

# An Update

## Geothermal Heat Pumps in Australia



**Brian Carey**

**IEA – Geothermal Annex VIII Task A Leader**

**19<sup>th</sup> October 2014**

**AIST Fukushima Workshop**

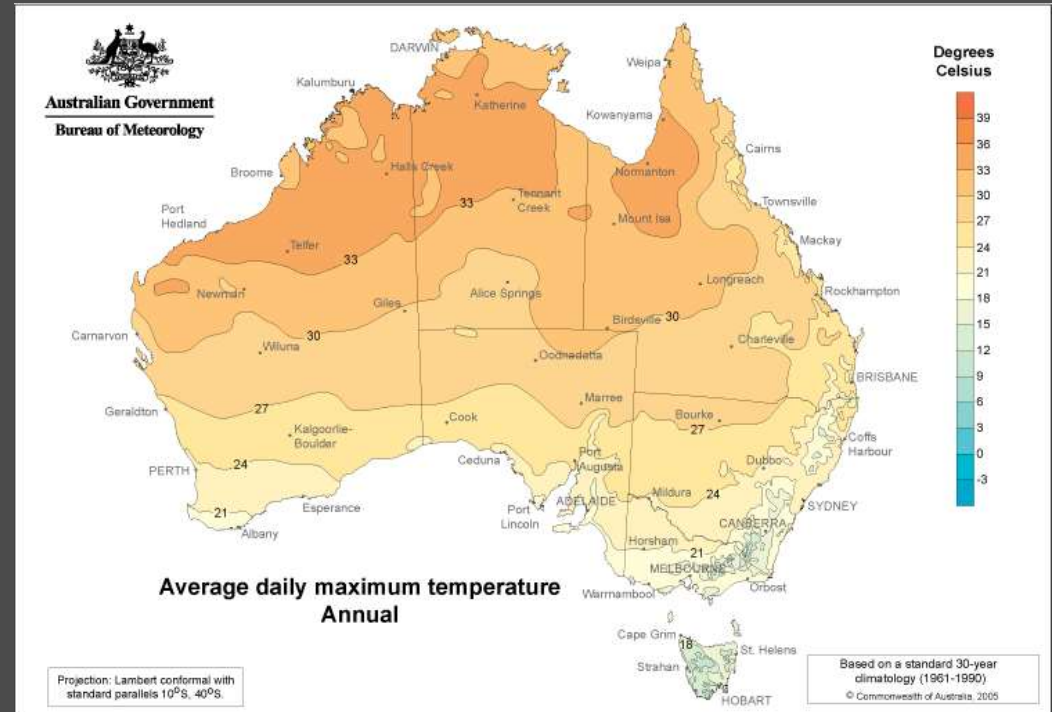


# Australia



# Australian Snapshot

- **Land Mass:**  
7 682 300 km<sup>2</sup>
- **Population :**  
22.2 million
- **Ground temperatures :**  
12 – 32 °C
- **Ambient temperatures :**  
-15 to 50°C
- **Climate :**  
generally arid to semi-arid temperature in south and east,  
tropical in North

