SELECT COMMITTEE ON ELECTRICITY SUPPLY, DEMAND AND PRICES IN NEW SOUTH WALES

1) QUESTION:

The Hon. ADAM SEARLE: Do we have any handle on what the indicative costs of geothermal would be?

Professor O'KANE: The one done by, as it used to be called Geodynamics, now ReNu Energy, that demonstration plant did completely work. Right at the end of the program, I will take it on notice but I seem to remember it was around the order of $50 million or $60 million to get a demonstration plant going.

The Hon. ADAM SEARLE: What capacity did that plant have?

Professor O'KANE: I think it might have been a megawatt. Was it even that high? It was pretty low.

The Hon. ADAM SEARLE: If you could take that on notice that would be interesting. You made an

ANSWER: Australia has a strong history in geothermal research and development. In fact, for a time (~2010-14) it was leading the world in enhanced geothermal research. Now, however, there is practically no geothermal research being carried out in Australia.

There have been various government funding programs at the federal and state level that have supported geothermal research and development and industry projects. A report prepared for ARENA by the CSIRO Energy Flagship[1] in 2014 attempts to collate government grants provided for geothermal energy industry activity, including through the Geothermal Drilling Program, an initiative of what was then the Renewable Energy Committee. The table from Appendix A.1 of that report listing government grants is attached for the Committee's reference.

Another important project including researchers from many disciplines and organisations was led by what was then the Information Communications Technology (ICT) Research Centre of Excellence (NICTA) (now Data 61) with funding from the Emerging Renewables Program. The project was titled Data Fusion and Machine Learning for Geothermal Target Exploration and Characterisation and it received $1.9 million. The project collated a variety of data sources and used statistical methods to analyse the data and develop new software that allows better identification of the characteristics of potential sites to determine whether a site may be favourable for geothermal energy development. Should the Committee be interested, Data 61 could supply the 3D visualisation portal that was produced as part of this project.

The most advanced enhanced geothermal energy project in Australia was undertaken by Geodynamics Ltd (now ReNu Energy) in the Cooper Basin in South Australia. This project received a series of government grants over time and also attracted significant private investment. Geodynamics Ltd successfully commissioned a 1 MWe power plant which ran from April to October 2013. Geodynamics Ltd was originally allocated a $90 million grant from the Renewable Energy Demonstration Program specifically for the demonstration plant project, but only in the order of $32 million was used. ARENA indicates that the total project

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[1] Huddlestone-Holmes, C. (2014), *Geothermal Energy in Australia*, prepared by the CSIRO Energy Flagship for the ARENA International Geothermal Energy Group, retrieved from https://arena.gov.au/assets/2017/02/Geothermal-Energy-in-Australia.pdf

value was in the order of $144 million[2], with significant industry investment matching the government grants.

2) QUESTION:

The Hon. BEN FRANKLIN: On that issue, would you agree that the volume of information is important and the understandability of the information, particularly for consumers, is something that there could be more work done on?

Professor O'KANE: Absolutely. I also think the consumer bodies are good in this regard, Rosemary Sinclair's group—I forget the name.

The Hon. JOHN GRAHAM: Would you be happy to take that question on notice if there were additional thoughts you had afterwards?

Professor O'KANE: We have not done a lot on the retail side. I would be happy to take it on notice.

The Hon. JOHN GRAHAM: Or on the data?

Professor O'KANE: On the data information, very happy to talk. Would the Committee allow us—because you will be going for a few weeks—to comment in our second report, if we gave you a paper?

The CHAIR: About 25 weeks, to be exact.

Professor O'KANE: We will go longer than the normal notice period just to give you a good, comprehensive answer.

ANSWER: The Energy Security Taskforce Final Report is due to be submitted to the NSW Government in December 2017 and this issue is analysed as part of the Report. A copy of the Final Report will be provided to the Committee when it is submitted to the Government.

3) QUESTION:

Mr JEREMY BUCKINGHAM: You say this leveraging power is considerable. New South Wales government agencies own and operate facilities and infrastructure and use more than 1,800 gigawatt hours of electricity each year or around 2.6 per cent of electricity sales. What could the Government be doing to leverage that because my understanding is that the State does not purchase energy in a holistic way?

Professor O'KANE: Yes.

