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# Guilt Free Energy

**Green Rock Energy Limited** ..... powering a cleaner future

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.... Green Rock Energy – the best geothermal investment

# Guilt Free Energy

## Corporate Overview



# Our mission and objective



## **CORPORATE MISSION**

To become a major geothermal energy company generating clean, renewable, base-load power

## **KEY OBJECTIVE**

To evaluate & develop the Olympic Dam Geothermal Energy project

## **OLYMPIC DAM TARGET**

To have 100 MW of capacity installed by 2016 with target of initial power generation by 2012

# Green Rock Energy : projects



| Asset                                  | Capacity                | Opportunity                                                                                                       |
|----------------------------------------|-------------------------|-------------------------------------------------------------------------------------------------------------------|
| Olympic Dam Project<br>South Australia | Target capacity 400 MW+ | The ideally located, commercially attractive, geothermal project                                                  |
| Patchawarra Project<br>South Australia | Target capacity 100 MW+ | Linked to a Cooper Basin power transmission line                                                                  |
| Upper Spencer Gulf                     |                         | Electricity production & water desalination                                                                       |
| Hungary                                | Target capacity 100 MW+ | Excellent resource, price & market access                                                                         |
| Western Australia                      |                         | Applications lodged 24 April 2008<br>In joint venture with major companies<br>Grant of title expected August 2008 |

..... a broad geothermal portfolio

# Capital structure



## Market Capitalisation

- A\$18 million

## Shares on Issue

- 180 million

## Shareholders

- 2,300
- Top 20 (40%)
- Directors (8%)

## Green Rock Energy Share Price



..... an undervalued company

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## Project Portfolio



# Australian projects



# Australian Projects



## **Patchawarra Project (Cooper Basin, S.A.) – 100% owned**

- Geologically prospective for hot geothermal water (hydrothermal)
- Target aquifers with good water flow potential
- With temperatures above 140°C at depths of +3km
- Evaluation of existing wells data underway to determine best locations for high water flow potential
- To be evaluated and developed in conjunction with the construction of an electricity distribution network connected to the Cooper Basin
- Targeting 100MWe plus

## **Upper Spencer Gulf, S.A. – 100% owned**

- Geologically prospective for hot rock project
- Potential for both electricity production and water desalination

# Western Australia



- Applications closed 24 April 2008
- Applied alone and with major resource companies for EGS and hydrothermal projects
- Grant of tenements expected this month

# European Projects

## Hungary – 33% interest

- New company established this month with strong partners (MOL and Enex)
- Aim to develop geothermal projects in Carpathian Basin, Central Europe
- Excellent resource potential known from 5,000 MOL wells & seismic surveys
- Prospects 140°C to over 200°C
- Supportive legislative regime
  - attractive feed in tariff pricing, €90/MWh (c.f. Australia: A\$60/MWh)
  - guaranteed access to market
- Targeting 100 MWe plus
- Joint technical team has selected two promising prospect areas – drilling location selection is underway



# South Australian Projects



## **Patchawarra:**

potential linked to a Cooper Basin power transmission line

## **Upper Spencer Gulf:**

electricity production and sea water desalination, straddled by national power grid

