



petratherm

SA Resources & Energy Investment Conference 2008

Developing a Portfolio of Quality Geothermal Energy Projects

Presented by:
Terry Kallis
Managing Director
Petratherm Limited
30 April 2008

Explorer and Developer of Geothermal Energy

Key Messages

- Petratherm's key strength lies in its approach to “exploration for heat” and its commercial assessment of projects - “location, location, location” – resource, market, permits/stakeholders
- The approach has resulted in a portfolio of 11 quality projects in Australia and Overseas – first mover in Spain - EGS, conventional & district heating and commencing in China
- Petratherm's unique HEWI model has the potential to concurrently and substantially reduce costs and risks – also reducing the time for delivery
- Petratherm has, in its Paralana Project, clear commercial and competitive advantages with a willing potential customer at “off grid” prices and a realistic long term commercialization path – unique path to commercialization
- Petratherm's business focus is to increase shareholder value through a clear combination of strategies that reduce cost, reduce risk and optimize revenue

Petratherm Mission and Business Model

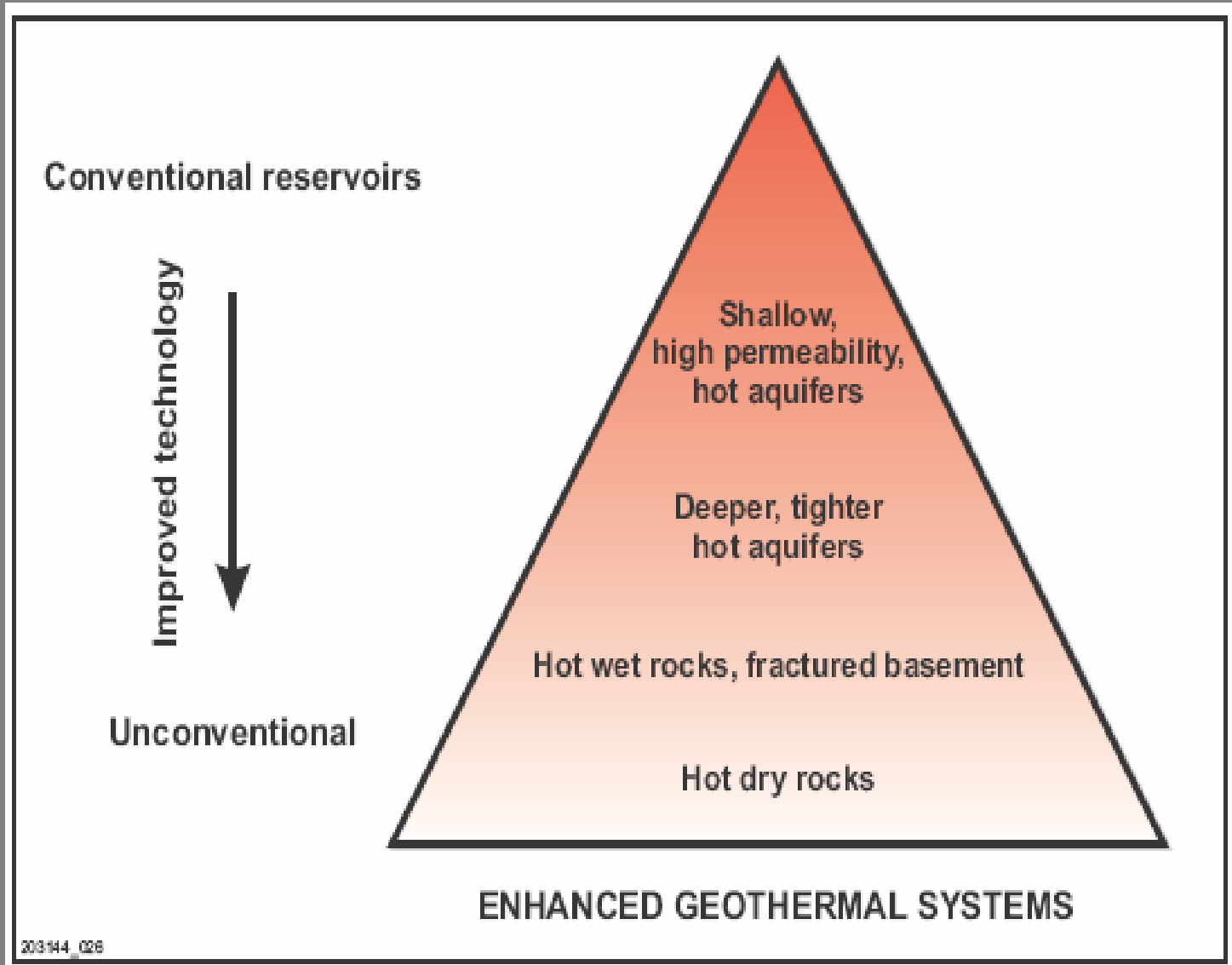
Mission

“to explore for and develop, emission free, geothermal energy projects that are commercially sustainable”

Business Model

“to develop a portfolio of quality geothermal energy projects conventional and EGS – for power and/or heat – where there is a favourable combination of geology and market conditions - and introduce joint venture partners with skills, risk appetite and funding ability to further develop projects through to production”

