



The Innot Hot Springs Geothermal Project

Responding to North
Queensland's Energy Needs

Cairns Mining Conference
7th October 2011

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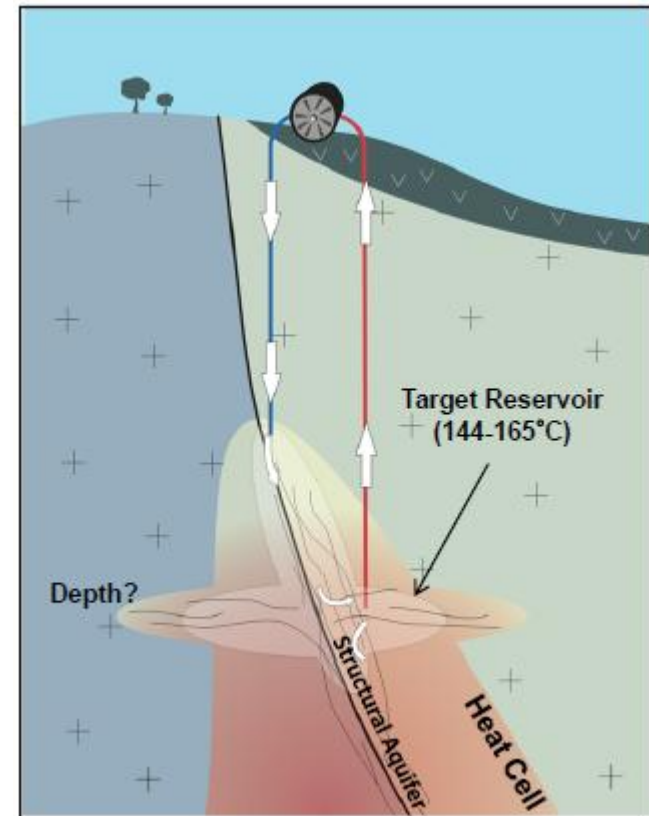
Who Are We?



- Planet Gas is an Australian Stock Exchange listed (ASX:PGS) energy company with interests in conventional oil and gas resources, coal bed methane (CBM), and geothermal energy.
- Strategic investor New Hope Corporation acquired 19.9% of Planet Gas during 2009, Rob Neale New Hope's CEO sits on Planet's Board.
- Alliance with Senex Energy through recent announcement of Joint Venture agreement in the Cooper Basin.
- Planet Gas Ltd current projects include the Innot geothermal tenement, near Cairns in Queensland.

What is Geothermal Energy?

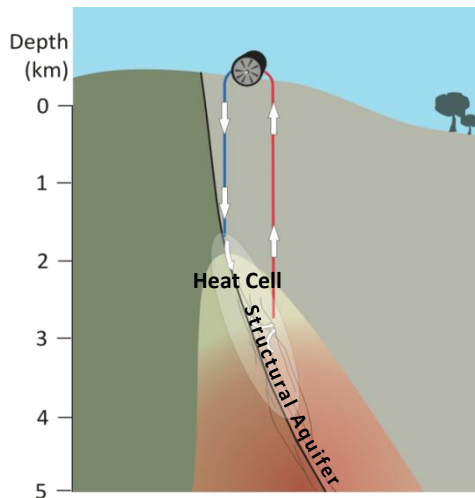
- Geothermal energy literally means –**heat from the Earth**.
- Heated water is brought to the surface and used to produce steam to drive turbines to produce electricity.
- Geothermal can provide zero-emission baseload power 24 hours a day, 7 days a week.
- **Geothermal is the only source of renewable energy that can replace baseload power generated by fossil fuels.**
- **Geothermal could be the most cost-effective renewable technology in the long-term*.**



*according to the Australian Bureau of Agricultural and Resource Economics (ABARE) 2010.