Mr JEREMY BUCKINGHAM: Should the State be doing that and what do you mean by "leveraging"?

Professor O'KANE: Exactly where we are going to come out on this is something we are determining at the moment for the Energy Security Taskforce second report so if we can take that on notice to answer that, along with that other question as we bring this down?

Mr JEREMY BUCKINGHAM: Yes.

ANSWER: The Energy Security Taskforce Final Report is due to be submitted to the NSW Government in December 2017 and the issue of demand management will be covered in the Report. A copy of the Final Report will be provided to the Committee when it is submitted to the Government.

In addition to the above, the Department of Planning & Environment (DPE) has done substantial work analysing the energy footprint of NSW Government agencies as part of its summer readiness work and the development of Code Warm protocols. This work is part of the Government's implementation of Recommendation 7 from the Energy Security Taskforce Initial Report. The Committee may wish to seek

[2] https://arena.gov.au/projects/cooper-basin-enhanced-geothermal-systems-heat-and-power-development/

information from DPE about its findings regarding NSW Government energy usage and energy purchasing procedures.

Attachment

Appendix A.1 from Huddlestone-Holmes, C. (2014), *Geothermal Energy in Australia*, prepared by the CSIRO Energy Flagship for the ARENA International Geothermal Energy Group, retrieved from https://arena.gov.au/assets/2017/02/Geothermal-Energy-in-Australia.pdf

A.1 Government Grants

Renewable Energy Equity Fund (REEF). The Renewable Energy Equity Fund is a venture capital fund established to increase Australian private investment in renewable energy and enabling technologies through the provision of equity finance. Approximately A$18 million of the available funding was provided via the Australian Greenhouse Office's REEF licence and approximately A$9 million is from private sources. The fund was announced in 2007 and established by AusIndustry in 2000. CVC REEF Ltd., part of The CVC Group, is licenced to manage the fund.

Renewable Energy Commercialisation Program (RECP). Administered by the Australian Greenhouse Office. The Renewable Energy Commercialisation Program (RECP) was launched in 1999 with $54 million in funding. The RECP was a five-year competitive grants program that sort to provide support for strategically important renewable energy technology initiatives that have strong commercial potential. Individual grants were usually between $100,000 and $1 million and grantees were required to fund at least 50% of the project costs from their own sources.

Strategic Assistance for Research and Development (R&D Start) Program. Administered by AusIndustry The R&D Start program was introduced in 1996 by the Federal government to assist Australian industry to undertake research and development and commercialisation. The program merged in to the Commercial Ready program in 2004. $1.3 bilion in industry grants were awarded during this time. Grants of up to $15 million were available and grantees were required to fund at least 50% of the project costs from their own sources.

Renewable Energy Development Initiative (REDI). Administered by AusIndustry, provided grants with matching funding from $50 000 up to a limit of $5 m for eligible renewable energy technology projects of up to three years in duration. The grant scheme was competitive and merit-based and aimed to support the development of new renewable energy technology products, processes or services that have strong early stage commercialisation and greenhouse gas emissions reduction potential. Project applications were invited from the solar, wind, geothermal, biomass, and hydro sectors and ocean energy harnessing technologies. The program ran from 2005 to 2008. Grantees were required to fund at least 50% of the project costs from their own sources

Greenhouse Gas Abatement Program GGAP. Administered by the Australian Greenhouse Office. GGAP was introduced in 1999 and ran until 2009. $400 million was allocated to the program, although the program was underspent. The program aimed at helping Australia meet its commitments under the Kyoto Protocol by funding the most cost-effective abatement opportunities across the economy as they arise.

The Plan for ACcelerating Exploration (PACE). Administered by the South Australian Department for Manufacturing, Innovation, Trade, Resources and Energy (DMITRE, previously PIRSA). The initiative was launched in April 2004 by the South Australian government and includes funding for collaborative exploration programs that will address critical uncertainties in mineral, petroleum and geothermal exploration, promoting South Australia as a premier destination for mineral and energy investment. Grantees were required to fund at least 50% of the project costs from their own sources Funding of $30.9 million from 2004 to 2011. **PACE 2020** is a $10.2 million expansion of the PACE initiative.