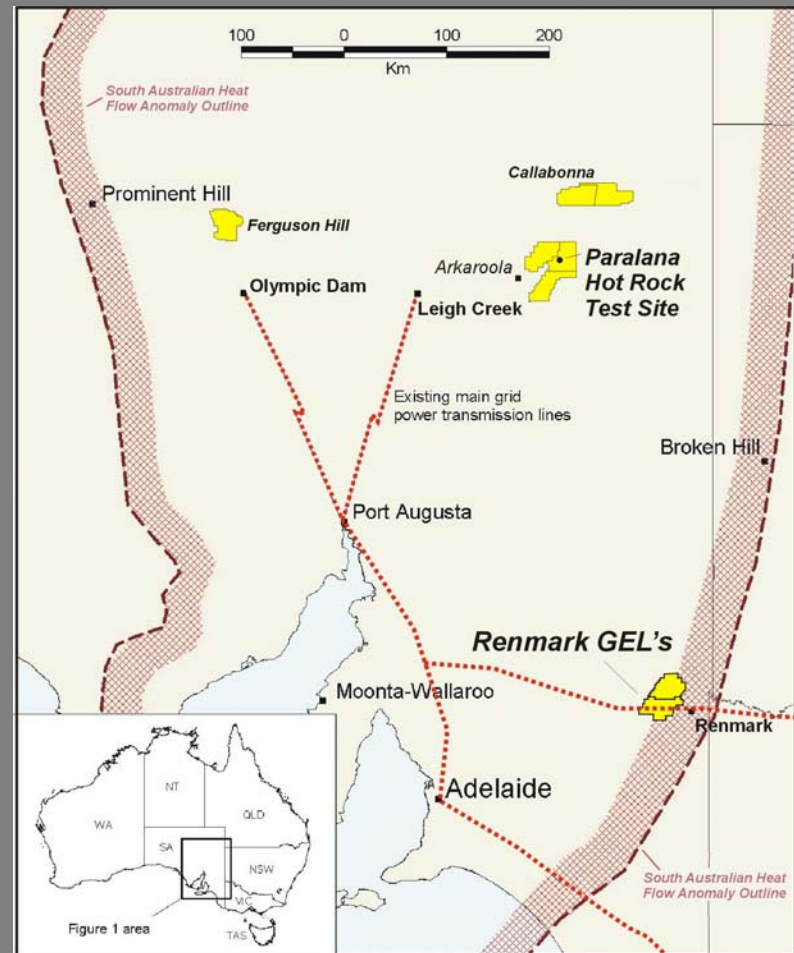
Engineered or Enhanced Geothermal Systems



Petratherm Limited

Geothermal Energy Explorer & Developer

- *MEP major shareholder 34%*
- *Market Cap \$44 M, current price \$0.77*
- *Four Australian projects in SA*
- *Seven Spanish projects*
- *Exclusive agreement to identify projects in China*
- *Flagship Paralana Project*
 - *Up to \$30M JV with Beach Petroleum*
 - *Federal grant of \$5M*
 - *MOU with Heathgate Resources to supply power*
 - *Next step drilling of deep wells*



Board & Management



*Derek Carter
Chairman*



*Simon O'loughlin
Director*



*Prof. Richard Hillis
Director*



*Dr Lloyd Taylor
Director*



*Richard Bonython
Director*



*Terry Kallis
Managing Director*



*Donald Stephens
Company Secretary*



*Peter Reid
Operations Manager*

Corporate Overview

Combined skills and experience of the Board, Management, Partners and Consultants capable of delivering **successful geothermal energy projects – from underground resource through to market**

Beach Petroleum - subsurface – well design ,
drilling & fracking

Geothermal Explorers – EGS reservoir/project
development

Expert Consultants – Prof. Richard Hillis &
Dr. Martin Hand

Petratherm's Exploration Model

“Shallow Hot Rocks close to Market”

*“Hot Rocks” are EGS , i.e.
Engineered Geothermal Systems*

Prime Cost Drivers

- Temperature Differential
- Drilling Depth
- Flow Rate
- Network Connection
- Generation Plant



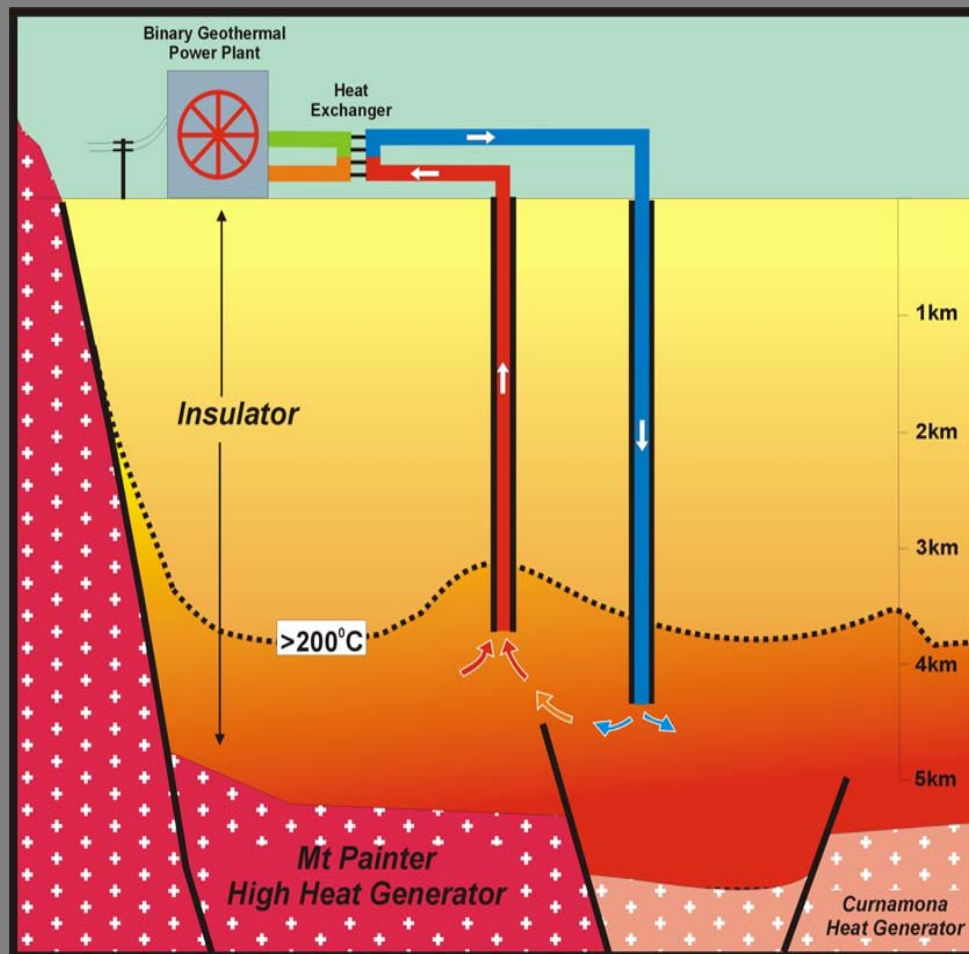
Petratherm is seeking to **optimize the key drivers** to achieve the **lowest long run average cost** electricity delivered while minimizing project risks.