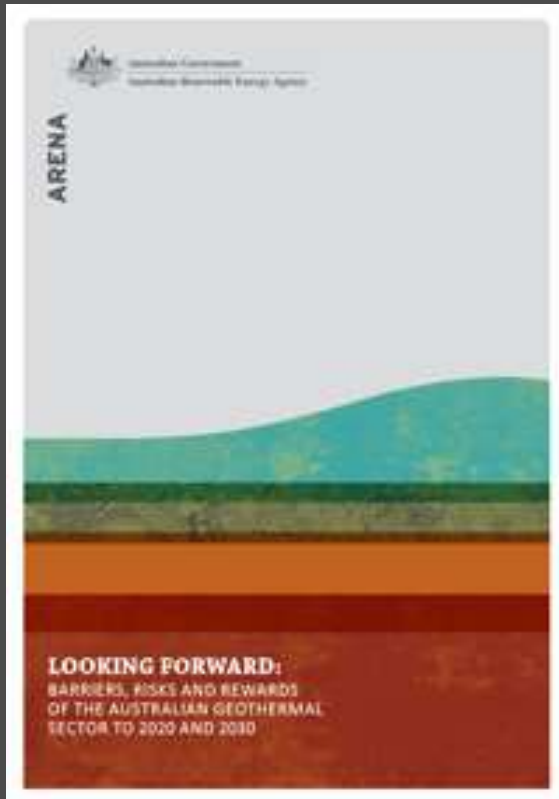


# Australia

- 2012 to 2014 looking for more carbon friendly energy solutions
- Geothermal solutions were part of this
  - Engineered geothermal systems
  - Sedimentary aquifers
  - Geothermal heat pumps
  - District heating and cooling schemes
- Tony Abbot's government repealed carbon pricing on 17<sup>th</sup> July 2014
  - Playing field shifted - pricing tool now lost for 5 years ?
- The Australian Renewable Energy Agency (ARENA) continues to be funded



# Australian Renewable Energy Agency (ARENA)



**Board of ARENA asked an international geothermal expert group for options to realise the potential of geothermal in the coming decades**

**“The report sets out the steps for developing an innovation roadmap for harnessing the potential of geothermal energy in Australia.”**

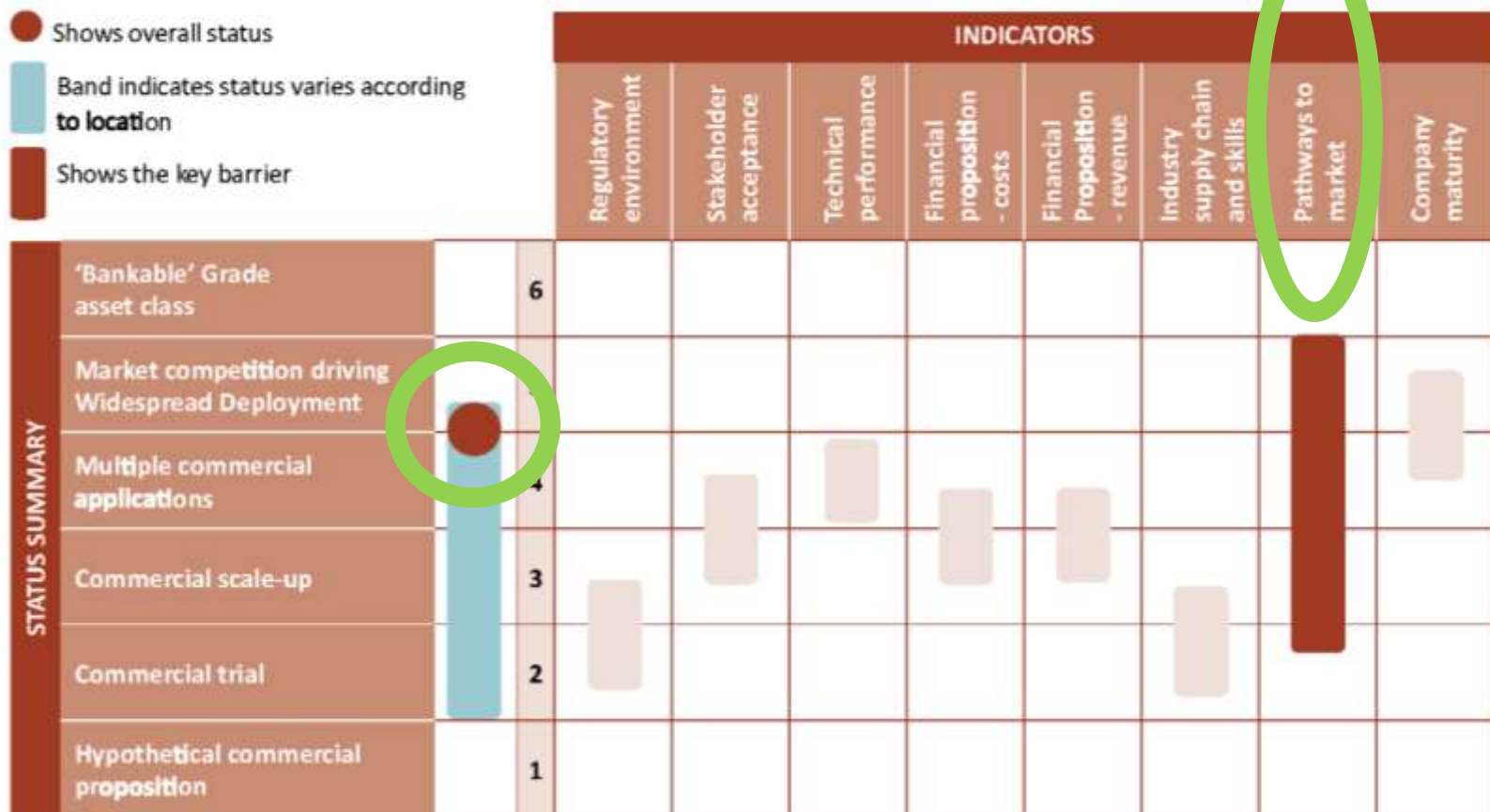
<http://arena.gov.au/files/2014/07/ARENA-IGEG-main-report.pdf>