NSW Climate Change Fund Renewable Energy Development Program (CCFERD). Established by the New South Wales government, CCFERD supports renewable energy projects which will generate electricity or displace grid electricity use in NSW for stationary energy purposes.

Geothermal Drilling Program (GDP). The GDP was launched in August 2008 as a result of a commitment made during the 2007 federal election campaign. The program was administered by the Department of Resources, Energy and Tourism, then the Australian Centre for Renewable Energy, and now ARENA. The program

had $50,000,000 in available funds aimed at assisting the geothermal industry in overcoming the short-term barrier posed by high drilling costs to demonstration of proof-of-concept. The GDP was a competitive, merit-based grants program. Funding is capped at $7 million per proof-of-concept project and grantees were required to fund at least 50% of the project costs from their own sources. There were two rounds of funding (Round 1 in 2008/2009 and Round 2 in mid to late 2009).

South Australian Regional Development Infrastructure Fund (RDIF). RDIF makes available up to $3 million per year in grants to infrastructure projects in regional areas. The grants are awarded through a competitive merit-based application process.

Renewable Energy Demonstration Program (REDP). The REDP was launched in February 2009 and was administered by the Department of Resources, Energy and Tourism, then the Australian Centre for Renewable Energy, and now ARENA. The program had $435,000,000 in available funds aimed at supporting the commercialisation and deployment of renewable energy in Australia. The REDP was a competitive, merit-based grants program, with funding provided on the basis of the applicant providing at least two dollars for every dollar of grant funding.

Queensland Collaborative Drilling Initiative (CDI). The CDI is designed to stimulate exploration investment in under-explored parts of Queensland. The program co-funds the drilling costs of innovative exploration programs through grant rounds.

Education Investment Fund (EIF). EIF was announced in the 2008-09 Budget. The role of the EIF is to build a modern, productive, internationally competitive Australian economy by supporting world-leading, strategically-focused infrastructure investments that will transform Australian tertiary education and research. EIF had a sustainability round with applications accepted in September 2009.

Energy Technology Innovation Strategy (ETIS). Established by the Victorian Government, ETIS aims to accelerate a variety of pre-commercial energy technologies through research, development, demonstration and deployment stages, so that they are ready for market-uptake.

Low Energy Emissions Development (LEED) Fund. Established by the Western Australian Government and administered by the WA Department of Environment and Conservation. LEED provides financial support for the demonstration and commercialisation of innovative low greenhouse emissions energy technologies in Western Australia. LEED funding support of around $30 million has been invested in a range of projects. There have been four rounds of funding, with the successful applicants in the final round announced in June 2006. Every dollar of LEED funding is required to be matched by three dollars provided from other sources.

Western Australian Royalties for Regions funded, Exploration Incentive Scheme (EIS). The (EIS) is a Western Australian government initiative that aims to encourage exploration in Western Australia for the long-term sustainability of the State's resources sector. The $80 million initiative, funded by Royalties for Regions over five years, will stimulate increased private sector resource exploration and ultimately lead to new mineral and energy discoveries. Most of the activities in the EIS are focused in under-explored greenfield regions.

Emerging Renewables Program (ERP) The ERP was first established by ACRE and has since been expanded by ARENA. The aim of this program is to funds activities to support the development, demonstration and early stage deployment of renewable energy technologies with the potential to lower the cost, and thereby increase the supply, of renewable energy in Australia. The ERP has $215 million in funding available.