Heat Exchanger Within Insulator (HEWI) Model

EGS - engineered geothermal system
i.e. underground heat exchanger

- Higher Permeability
- Chemically Stable
- No Potential Radon build up
- Lower Risk

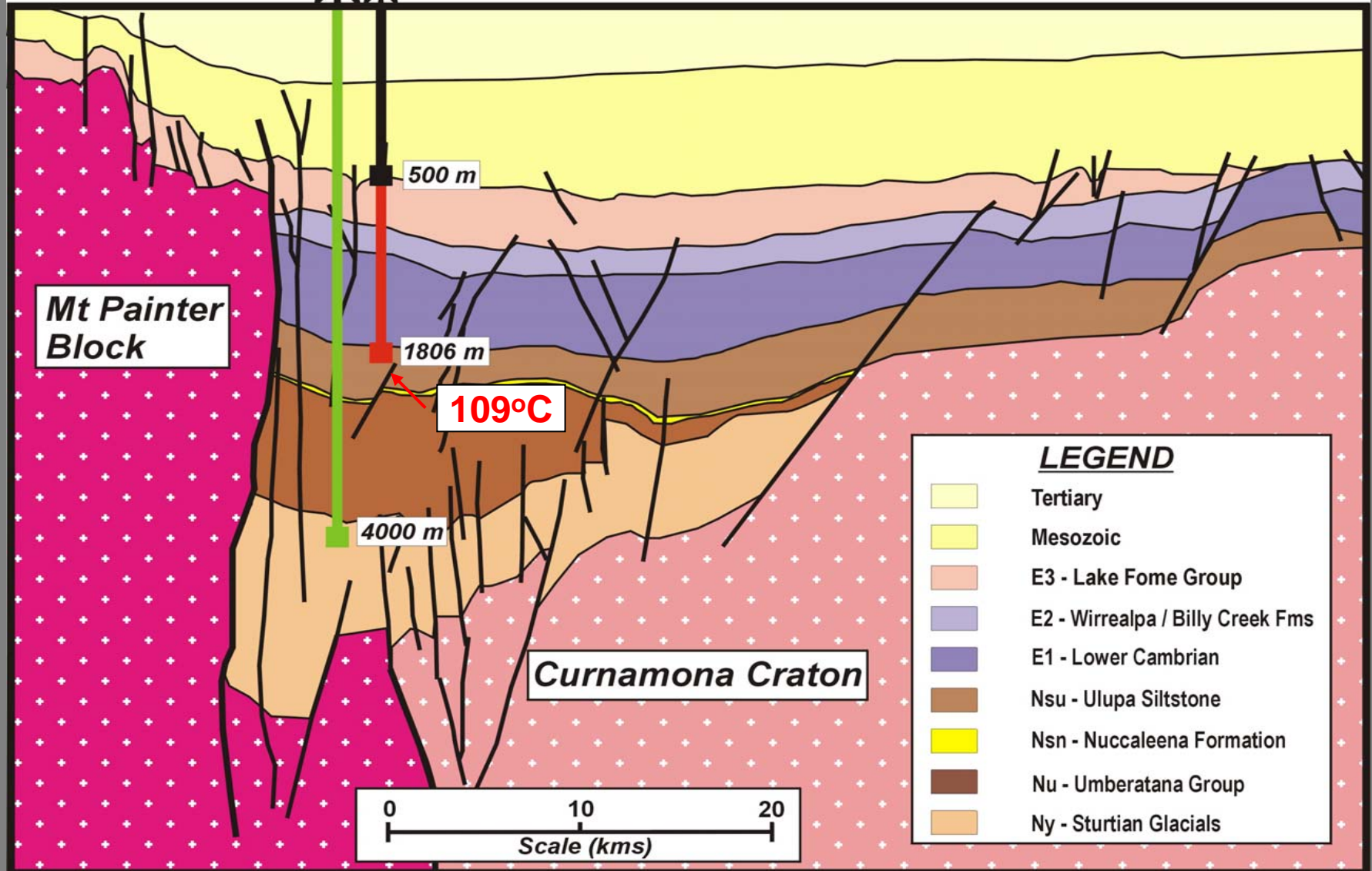
= Cheaper Power!