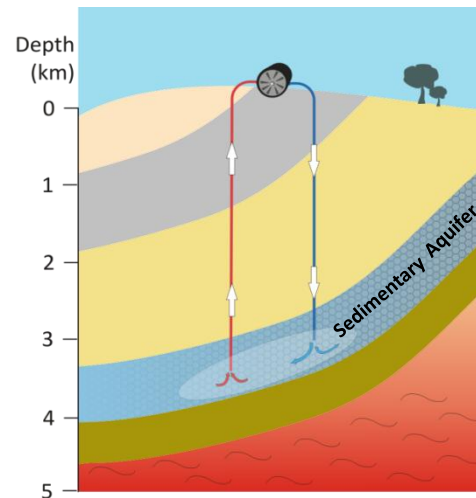
Geothermal Systems

Hot Fractured Aquifer (HFA)



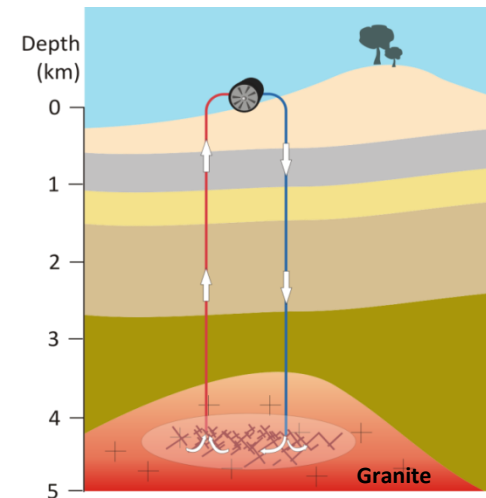
- Natural permeable reservoir due to fractures/faults
- Common geothermal system in active volcanic regions
- Low exploration and development costs
- Commercial plants in operation

Hot Sedimentary Aquifer (HSA)



- Natural reservoir within porous/permeable sedimentary rocks
- Common in oil/gas basins
- Low exploration and development costs
- Commercial plants in operation

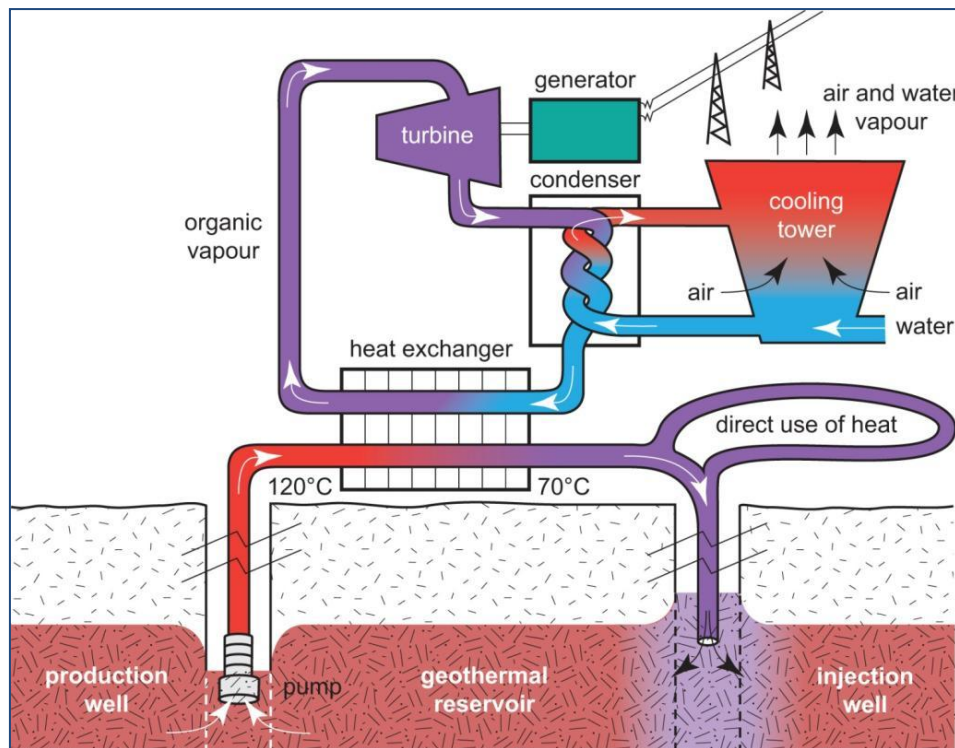
Enhanced Geothermal System EGS (HFR & HEWI)