Grant Program	Matching Funding	Year	Recipient	Description	Amount	Amount Spent	Result
RECP	yes	2/1999	**Pacific Power/ANU**	**Validation of hot dry rock resources** **In the Hunter Valley, New South Wales.**	$790,000	$790,000	Drilling of heat flow wells, including one well to a depth of 1,946 m, a 19 km long seismic reflection line, a micro-gravity study and an assessment of the resource. Geodynamics Ltd. acquired this and two surrounding tenements soon after floating.
RECP	yes	2000	**Scope Energy Pty. Ltd. and UNSW**	**Hot dry rock geothermal reservoir development.** A project to evaluate the hot rock energy reservoir potential of the granite at the base of Big Lake 60 well.	$1,000,000	$1,000,000	Nothing Published, assumed to have been spent.
REEF	equity funding	2002	**Geodynamics Ltd.**	**Equity Investment in Geodynamics Ltd** Initial investment in 2001. $100k for 7% equity and made a number of follow on investments. Corner-stoned and partially under-wrote IPO (2002) and a number of subsequent capital raisings as required.	$1,800,000 ($1,200,000 govt share)	$1,800,000 ($1,200,000 govt share)	Assisted in initial floating of Geodynamics Ltd. and contributed equity for early operations near Innamincka. CVC REEF Ltd. exited Geodynamics on market in 2006, like a profit.
R&D Start	yes	2002	**Geodynamics Ltd.**	**Development of Hot Dry Rock Resources in the Cooper Basin.** Funding for field operations in the Cooper Basin (Innamincka)	$5,000,000	$5,000,000	Drilling of the Habanero 1 well.
R&D Start	yes	2003/2004	**Geodynamics Ltd.**	**Development of Hot Dry Rock Resources in the Coope r Basin** Funding for field operations in the Cooper Basin (Innamincka) in South Australia.	$1,500,000	$1,500,000	Top up of 2002 Start Program grant because of higher than anticipated costs of Habanero 1.
PACE 2	yes	4/2005	**Petratherm Ltd**	**Callabonna Geothermal and Petroleum Evaluation Well.** Funding to support the drilling of a geothermal evaluation well at Callabonna in South Australia.	$140,000	$140,000	The Yerila-1 was drilled in August 2005 to 693.5 metres. A botom hole temperature of 64°C was measured and the overall thermal gradient determined from the data is at least 68°C/km.

Grant Program	Matching Funding	Year	Recipient	Description	Amount	Amount Spent	Result
PACE 2	yes	4/2005	**Scopenergy Ltd**	**Limestone Coast Geothermal Project** **Drilling** Drilling of a heat flow well in the Otway Basin, near Beachport in South Australia.	$130,000	$130,000	Scopenergy drilled several heat flow wells in their tenement, GEL 173 and GEL 170. Also received a REDI grant for this project.
PACE 2	yes	4/2005	**Eden Energy Ltd**	**Evaluation and Interpretation of RIO at West Well.** Evaluation of existing data for geothermal resources based on the Radiogenic Iron Oxide model, near Witchellina in South Australia.	$21,000	$21,000	Unclear, expect that desktop study was completed and existing well may have been re-entered. No record of any drilling.
GGAP	yes	5/2005	**Geodynamics Power Systems (Subsidiary of Geodynamics Ltd.)**	**Commercialising the Kalina Cycle**. A project to demonstrate the Kalaina Cycle in a waste heat recovery project at the Mt Keith Nickel Plant. While the heat source is not geothermal, the Kalina Cycle is well suited to geothermal resources and this grant was awarded to a geothermal energy company.	$2,076,000	$0	Mt Keith Nickel Plant changed owners after the grant was awarded and before contractual terms could be agreed.
PACE 3	yes	12/2005	**Greenrock Energy Ltd.**	**Olympic Dam Geothermal Project, SA** Drilling of a second heat flow well near Olympic Dam in South Australia.	$68,000	$0	Project withdrawn.
PACE 3	yes	12/2005	**Havilah Resources Ltd. (Geothermal Resources Ltd.)**	**Curnamona Geothermal Project, SA.** For drilling several holes to around 500 metres to determine the subsurface heat flow across the Frome project area in South Australia.	$100,000	$100,000	Several shallow heat flow wells drilled. Also received a REDI grant from the federal government for the same project.
REDI	yes	12/2005	**Geodynamics Ltd**	**Innamincka Hot Fractured Rock Power Plant** For a project that integrates sustainable heat mining from a Hot Fractured Rock (HFR) geothermal reservoir to produce zero-emission electricity. The project comprises the construction and operation of a high efficiency Kalina cycle generation plant based on existing geothermal wells near Innamincka, SA.	$5,000,000	$4,261,568	Continued operations at Innamincka, including the drilling of the Habanero 2 well. Failed to complete the planned pilot power plant.