Paralana 2
Phase 3 drilling

Paralana 1

Paralana Work Program



Paralana Geothermal Energy JV Project

Key Ingredients for Success

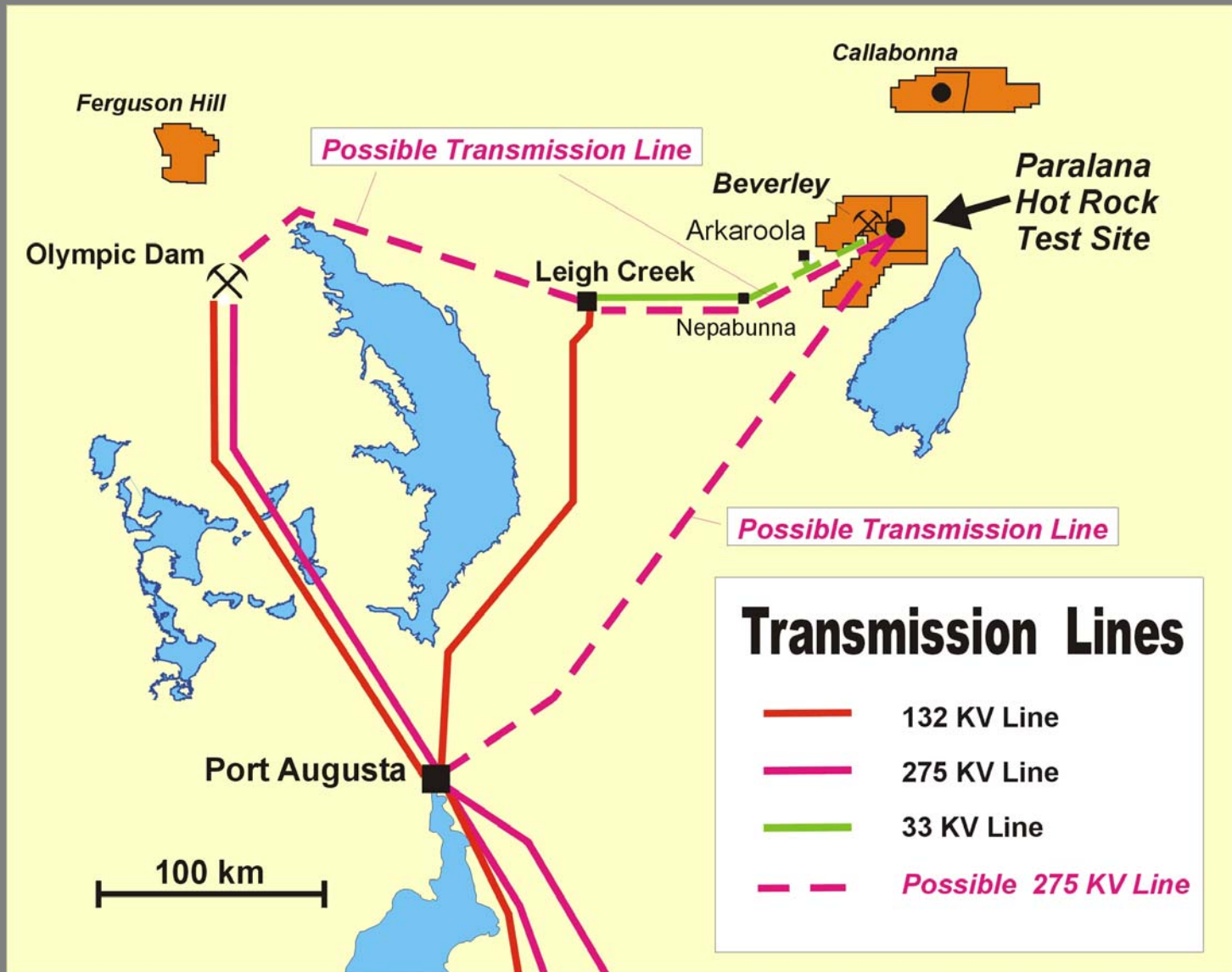
- Excellent thermal resource 200°C at 3600m
- Highest mainland heat flow 128mW/m²
- Stable geological formation – drilling conditions
- Close proximity to willing customer – Beverley Uranium Mine – off grid prices
- Up to \$30 M JV with Beach Petroleum
- \$ 5 M Federal REDI Grant for HEWI
- EGS Specialists –Geothermal Explorers
- Unique path to long term commercialization