# Geothermal Power Generation

- **Geothermal power sector is stalled**
  - Little activity in Australia
  - Proponents unable to attract funding
  - Not market ready
    - Unlikely to be for a number of decades
- **South Australian Centre for Geothermal Energy Research (U of Adelaide)**
  - Funding from South Australian Government and ARENA
  - Active research program in subsurface fracture characterisation, fluid – rock interaction and determination of reservoir permeability ahead of drilling

# Shallow Geothermal Direct-use resources Commercial Readiness Index

The technology for Shallow Direct-use resources is well advanced, as demonstrated by the projects established in Perth and Victoria: costs are well known and the resource is well understood.



# Direct Geothermal and Heat Pumps

- **Growth in residential and commercial sectors**
- **Size 10 to 2500 kW**
- **> 50% energy savings over conventional energy solutions**
- **IGSHPA**  
Australasian GSHPA  
2013



Photos from geoexchange web site <http://www.geoexchange.com.au/commercial-case-studies/>

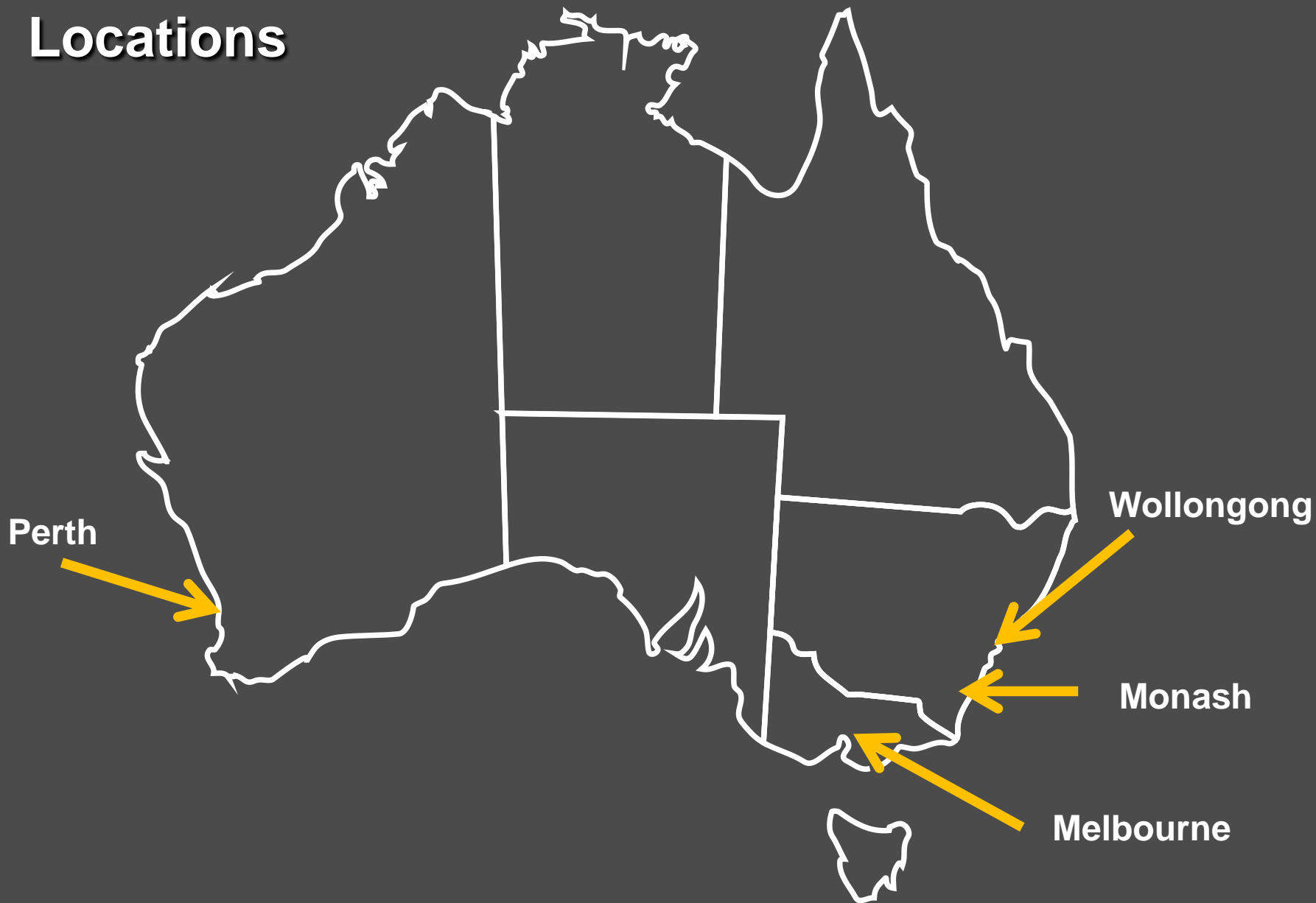


# Australian Universities and GHP Research

- Melbourne
- Monash
- Wollongong
- Perth



# Locations



# Melbourne University - Research

- Cooling and heating
- Ground Heat exchangers (GHE)
- Investing in GHE instrumentation and monitoring
- 3D modelling of GHE and Energy Piles
- Improved analysis
- Cost effective designs

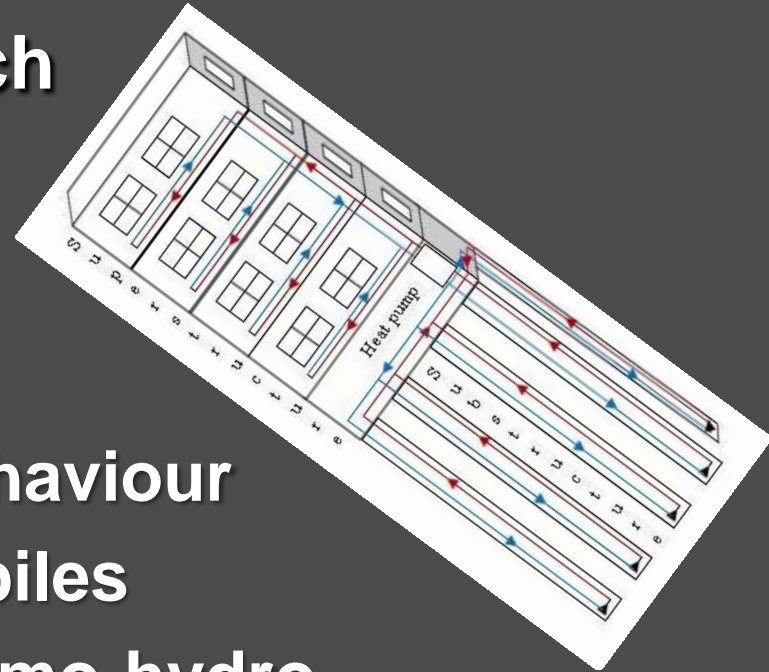
Web site <http://eddge.com.au/about/>

Publications <http://eddge.com.au/publications>



# Monash University - Research

- Soil thermal properties
- Soils thermo-mechanical behaviour
- Field tests of geexchange piles
- Numerical simulation of thermo-hydro-mechanical processes in geexchange piles
- Cost benefit analysis of using geexchange piles in buildings