Grant Program	Matching Funding	Year	Recipient	Description	Amount	Amount Spent	Result
REDI	yes	12/2005	**Scopenergy Ltd.**	**Geothermal Power in the Limestone Coast** For a proof-of-concept project on the Limestone Coast which will lead to a 50 MW geothermal power plant. The project will better define prospects for more than 1000 MW of geothermal power in the region.	$3,982, 855	$3,982, 855	Developed a better understanding of the resource potential in the Otway Basin. Heat flow drilling
REDI	yes	7/2006	**Geothermal Resources Ltd.**	**Heat generating capacity of buried hot radiogenic granite** The project will seek to identify, and ultimately map, the composition of granites in the Curnamona Craton region of South Australia. It is anticipated the high uranium/thorium-bearing granites in this region will generate abundant heat. Once an understanding of the heat generating capability and thermal conductivity of the granites has been established, the heating capacity will be mapped in three dimensions for the purpose of assessing the geothermal energy potential.	$2,409,702	$2,409,702	Comprehensive program of activities completed, incuding seismic surveys and drilling 13 wells including a 1761 m and 1809 m well with bottom hole temperatures of over 90 °C.
REDI		12/2006	**Proactive Energy Developments Ltd.**	**A novel regenerator for adapting supercritical cycles to geothermal power applications.** The project aims to develop an innovative regenerator (heat exchanger) that makes possible the use of high efficiency Regenerative Supercritical cycles for production of low-cost zero-emission electricity from geothermal reservoirs.	$1,224,250	$0	No information other then the awarding of the grant available
PACE 4		12/2006	**Torrens Energy Ltd.**	**Heatflow Exploration in Adelaide Geosyncline** For exploration drilling in the Barossa-Clare Project, South Australia.	$100,000	$100,000	Several heat flow wells drilled in 2010.

Grant Program	Matching Funding	Year	Recipient	Description	Amount	Amount Spent	Result
PACE 4		12/2006	**Eden Energy Ltd.**	**Renmark (Chowilla) Geothermal Project, SA** For drilling of a geothermal well to acquire drill core and temperature measurements from within the Renmark Trough to confirm the anomalous heat flow status of the Renmark area, South Australia.	$100,000	$100,000	Chowilla 1 well drilled to a depth of 515 m in December 2007. Results of temperature logging were disappointing.
PACE 4		12/2006	**Geodynamics Ltd.**	**High Temperature Borehole Image logging of Habanero 3, Cooper Basin, SA** Funding to bring to Australia a US Government (Sandia Laboratories) high temperature image logging tool to be run in Habanero .3	$100,000	$100,000	Project completed.
REDI	yes	2/2007	**Petratherm Ltd.**	**Testing the HEWI model at the Paralana Geothermal Energy Project.** The grant funds have been offered to Petratherm to develop the next stage of its Paralana Geothermal Energy Project, 130 kilometres east of Leigh Creek. This will involve the creation of an underground heat exchanger within the insulating rocks above the granite heat source, that is, Petratherm's HEWI Model (Heat Exchanger Within Insulator) and will require the drilling of two wells and establishing circulation of water between those wells.	$5,000,000	$5,000,000	Contributed to the drilling of the Paralana 2 well and stimulation activities.
REDI	yes	8/2007	**Torrens Energy Ltd.**	**3D Temperature Field Data Collection and Modeling** Funds will be used to accelerate exploration drilling and temperature modelling to reduce risk by mapping heat flow over highly prospective geothermal targets in South Australia	$3,000,000	$3,000,000	Conducted extensive heat flow drilling program including one well to 1,807 m depth that has helped to define the Parachilna resource.