Paralana Geothermal Energy JV Project

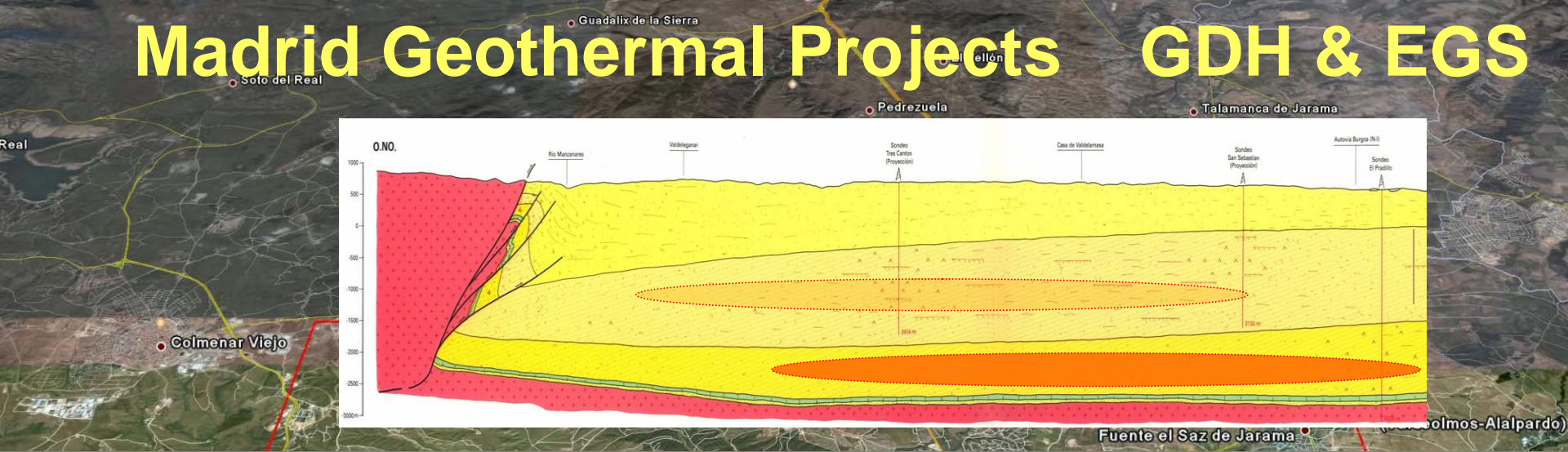
Development Summary

- Spud first well in second half of 2008
- Apply for Federal Govt. drilling funding for 2 well program – second half of 2008
- Apply for Fed Govt. Renewable Energy Fund, 30 MW demonstration -2009
- Drilling second well – 3 to 6 months after first well
- Long term circulation tests mid 2009
- Produce first power to Beverley – early/mid 2010
- Upscale to from 7.5 MW to 30 MW and then large scale development of 260 MW to 520 MW

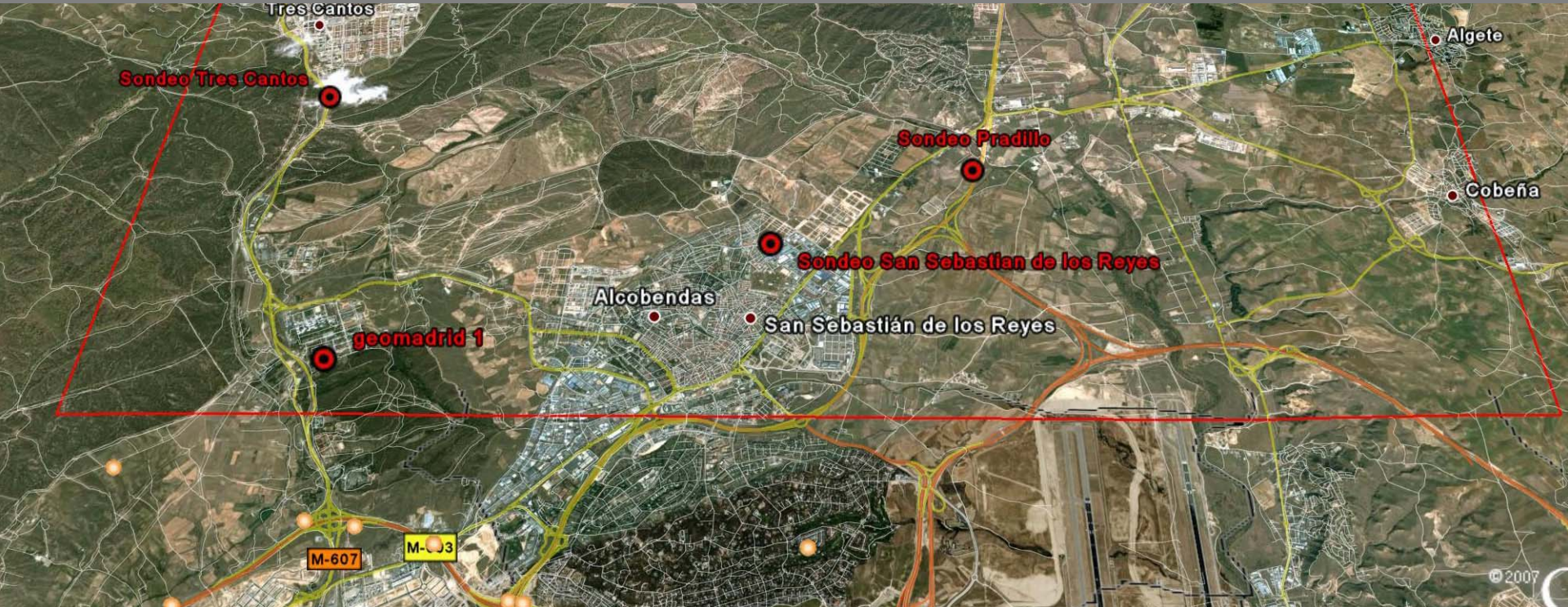
Paralana Commercialization Plan



Madrid Geothermal Projects GDH & EGS



Geo-Madrid existing well doublet with temperatures of 75°C, flow rate of 200m³/h, 1500m, potential capacity of 8 MWt or 45 GWth/a - Pradillo well 3,400 m at 156 °C



Exclusive Cooperative Agreement to identify high prospect geothermal energy projects in China with four Chinese Government Institutions

- Chinese Geothermal Energy Society
- Geological Survey of China
- Chinese Academy of Sciences
- China Institute of Geo-Environment Monitoring