- Poor natural reservoir requires enhancement
- Large worldwide potential resource base
- Increase exploration and development costs
- Demonstration plants in operation

Power Generation

Binary Power Plant



Additional Direct-Used benefits for regional industries:

- Space heating
- Cooling – using absorption chiller technology
- Spa complexes
- Greenhouse horticulture
- Aquaculture (fish, algae etc)
- Industrial processes

Global Geothermal Power



- The International Geothermal Association (IGA) has reported that 10,715 MW of installed geothermal capacity in 24 countries, generating 67,246 GWh of electricity in 2010.
- Geothermal industry in USA employed 25,000 people in 2008*. Of which 9000 are direct jobs involved in operating, construction and manufacturing and 16,000 indirect and supporting jobs.



Unterhaching, Germany

- Kalina Binary Power Plant (2009)
- 122°C reservoir water
- 3.36eMW facility;
38MW thermal energy
- Flow rate 150l/s
- Depth wells = 3,350m

Installed geothermal capacity (MW)

Australia	1.1
Austria	1.4
China	24
Costa Rica	166
El Salvador	204
Ethiopia	7.3
France	16
Germany	6.6
Guatemala	52
Iceland	573
Indonesia	1,197
Italy	843
Japan	536
Kenya	167
Mexico	958
New Zealand	628
Nicaragua	88
Papua-New Guinea	56
Philippines	1,904
Portugal	28
Russia	82
Thailand	0.3
Turkey	82
USA	3,093
Total	10,715 MW

*Geothermal Energy Association (GEA) 2008

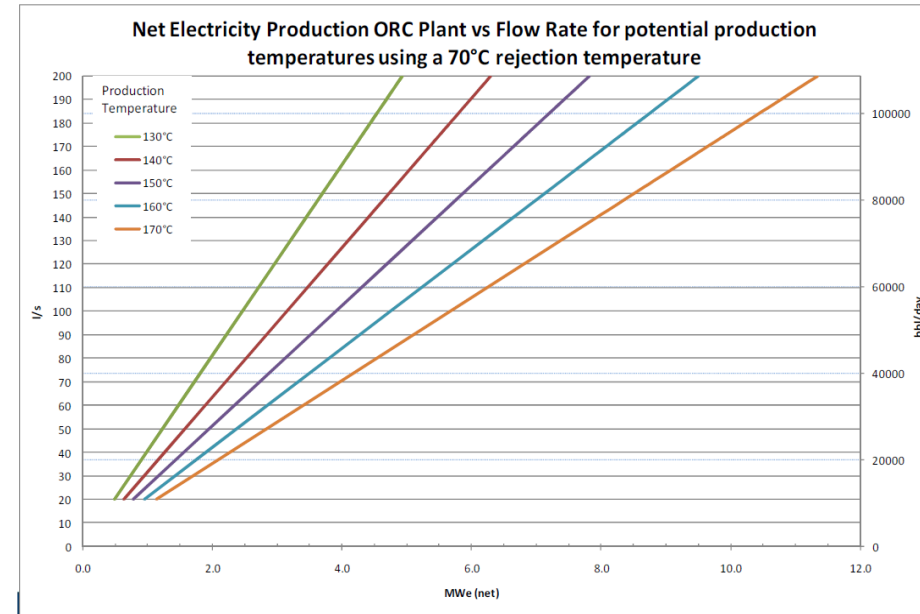
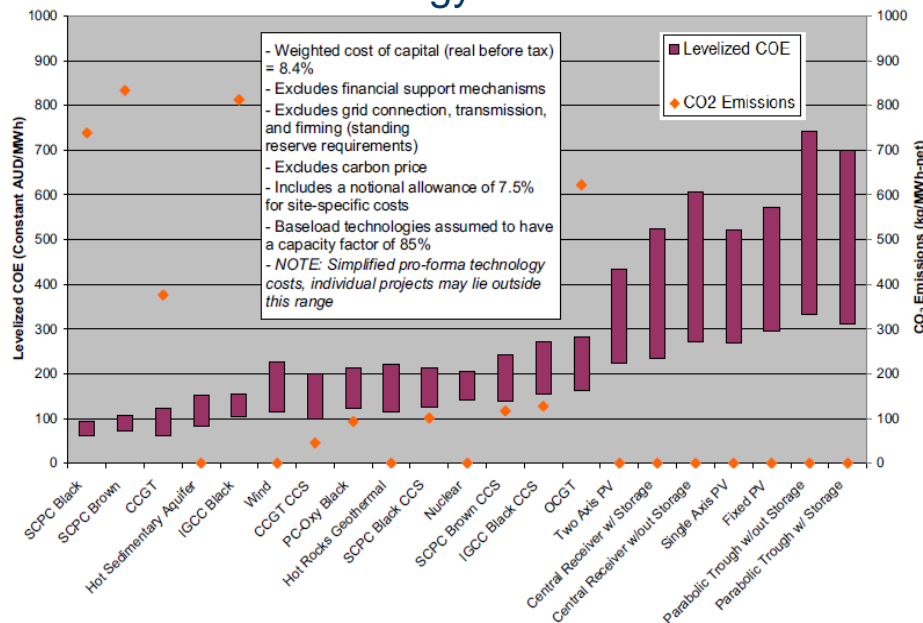
Geothermal Economics