Grant Program	Matching Funding	Year	Recipient	Description	Amount	Amount Spent	Result
PACE 5	yes	2/2008	**Petratherm Ltd.**	**Trial of a New Method of Resource Mapping at the Paralana Project** Passive seismic monitoring to map fractures at depth using shear wave splitting.	$100,000	$100,000	Seismic array installed and, although insufficient seismic events were detected to allow the analysis of shear-wave splitting as an exploration tool, the study was deemed to have been a technical and operational success, allowing background seismicity to be determined.
PACE 5	yes	2/2008	**Torrens Energy Ltd.**	**3D Temperature Field Data Collection and Modeling** Funds will be used to accelerate exploration drilling and temperature modelling to reduce risk by mapping heat flow over highly prospective geothermal targets in South Australia	$100,000	$100,000	Two 2D Seismic lines collected at the Paralchina prospect in 2009.
CCFERD	yes	11/2008	**Geodynamics Ltd.**	**Hunter Valley Geothermal Power Project.** **Th**e first commercial hot rock geothermal energy project in NSW, which will draw geothermal energy from hot rocks with estimated temperatures above 200°C at depths of 4000–5000 metres. Deep wells will feed a 10 MW binary cycle power station that will generate approximately 80 gigawatt hours of zero emission baseload power a year for at least 30 years. The project will demonstrate the potential of the Hunter Valley hot rock resources and pave the way for expansion to a 50 MW plant.	$10,000,000	$0	Project withdrawn. Geodynamics Ltd. have focused on their Cooper Basin activities.
GDP (Round 1)	yes	4/2009	**Petratherm Ltd.**	**Paralana Project.** Contribute to the costs associated with drilling a doublet for proof of concept at the Paralana Geothermal Project.	$7,000,000	$4,200,000	Paralana 2 well completed in 2009. The remaining $2.8 was relinquished in 2013 in conjuction with the award of an Emerging Renewables Program grant.

Grant Program	Matching Funding	Year	Recipient	Description	Amount	Amount Spent	Result
GDP (Round 1)	yes	4/2009	**Panax Ltd.**	**Penola Project.** Contribute to the cost associated with drilling a single production well at the Penola Geothermal Project.	$7,000,000	$7,000,000	Salamander 1 well completed in 2010. Disappointing flow test results have lead to the project being suspended.
RDIF	yes	4/2009	**Geodynamics Ltd.**	**Innamincka Project** Funding for the construction of a power line from the Habaenero site to Innamincka.	$560,000	$560,000	Project completed.
REDP	yes	11/2009	**Geodynamics Ltd.**	**Cooper Basin Geothermal Demonstration Project.** The 25 MW Cooper Basin Geothermal Energy Project aims to demonstrate the potential of hot-rock geothermal energy. The total cost of the project is $338.6 million.	$90,000,000	$32,400,000	Geodynamics Ltd. ran their 1 MWe pilot plant in 2013, achieving an important milestone in their REDP grant
REDP	yes	11/2009	**Petratherm Ltd.**	**Paralana Geothermal Energy Project** The 30 MW Paralana Geothermal Energy Project is an engineered geothermal system project based on Petratherm;s Heat Exchanger Within Insulator model. The total cost of the project was $188.3 million.	*$62,760,000* original grant **$24,500,000** (re-scoped grant in 2013)	$0	This project was re-scoped in 2013 in conjuction with the award of an Emerging Renewables Program grant for the drilling of the Paralana 3 well. The project is now for a 7 MWe plant with two additional wells with a total cost of around $75 million
ETIS	yes	12/2009	**Greenearth Energy Ltd.**	**Geelong Geothermal Project** $25 million for Stage 1 (Proof of Concept, $5 million) and Stage 2 (12 MWe Demonstration, $20 million) for the company's flagship domestic project , the Geelong Geothermal Power Project located northwest of the township of Anglesea Victoria.	$25,000,000	$0	Grant relinquished – unable to raise remaining funding.
GDP (Round 2)	yes	12/2009	**Hot Rock Ltd.**	**Koroit Project.** Contribute to the costs associated with drilling a doublet for proof of concept at the Paralana Geothermal Project.	$7,000,000	$0	Grant relinquished – unable to raise remaining funding.