Boiling Springs – Yunnan Province, China



Increasing Shareholder Value

- **Cost Reduction**
 - HEWI Model - shallower wells reducing drilling costs
 - Competitive sourcing of plant and equipment – “no ties” to a plant manufacturer – “fit for purpose” – conventional, lower cost plant
- **Risk Reduction**
 - Initial project selection – targeting lowest cost to relevant market
 - HEWI Model – shallower wells, less drilling, greater permeability
 - Several quality projects and a continuous pipeline of projects
 - Project portfolio spread across jurisdictions – local and overseas
 - Partner selection – key skills and capabilities – Beach Petroleum
 - EGS and lower risk conventional geothermal projects
- **Revenue Optimization**
 - Target local “off grid” opportunities – nearby mines
 - Exploit multiple products – electricity and direct use heat
 - Focus on attractive jurisdictions price and growth – Spain/China

Summary

- Petratherm's key strength lies in its approach to “exploration for heat” and its commercial assessment of projects - “location, location, location” – resource, market, permits/stakeholders
- The approach has resulted in a portfolio of 11 quality projects in Australia and Overseas – first mover in Spain - EGS, conventional & district heating and commencing in China
- Petratherm's unique HEWI model has the potential to concurrently and substantially reduce costs and risks – also reducing the time for delivery
- Petratherm has, in its Paralana Project, clear commercial and competitive advantages with a willing potential customer at “off grid” prices and a realistic long term commercialization path – unique path to commercialization
- Petratherm's business focus is to increase shareholder value through a clear combination of strategies that reduce cost, reduce risk and optimize revenue

Thank You



ASX Code: PTR

www.petratherm.com.au

Phone: (08) 8274 5000



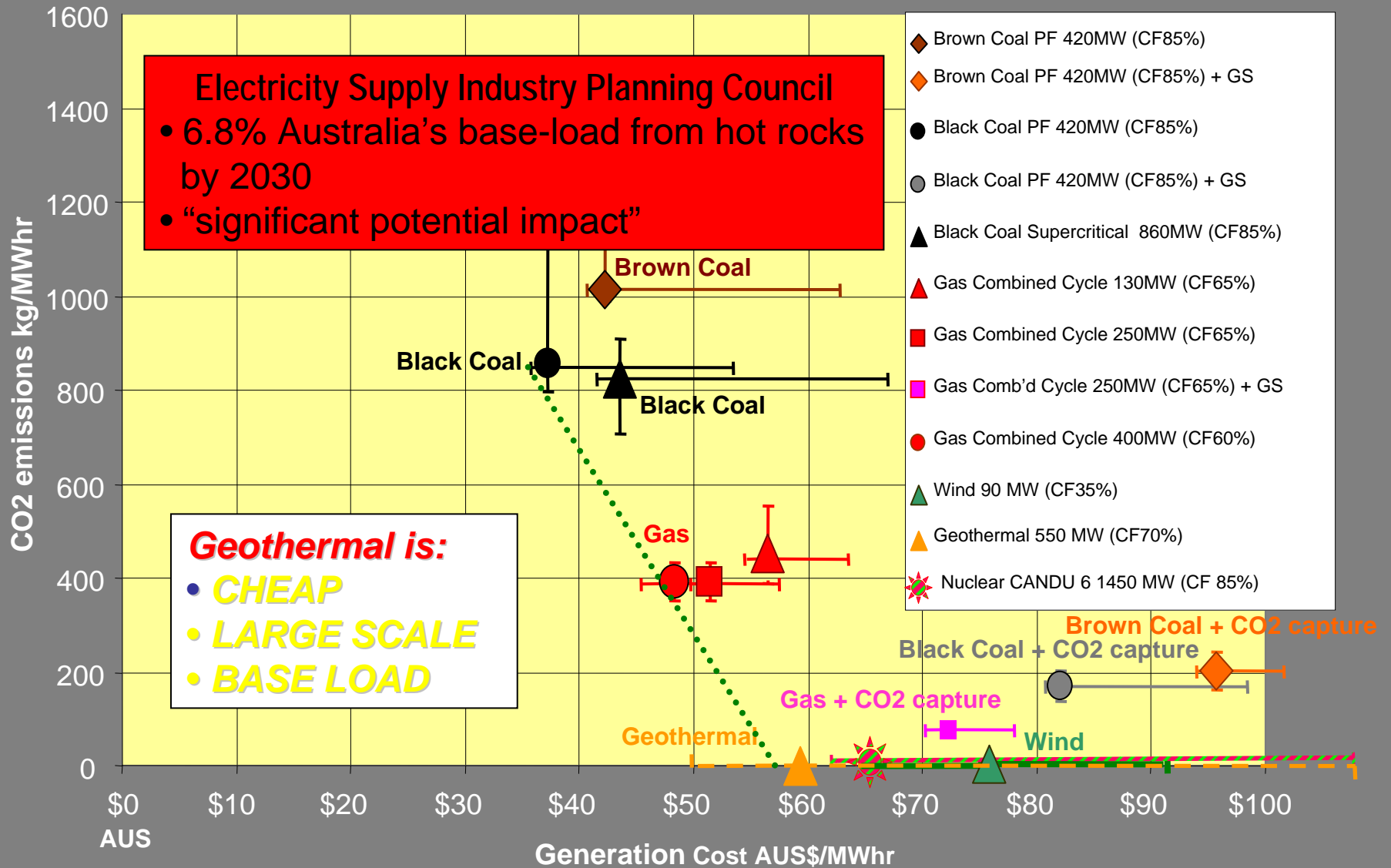
Overview of Geothermal Energy Industry

- Geothermal Energy Policy in Australia
- Engineered Geothermal Systems and Energy Cost Comparisons
- Geothermal Energy and Electricity Markets
- South Australian Projects
- Geothermal Energy Project Economics
- Key Challenges for EGS Projects