## **Olympic Dam:**

massive hot granite next to a major customer and the national power grid



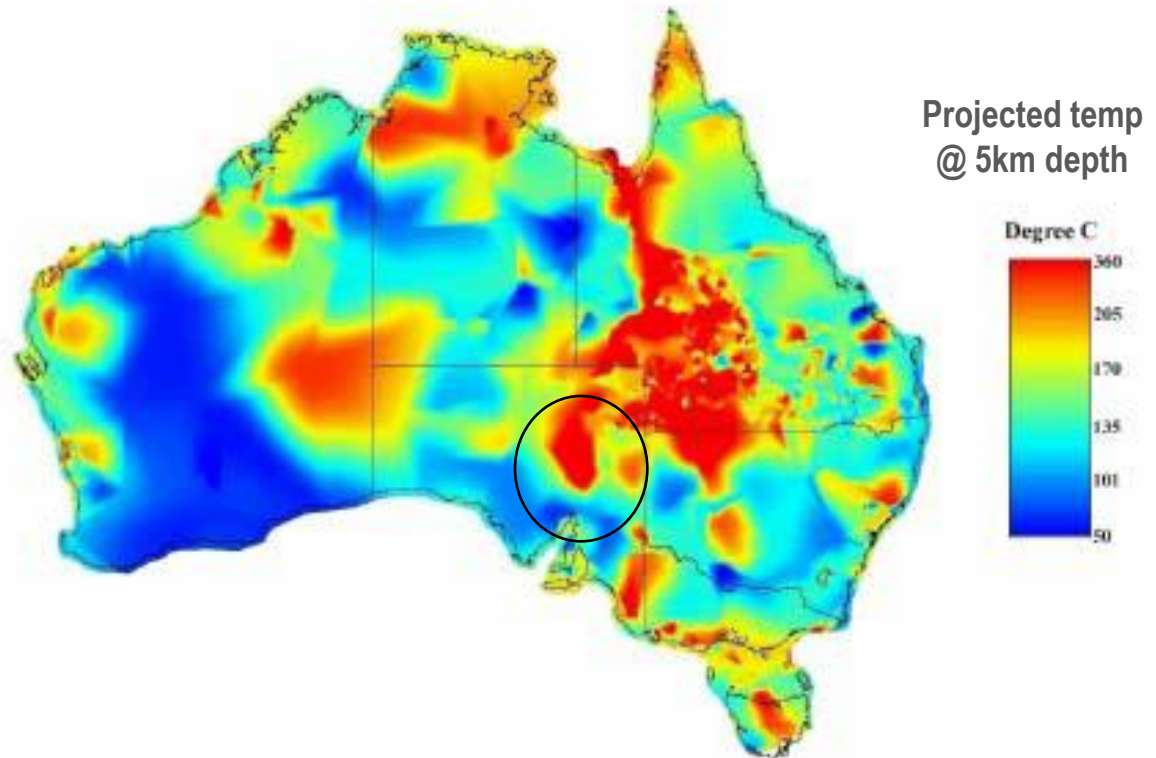
..... Olympic Dam at a major customer and national power grid

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Olympic Dam  
South Australia



# Olympic Dam : the heat resource

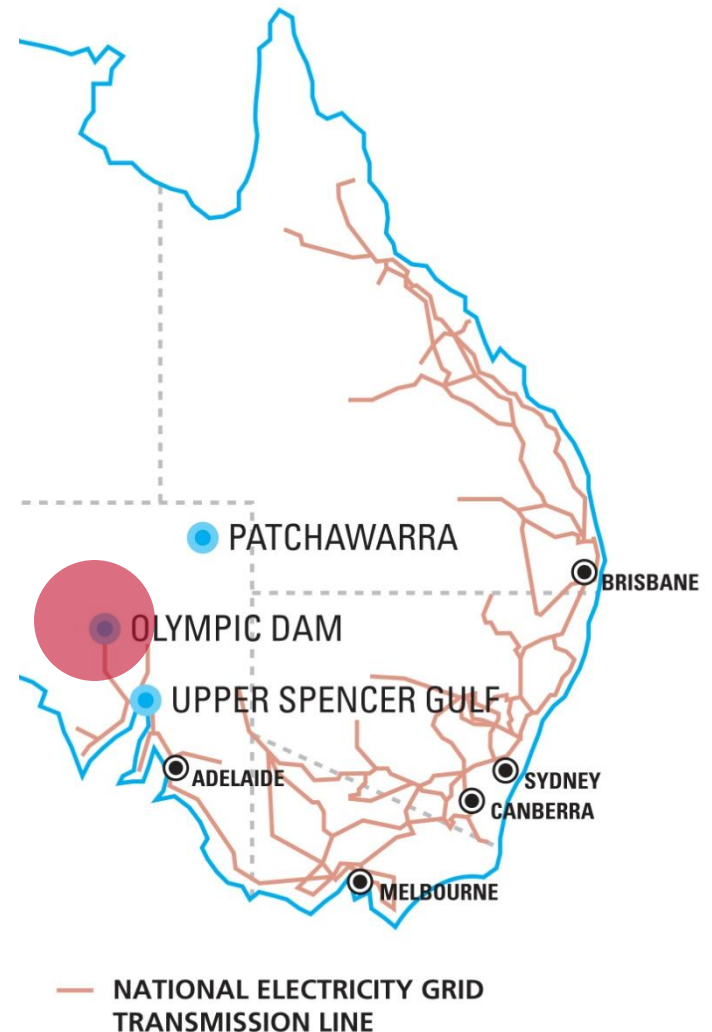


..... situated on a major heat anomaly

# Olympic Dam : the infrastructure



- ✓ **100% owned by GRK**
  - 2,899 sq kms licence area
  - Enormous energy potential
- ✓ **Proximity to national grid & major customer**
  - minimal transmission costs
    - 15km to power grid
    - 20km to mine site
- ✓ **Access to infrastructure**
  - airport, roads, engineering, labour force, medical, town services
- ✓ **Access to water supply**
  - Mine waste water
- ✓ **Enables staged development**