Primary Cost Drivers:

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

Technology Cost 2015*



For off-the-shelf Organic Rankine Cycle power plant

Economics of Geothermal System can be clearly assessed but are very project specific – resource and location.

*Electric Power Research Institute (EPRI,2010)
For Department of Resources, Energy and Tourism, Australia

Why Queensland?



- Queensland has the fastest growing population of the Australian states with a 2.4% annual growth rate since 2000¹, and surpassed Victoria in 2008-09 to become Australia's second largest electricity consumer at 52,300GWh per annum².
- An estimated 2500MW (or over 9,000GWh)³ of additional renewable electricity generation is required to meet the 20% RET 2020 as set by the Queensland Government.
- Rising energy demand, particularly along the coast of Queensland, makes this a natural market where traditional high carbon base-load power supply can potentially be complemented with low carbon geothermal energy.

1. Australian Bureau of Statistics, Australian Demographic Statistics, Cat. no. 3101.0

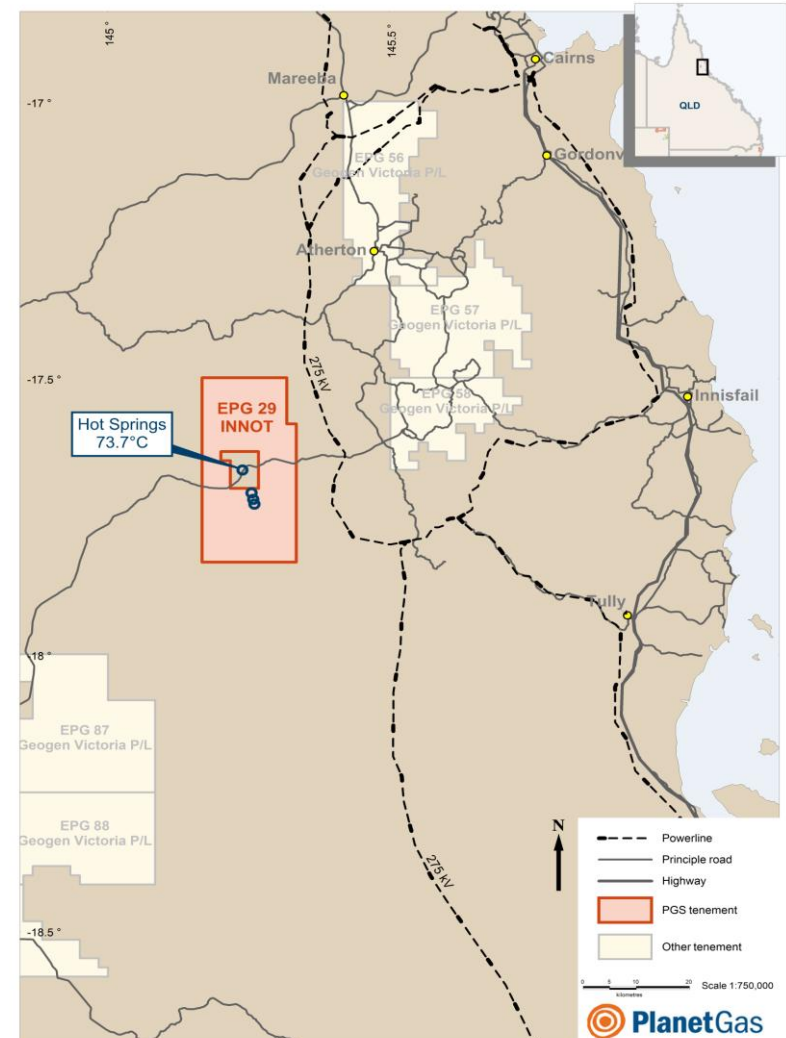
2. <http://www.aer.gov.au/content/index.phtml/tag/MarketSnapshotLongTermAnalysis/fromItemId/722740>