Renewable Energy Policy & Geothermal

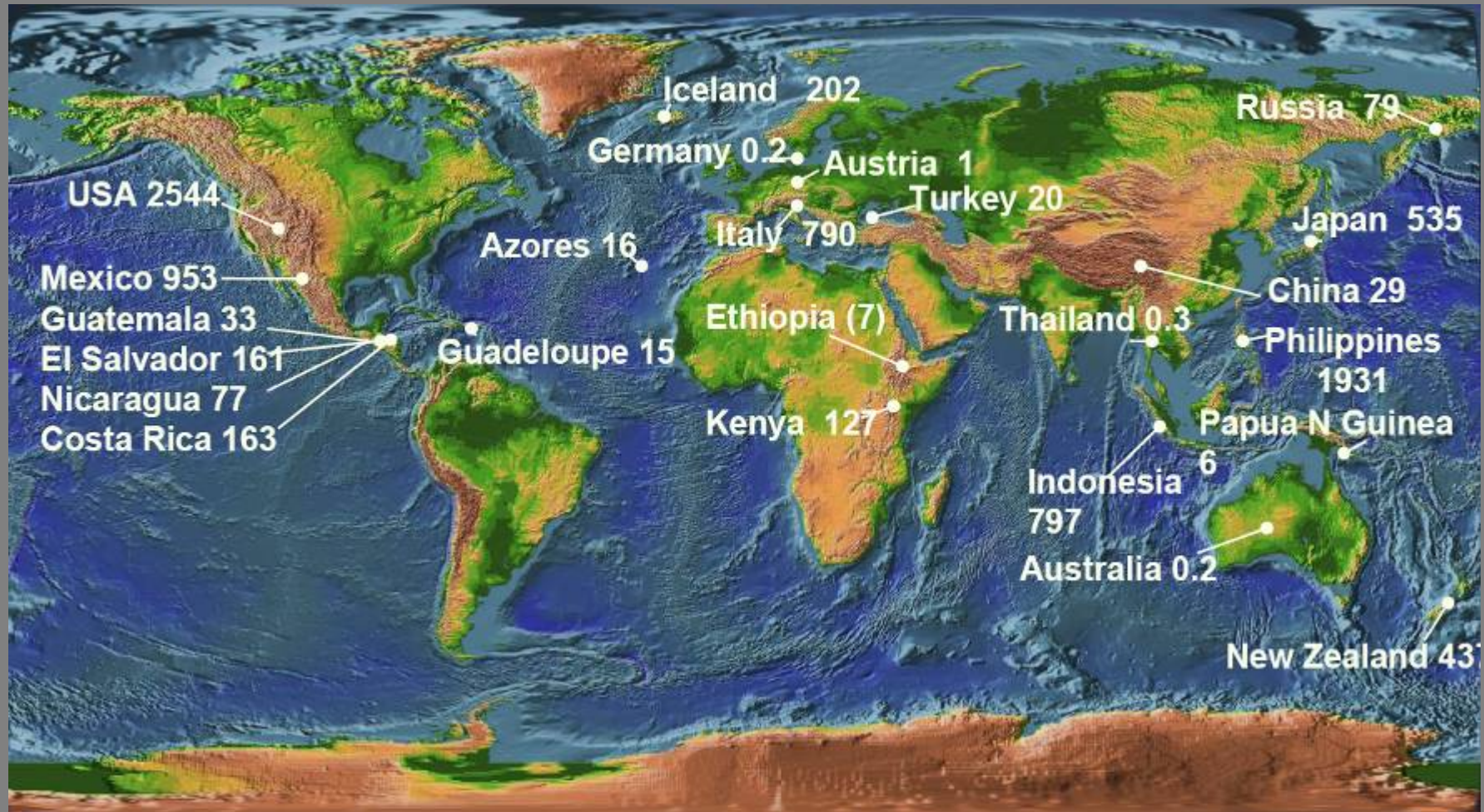
- Federal Labor Government Clean Energy Plan to ratify Kyoto, Emissions Trading by 2010, 20% Renewable Energy target by 2020, \$500 M Renewable Energy Fund including a \$50 M drilling initiative fund
- The Australian Geothermal Energy Group (AGEG) – South Australian Government initiative, developers/companies, academic/research institutions and government departments federal/state – collaborative work
- The Australian Geothermal Energy Association (AGEA) – developers/companies and service companies – Policy and Advocacy notably to governments.
- The Australian Geothermal Energy Industry Development Framework – Federal initiative aims to grow the Industry

Geothermal Energy Cost Comparison



COMBUSTION CO2 EMISSIONS vs LONG RUN COST
 (Source: PIRSA Compilation of ESIPC data 2006-07)

Global Geothermal Energy Installed Capacity in MW



Total 10,000 MW (2006)

Geothermal Energy and Electricity Markets

Australia

- Australia has the ideal conditions for EGS – high heat producing granites and a continent that is under compression
- Geothermal Energy potential is vast and could meet Australia's electricity needs for many centuries. The Paralana thermal resource potential alone is estimated at 13,000 MW
- ESAA estimates that 8% (around 3500 MW) of national demand could be met by 2030. Geothermal Energy Industry formulating a bold, yet realistic Vision with objectives for 2010, 2020 and 2030.
- The interconnected NEM in Australia is projected to require 5,000 MW of new capacity over the next 10 years (source: NEMMCO Statement of Opportunities).