..... the optimum location

# Olympic Dam : the geothermal licences



- Geothermal Exploration Licenses (“GELs”) totalling 2,899 km<sup>2</sup>
  - enclosing BHP Billiton’s Olympic Dam mine and operations

- 100% owned by Green Rock Energy Limited

- Contains extensive massive hot granite proven by drilling

- Enormous in situ energy potential in excess of 400 MWe

- Next to a major customer (BHP Billiton) and the Australian national power grid

- Olympic Dam mine and operations presently consume 130 MWe

- BHP Billiton expansion plans require in excess of 500MWe

# Olympic Dam : extensive heat source



Temperature profiles obtained from numerous mineral drill holes in granitic batholith underlying platform sediments

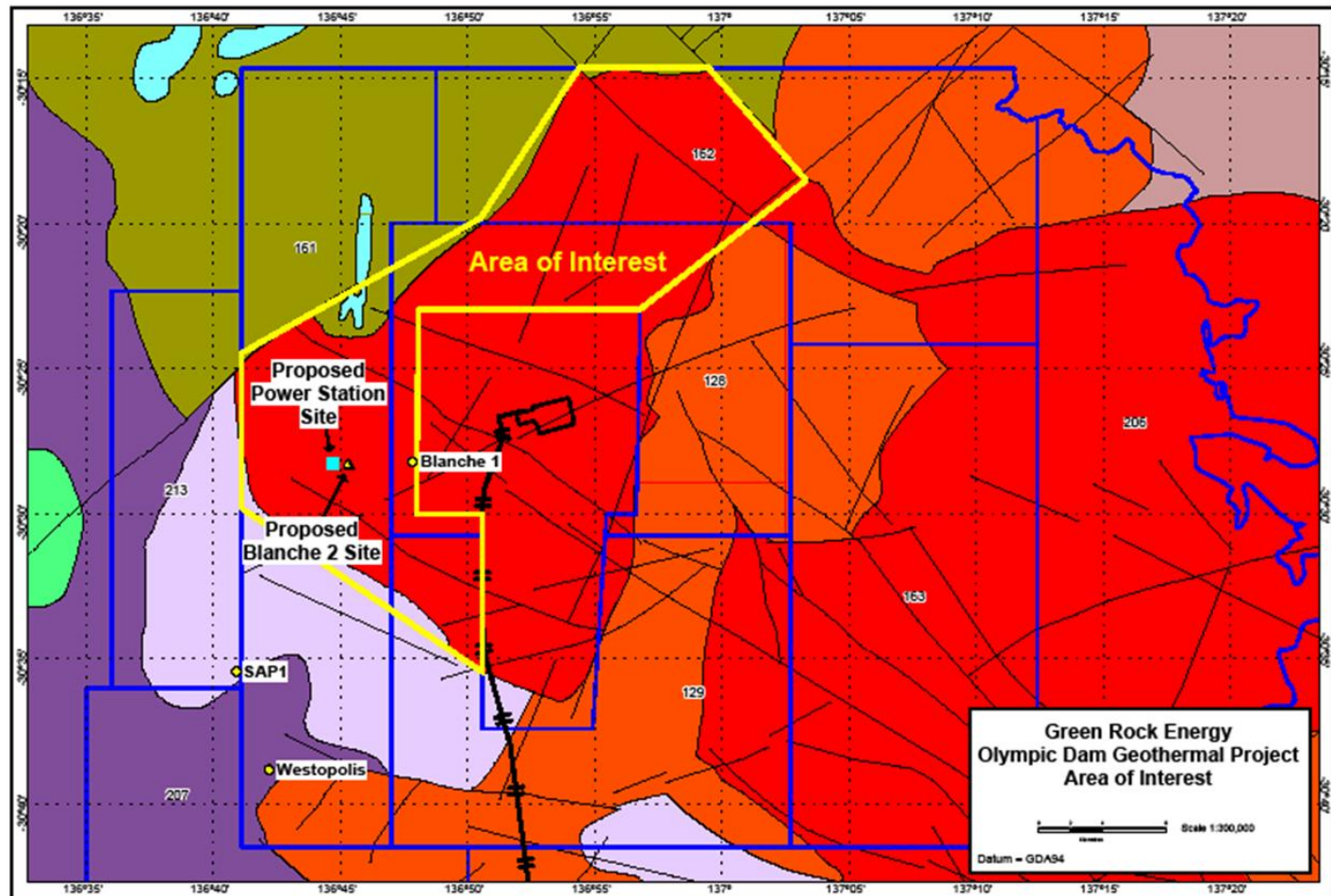
- Drilling shows an extensive volume of high heat flow Hiltaba Suite granites ( $118\text{mW/m}^2$  and  $125\text{mW/m}^2$  near the ore-body)