# Wollongong University – Energy Research

- Sustainable Building Research Centre
- Develop prototype and test sustainable building technology
- Experimental and theoretical analysis of building design
- Energy efficiency training for engineers





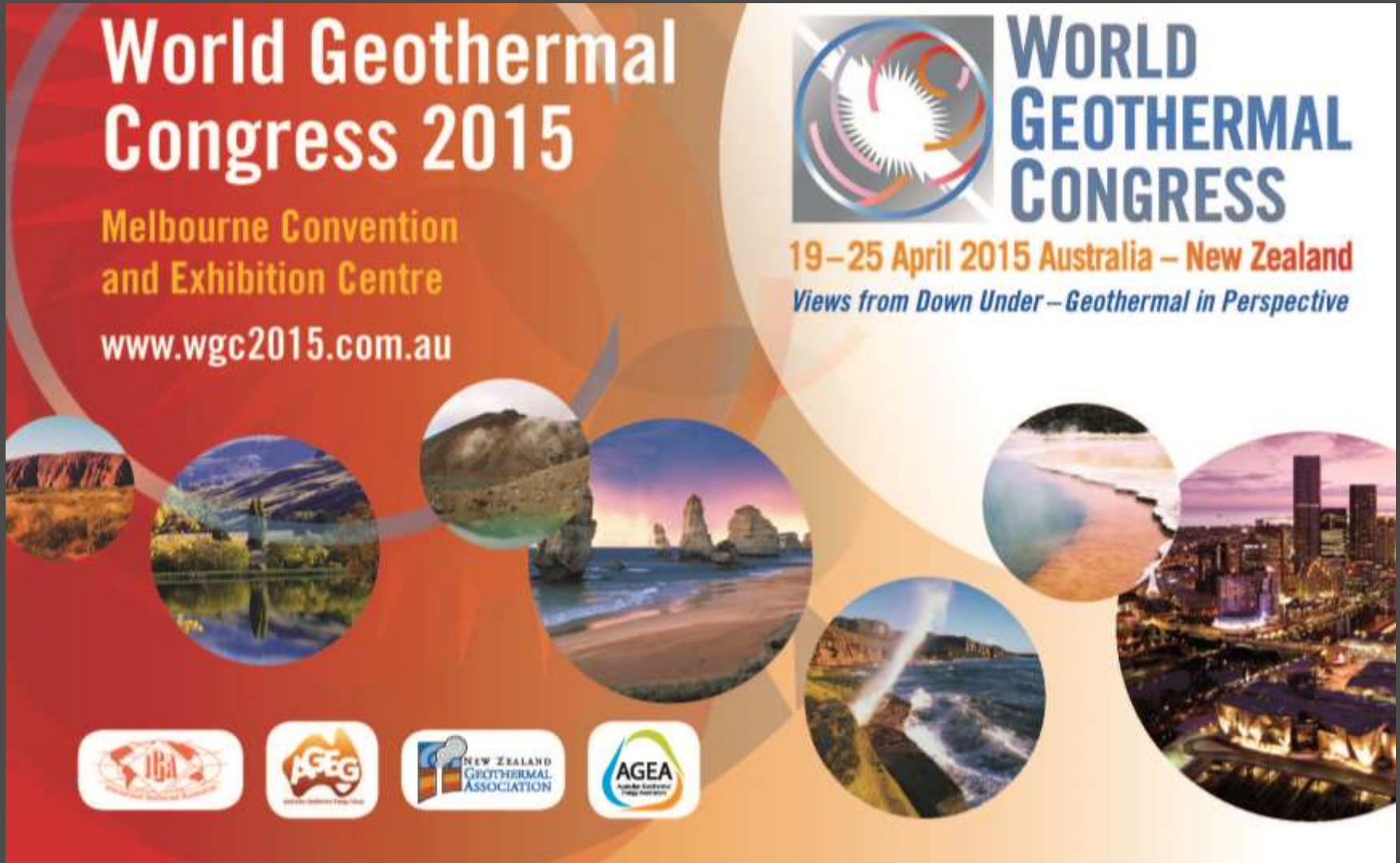
Direct Geothermal Field Projects at  
The University of Melbourne  
Victoria, Australia

