquifer layers. The geothermal cooling projects described previously initially target only the shallowest aquifers. The deeper aquifers below 4-5 km are viable for electricity generation. The Western Australian Geothermal Centre of Excellence has estimated the available resource to be sufficient to sustain cooling of Metropolitan Perth. It is conceivable that Perth's cooling, heating, electricity generation and geothermal desalination needs could be sustained using the available geothermal energy resources.

### **What would the costs of such an exercise be? What other cities/towns could rely on geothermal energy?**

#### *Geothermal district Cooling and Heating*

An economic feasibility study conducted by Sydney Capital Partners indicates that establishing the Pawsey Centre/ARRC as a direct heat geothermal demonstration site will reduce power consumption by 1.9MW<sub>electric</sub> (equivalent to electricity costs of around \$3 million pa) once the Pawsey Centre is commissioned in 2013. Once established, the new facilities will represent Australia's largest direct heat geothermal project. The purpose of the 10 MW<sub>therm</sub> demonstrator is to show economic viability for similar projects or future large scale projects at industrial scale. Economic viability increases with scale.

#### *Geothermal Electricity generation*

Commercial Australian geothermal electricity generation projects have not yet started and economic viability data for an Australian environment is not available. Costs are available from similar overseas projects, however the extent to which this data can be extrapolated to provide information based on Australian conditions must be carefully examined.

### **What other cities/towns could rely on geothermal energy?**

There are many hot sedimentary basins in Australia. The Great Artesian Basin covers one fifth of the Australian landmass, with much of the coastline of Western Australia forming part of deep sedimentary basins. Most of the major capitals in Australia are built on or adjacent to sedimentary basins. Outside these sedimentary basins, the classical hot dry rock technology can be applied. Geoscience Australia has compiled a map of geothermal potential in Australia highlighting sedimentary basins and hot rock targets

[http://www.ga.gov.au/minerals/research/national/geothermal/hot\\_rock\\_map.jsp](http://www.ga.gov.au/minerals/research/national/geothermal/hot_rock_map.jsp). The Australian Geothermal Energy Association gives an excellent overview over the existing projects.  
<http://www.agea.org.au/geothermal-energy-facts/australian-projects-overview/>.