3. http://www.cleanenergy.qld.gov.au/queensland_renewable_energy_plan.cfm

Innot Geothermal Project



- After a competitive bid process with Department of Energy and Mines, Gradient Energy Ltd was awarded the Innot Geothermal Exploration Permit (EP29) on 1st May 2010 for five years.
- The Innot Geothermal project, covering 596km², is 100km from Cairn and 250km from Townsville, in northern Queensland.
- Hottest recorded spring temperatures in Australia 73.7°C*
- Excellent Infrastructure = project is situated only 10km from the 275 kVa power lines of the main east coast grid.
- Target natural high-flow permeable structural zones (HFA)
- Modelled temperatures of 137-200°C @ ~3000mRT
- Fluid temperature within the window of commercial power generation



Exploration

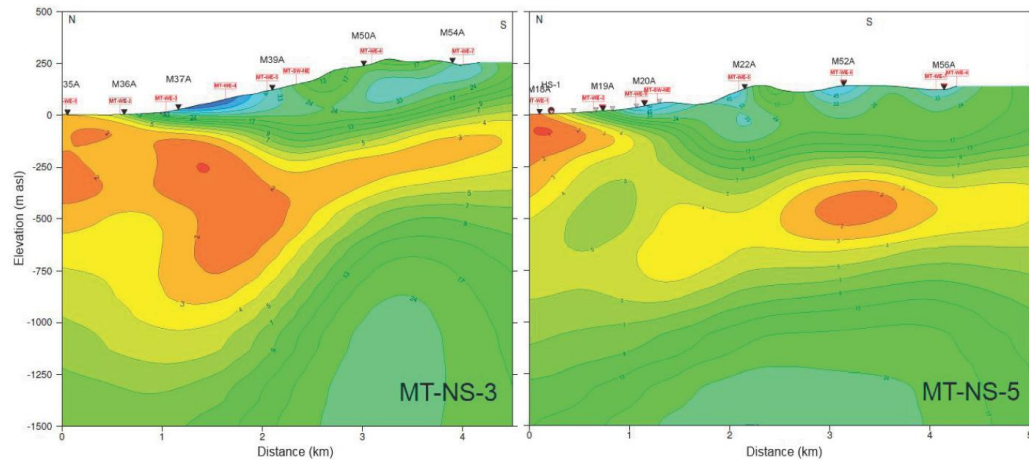


Various exploration techniques to understand the thermal regime of Innot licence area:

- Temperature logging of bores
- Thermal conductivity of sediment layers to depth of heat source
- Image and analyse granite/volcanics at depth (heat source)
- MT surveys
- Drilling to depth of heat source

Assess data for economic viability of geothermal power production in 2014-2115.

Total estimated expenditure
\$14 million (AUD) over five years.



KUTh Energy MT (2010) survey in of their Vanuatu
licence area

Thank you

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