Program Leaders:  
Professor Ian Johnston and Dr Guillermo Narsilio

October 2014



# Information and advertising



**World Geothermal Congress 2015**  
Melbourne Convention and Exhibition Centre  
[www.wgc2015.com.au](http://www.wgc2015.com.au)

**WORLD GEOTHERMAL CONGRESS**  
19–25 April 2015 Australia – New Zealand  
*Views from Down Under – Geothermal in Perspective*

The banner features a central graphic of overlapping circles containing various landscape and geothermal images: a desert canyon, a lake with mountains, a coastal town, a beach with rock formations, a geothermal vent, a coastline, and a city skyline at night. At the bottom, there are four logos: IGA, AGEG, New Zealand Geothermal Association, and AGEA.



# Geothermal Associations of Australia and New Zealand

## Welcome you to Melbourne

**1359 papers**

**10 technical sessions + Keynote sessions**

**IEA – Geothermal represented**

# Pre-congress Short Courses (2 & 3 Days)

## To be held in Melbourne

Geothermal Well Drilling, Completion and Testing (2)

Scaling and Corrosion in Geothermal Development (2)

Reservoir Engineering (2)

Electricity generation from low temperature geothermal resources (2)

Reducing Drilling Risk (3)



# Post-congress Short Course (3 Days)

To be held in Taupo, New Zealand

## Geothermal Policy and Implementation

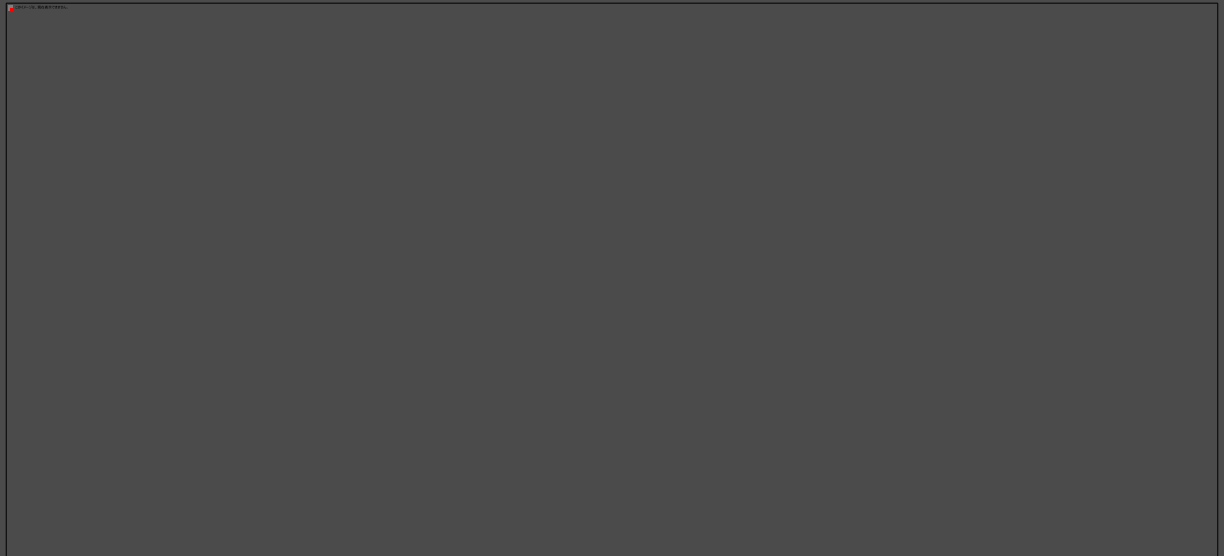
– The New Zealand Example



# Four post-congress Field Trips

To be run in New Zealand

1. Powerful landscape
2. Glorious geothermal energy
3. Northern escape
4. Lord of the rings and hobbits middle earth adventure