SA Geothermal Projects

- Many players – 33 Companies, 10 ASX listed
- 277 GELs mostly in SA – PACE grants
- Very large resources
- Exploiting different geothermal resources mainly Hot Rock but also “Hot Water”



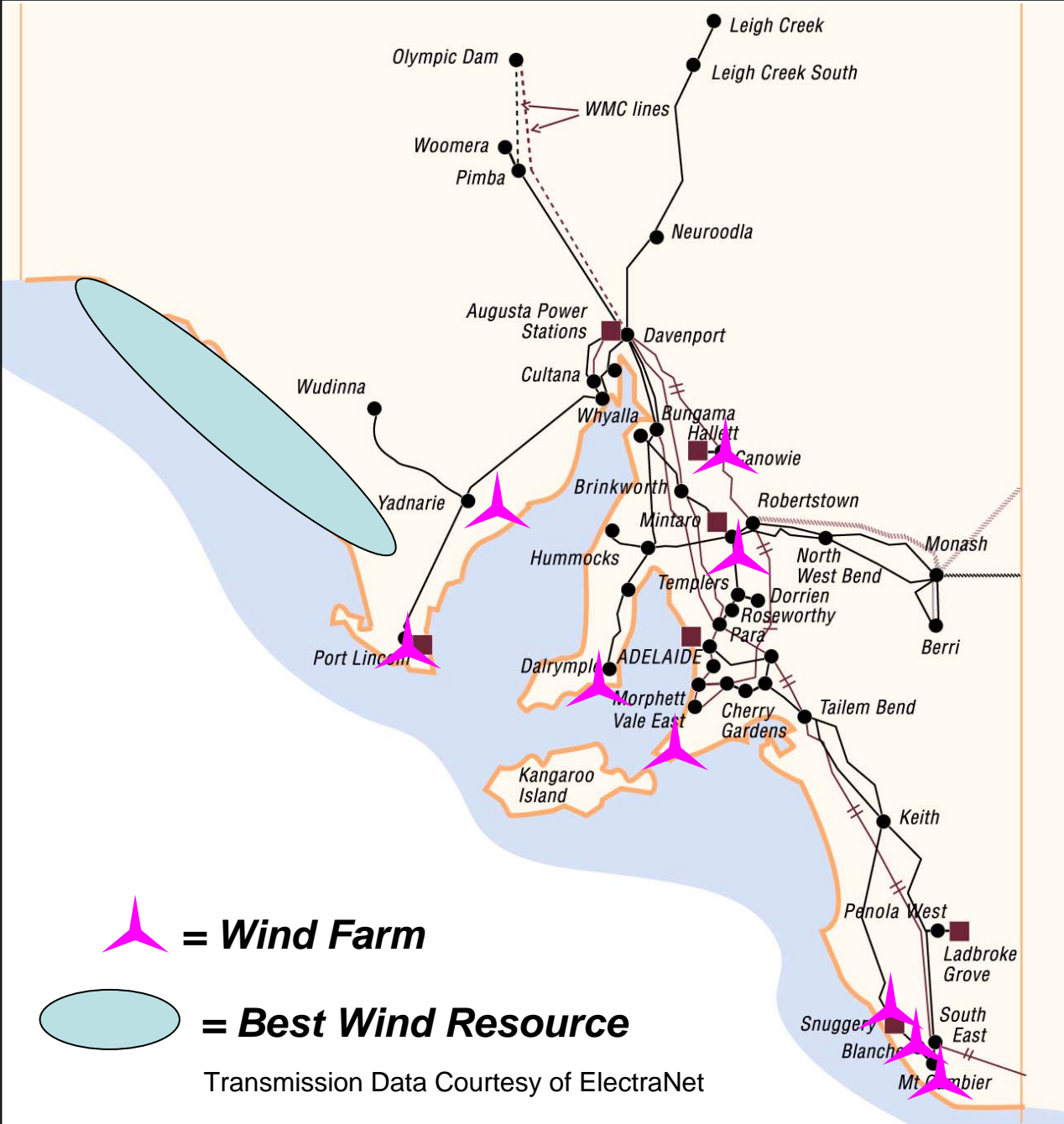
Geothermal Energy Project Economics

- Temperature (differential, quality and type of resource)
- Drilling Costs (depth, size, geological formation, availability)
- Energy Flow Rates (volume, pressure, energy transfer)
- Plant Capital Costs and related efficiencies
- Connection and Access to markets
- Operating Costs
- Economies of Scale/Production
- Revenue/Product Pricing in a Competitive Market
- Regulatory Regime – carbon pricing

- Critical Project Parameters are Revenue (grid/off grid & carbon prices), Capital Costs (drilling, plant, connection) and Thermal Resource (temperature differential, volume and flow)

Network Access & Connection

- Transmission Costs
- Transportation losses
- Margin Loss Factor
- System Stability
- Development Approvals, Licensing, Easements and Permits
- Network Capacity at connection point



Challenges for EGS Projects

- **Securing a quality site** – the three locations – **resource, market, permits** – optimizing economics in a competitive market – primary project risk reduction
- Confirming the **quality of the potential resource** – temperature differential, stress regime / permeability.
- **Deep drilling** of wells – well design, drilling rig availability and costs.
- **Establishing long-term circulation between injection and production wells** - permeability, fracturing, flow rate.
- **Integration of above-ground generation plant** with below-ground thermal resource, achieving reliable power plant output – then followed by up scaling of generation capacity.
- **Electrical connection** (transmission) to the National Electricity Market.
- **Water** quality, usage, net losses, rights, obligations, accessibility, environmental impacts – short and long term – small and large scale.