Initial area of focus is to the immediate west of the mine site

- Initial exploratory well (1.935 km deep) – Blanche No 1 (heat flow  $94\text{mW/m}^2$ )

- Other thermally anomalous granite within GELs could be targets for future development of geothermal energy

# Blanche: proposed initial development area



Hiltaba Suite Granites = red  
Donington Suite = orange

# Olympic Dam: progress and objectives



## Progress to date

- Blanche No 1 well drilled, cored & logged to 1,935 m into hot granite
- In-situ stress analysis – confirmed horizontal compressional stress
- Hydro-fracture testing – successfully opened fractures at expected operating pressures
- Well productivity capability (GeothermEx) – potential 5 to 7 MWe/well

**Objectives:** 400 MWe + of installed capacity

- Electricity Price (including RECs) \$100+/MWh
- Incremental development

# Blanche project site: high heat flow granite



High heat flow, coarsely crystalline, potassium rich granites cored in Blanche No 1 exploratory well:

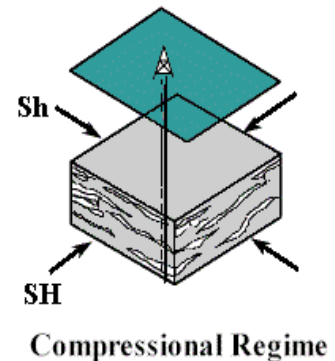
- Proven heat source - thermally anomalous Roxby Downs Granite –
  - Hiltaba Suite granite
  - average heat generation from the drilled section calculated at  $8.7\mu\text{W}/\text{m}^3$  and heat flow at  $94\text{ mW}/\text{m}^2 \pm 4.1\text{mW}/\text{m}^2$
- Temperature at 1,934 metres depth was  $85.4^\circ\text{C}$ , thermal gradient in measured section of granite is around  $30^\circ\text{C}/\text{km}$  depth
- Sedimentary platform cover sequence overlying high heat flow granites :
  - ranges from 720m thick at Blanche No 1 to 1,700 m deep 4km further to the west of Blanche No 1
  - maximum thermal gradient from the sedimentary sequence overlying granites in Blanche No 1 is in excess of  $60^\circ\text{C}/\text{km}$  depth

# Blanche: sub-surface stress

Analysis of the stress field in Blanche No 1 well from diamond drill core, acoustic televiewer images and hydraulic pressure testing shows:

- fractures in the granites have been successfully opened by the hydraulic injection
- the granites have high horizontal stresses with the minimum principal stress being the vertical stress
- fracture stimulation to generate an EGS reservoir at production depths is likely to generate sub-horizontal fracture sets in the hot granites, this means wells should be able to be spaced further apart
- the required operating pressures to open the fractures should be in the order of the minimum principal stress