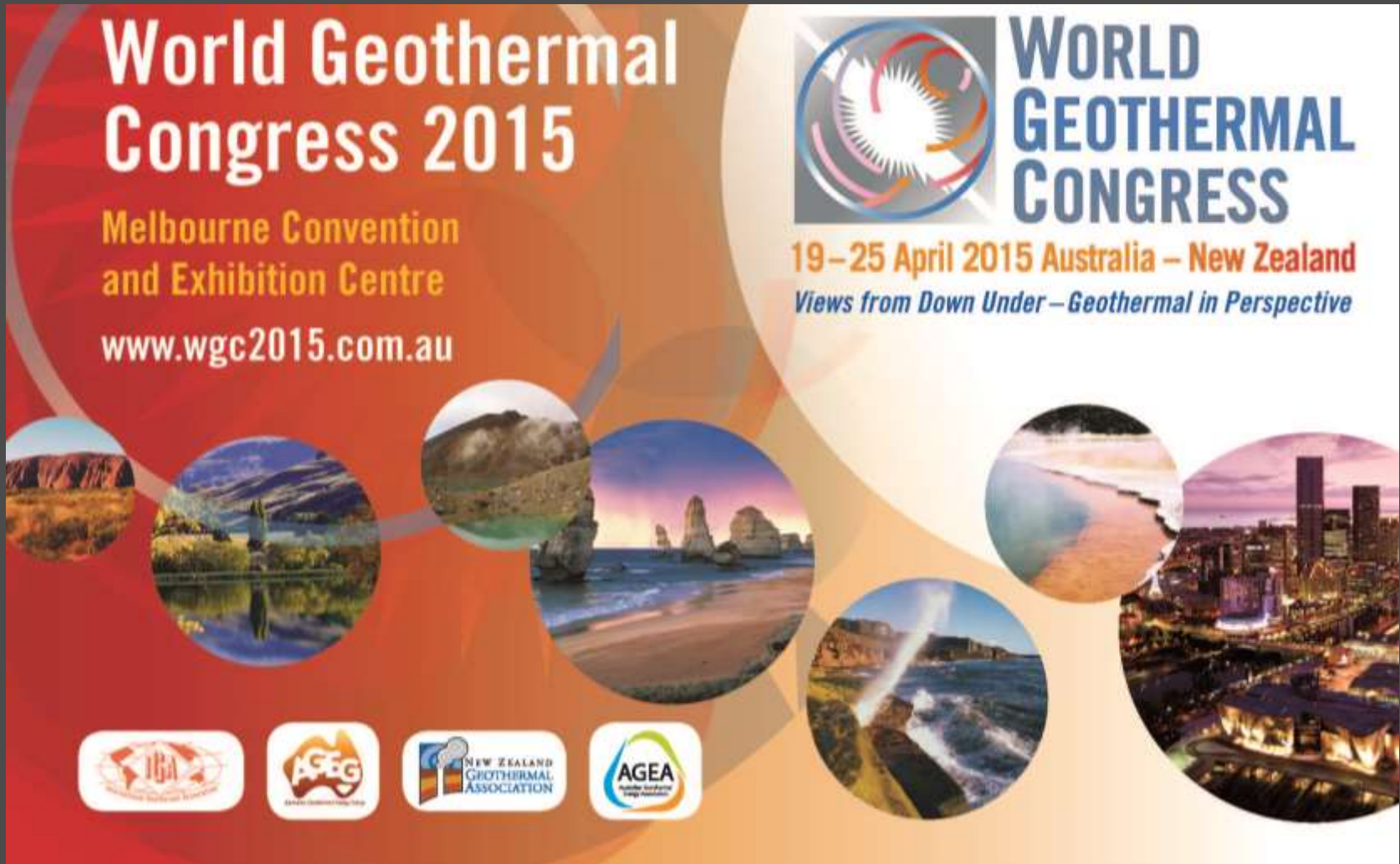


**Come to Australia and NZ in April 2015**

**Gandalf and the Geothermal Associations  
of Australia and New Zealand extend to  
you a very warm welcome**



# Early bird registration closes end January 2015 ... the thrifty save $\approx$ 10%



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# Kia Ora