Grant Program	Matching Funding	Year	Recipient	Description	Amount	Amount Spent	Result
GDP (Round 2)	yes	12/2009	**Geodynamics Ltd.**	**Hunter Valley Project.** Contribute to the costs associated with drilling a doublet for proof of concept at the Hunter Valley Geothermal Project.	$7,000,000	$0	Grant relinquished.
GDP (Round 2)	yes	12/2009	**Torrens Energy Ltd.**	**Parchilna Project.** Contribute to the costs associated with drilling a doublet for proof of concept at the **Parchilna** Geothermal Project.	$7,000,000	$0	Grant relinquished – unable to raise remaining funding.
GDP (Round 2)	yes	12/2009	**Green Rock Energy Ltd.**	**Perth Metro Project.** Contribute to the costs associated with drilling a doublet for proof of concept at theUniversity of Western Australia District Heating/Cooling Project.	$7,000,000	$0	Grant relinquished – unable to raise remaining funding.
GDP (Round 2)	yes	12/2009	**Greenearth Energy Ltd.**	**Geelong Project.** Contribute to the costs associated with drilling a doublet for proof of concept at the Geelong Geothermal Project.	$7,000,000	$0	Grant relinquished – unable to raise remaining funding.
Queensland Renewables Program	yes	2009	**Ergon Energy Ltd.**	**Upgrade of Birdsville Geothermal Power Station** A one off grant to upgrade the Birdsville Geothermal Power station.	$4,300,000	$0	Project did not progress after a tender process failed to find suitable technology..
CDI	yes	3/2010	**Geodynamics Ltd.**	**Queensland Cooper Basin Project** Funding for heat flow drilling.	$150,000	$0	Project withdrawn
PACE 6	yes	5/2010	**Gradient Energy Ltd. (Planet Gas Ltd.)**	**Leigh Creek Temperature Anomaly Study.** Funding for an innovative systematic geothermal exploration program which was aimed at identifying and mapping the surface expression of deep Hot Fractured Aquifer (HFA) geothermal systems using satellite thermal imagery, satellite alteration mapping and surface/near surface water geochemistry within its Leigh Creek Project.	$80,000	$80,000	Due to the difficult economic climate within the geothermal sector in 2010-2011, only some of the originally proposed project analysis covered by the PACE Grant could be completed, and no field activities were done.

Grant Program	Matching Funding	Year	Recipient	Description	Amount	Amount Spent	Result
PACE 6	yes	5/2010	**Terratherma Ltd** **(subsidiary of Eden Energy Ltd.)**	**Coorichina, Torrens Hinge Zone.** Exploration activities north of Olympic Dam	$40,000	$0	Eden Energy Ltd. exited Geothermal Exploration in 2011. Grant relinquished.
EIF Sustainability Round	no	6/2010	**CSIRO**	**Sustainable Energy for the Square Kilometer Array – Geothermal Component.** This project was originally intended to provide cooling power for a supercomputer in Perth by accessing hot water from a HSA at 3 km and using it in an absorption chiller. This grant could arguably be considered as R&D support. As it was essentially funding for a demonstration project is included as a grant to 'industry'.	$19,800,000	$6,100,000	Rising costs and other commercial risks along with a decrease in the cooling needs of the supercomputer led this project to be substantially re-scoped. The cooling is now provided by heat rejection in to a shallow aquifer, and the project costs have reduced to around $6.1 million. The remaining funding has been relinquished.
LEED (Round 3)	yes	9/2010	**Greenrock Energy Ltd.**	**Perth Metro Project.** Contribute to the costs associated with drilling a doublet for proof of concept at theUniversity of Western Australia District Heating/Cooling Project. Complimented GDP grant.	$5,400,000	$0	Grant relinquished – unable to raise remaining funding.
LEED (Round 4)	yes	6/2012	**Greenrock Energy Ltd.**	**Mid West Geothermal Power Project.** Proof of concept project in the North Perth Basin.	$5,380,000	$0	Additional funding currently being sought, including ARENA Emerging Renewables Program Project funding. JV partner secured.
EIS	yes	6/2012	**Greenpower Energy Ltd.**	**Esperance Geothermal Project** Funding will be used for the completion of two drill holes to 400 m one each in Greenpower's GEP38 and GEP39 tenements.	$120,000	$120,000	One heat flow well was drilled to 400 m. No anomalous heat flow found and the leases were relinquished.

Grant Program	Matching Funding	Year	Recipient	Description	Amount	Amount Spent	Result
ERP Project	yes	6/2013	**Petratherm Ltd.**	**Paralana Project** Funding to assist the next stage of works at Paralana, including the drilling and stimulation of the Paralana 3 well - a producer well into the hot rock reservoir created around the existing Paralana 2 well, as part of an applied research project into the site's commercial potential.	$13,000,000	$0	A condition of this grant is that Petratherm secures an additional $5 million in equity within 6 months of the grant date. The company has not announced whether this has been achieved.
Totals					**$315,348,952**	**$76,112,270**	
				Allocated, unspent and still available	**$100,480,000**		