$$S_H > S_h > S_V$$



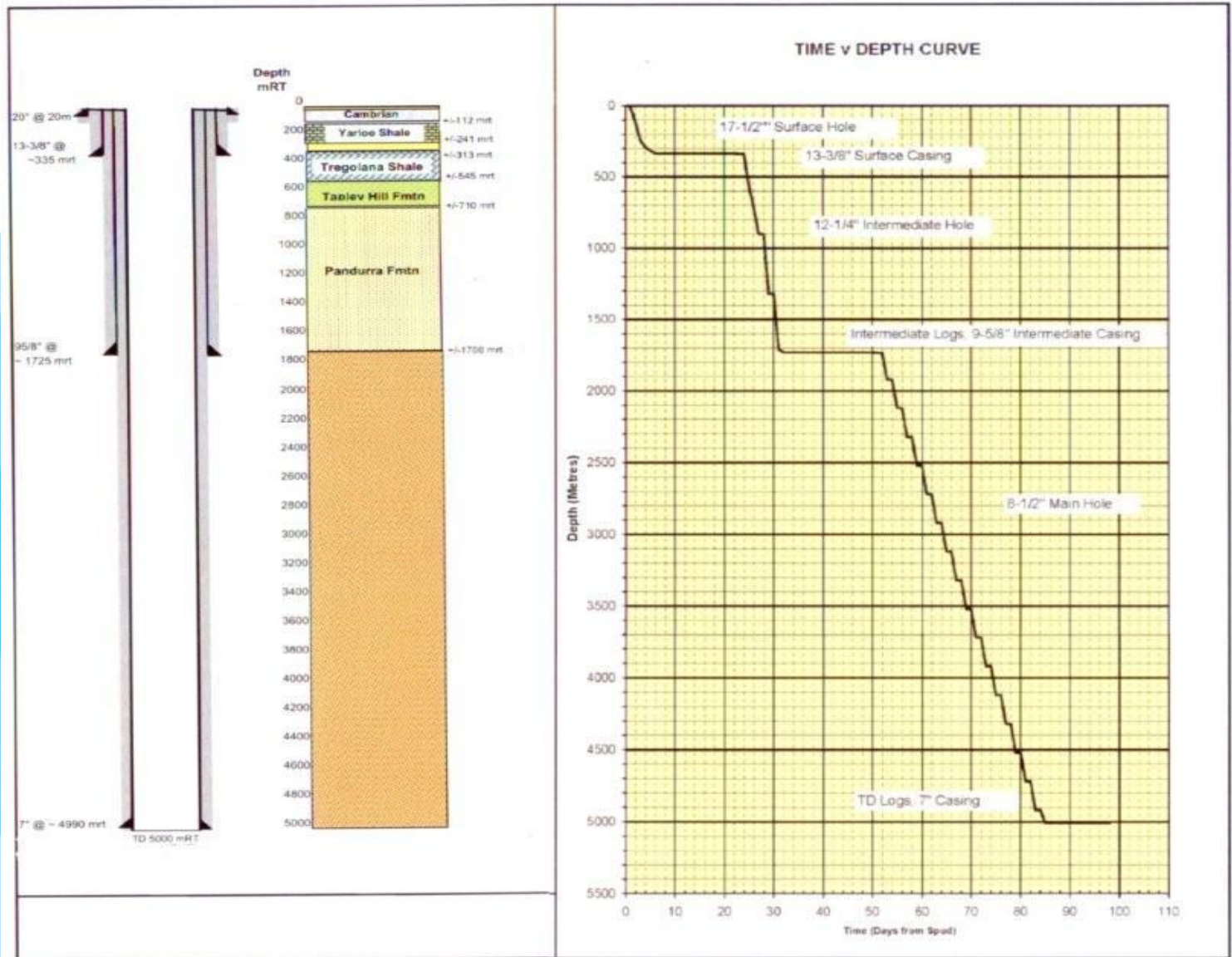
# Blanche project site: well productivity



An assessment of the potential per-well productivity by international geothermal consultant GeothermEx Inc., estimates the net power capacity of each production well could range up to 7.6MWe depending on flow rates

■ This assessment is currently being reviewed in light of the results of the hydraulic fracturing test work recently completed to determine the potential gross power output per well and parasitic power use for pumping to circulate water

# Blanche 2 : well design



# Olympic Dam : the next steps



| 2008                                                                | 2009                                                           | 2010                                          | 2012                                 | 2014                                                          | 2015                                                          | 2016                                                           | 2020                  |
|---------------------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------|--------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|-----------------------|
| VSP survey<br><br>Design<br>Proof-of-<br>Concept<br>work<br>program | Drill 1 <sup>st</sup> & 2 <sup>nd</sup><br>evaluation<br>wells | Order power<br>plant<br>(3-5 MWe)             | Commission<br>3-5 MWe<br>power plant | Commission<br>20 MWe<br>power plant<br>(cumulative<br>25 MWe) | Commission<br>25 MWe<br>power plant<br>(cumulative<br>50 MWe) | Commission<br>50 MWe<br>power plant<br>(cumulative<br>100 MWe) | Cumulative<br>400 MWe |
| Joint venture                                                       | Hydro-<br>fracture &<br>water<br>circulation<br>testing        | Commence<br>production<br>drilling<br>program |                                      |                                                               |                                                               |                                                                |                       |
| Contract<br>Drill Rig                                               | Complete<br>Proof-of-<br>Concept                               |                                               |                                      |                                                               |                                                               |                                                                |                       |

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