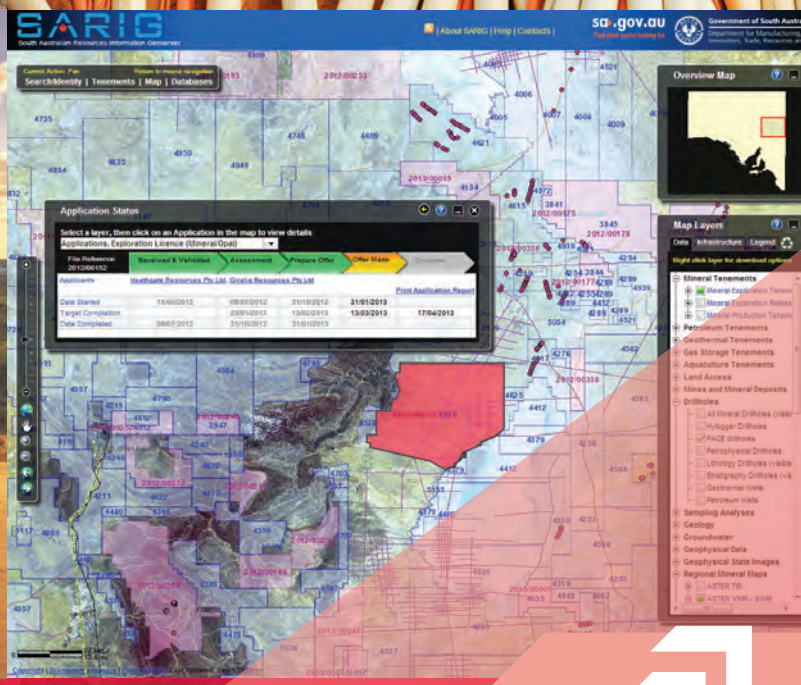


DELIVERING RESULTS

PACE 2020
Progress Report 2010–12

www.minerals.dmitre.sa.gov.au/pace2020

Government of South Australia
Department for Manufacturing, Innovation, Trade, Resources and Energy

SOUTH AUSTRALIA

PACE 2020 exploration mining energy global

RB 2013/1

PACE Exploration
PACE Mining
PACE Energy
PACE Global

PACE 2020

PACE 2020 has been the driving force behind growth in the mining sector in South Australia. It has been leveraging existing successes in exploration, focusing on new areas for exploration, and developing best practice mine development processes.

PACE 2020 also builds on our world-class service to the mining sector by providing even more online geological and geophysical information, to support the industry in exploration. The initiative has a direct line of sight through the resources value chain, working to streamline the process of exploration to mine development, ensuring a timely and transparent approval process.

PACE 2020 consists of four key components:
***PACE* Exploration**
***PACE* Mining**
***PACE* Energy**
***PACE* Global**

***PACE* Exploration** is designed to maintain and increase mineral exploration activity, using the same mechanisms that proved successful in the original *PACE* initiative. It continues to offer collaborative opportunities between government and industry through *PACE* Discovery Drilling, *PACE* Targeting and *PACE* Geochronology.

The commitment to major regional geophysical programs, data collection and information delivery also continues under *PACE* Exploration.

***PACE* Mining** addresses the next step of the mining development process, by streamlining the process from minerals exploration to mine development. The Government has committed to a target of a six-month turnaround time for mine lease assessment and approval. *PACE* Mining will allow us to meet this commitment, by providing improved online application systems and tracking capability, to further streamline the mining approval process.

Through *PACE* Mining, the Mineral Resources Division of the Department for Manufacturing, Innovation, Trade, Resources and Energy (DMITRE) has partnered with the Department of Environment, Water and Natural Resources (DEWNR) and the Goyder Institute for Water Research, to enhance the understanding of South Australia's groundwater resources and assist mining companies to identify supplies for their mining projects.

***PACE* Energy** brings together a series of projects, collaborative programs and sponsorships to support South Australian energy explorers and researchers. *PACE* Energy is built on a strong foundation of partnership with projects and programs linking to new, contemporary national and international geothermal research efforts, including Geoscience Australia's new unconventional gas initiative.

***PACE* Global** continually delivers new exploration data online to resource companies and investors worldwide. It provides online delivery of all geoscientific data, including new and historical data. By improving our data delivery to industry, we will maintain our competitive advantage in attracting exploration investment and remain one of the world's most competitive jurisdictions for mining investment.

Contents

PACE 2020

Executive Summary

The Plan for Accelerating Exploration (*PACE*) was launched in April 2004 (2004–2009; $22.5M) and quickly gained worldwide recognition as one of the most innovative government mineral resources initiatives. *PACE* was also quick to attract the support of local industry and in April 2007 *PACE* was extended by two years bringing its total value to $30.9 million over seven years.

PACE builds upon the successes of previous government initiatives adopting the core principals of economic stimulation, accessibility to land, development of sustainable exploration and mining, and increasing cultural awareness. It has directly contributed to the impressive surge in the South Australian mining and exploration sector and the identification of many new mineral deposits such as the world class Carrapateena ore body.

In 2010, the Government released *Mining in South Australia Policy* of which the cornerstone was a $10.2 million expansion of the *PACE* Initiative. The new *PACE* initiative – *PACE* 2020 – leverages the success of *PACE* and is a key component in achieving South Australia's State Strategic Plan targets and other key priorities:

- Exploration expenditure in SA to be maintained in excess of $200 million per annum until 2015; and,
- Increase the value of minerals production and processing to $10 billion by 2020.

PACE 2020 is closely aligned with meeting, maintaining and exceeding the challenging key mineral exploration and production targets set out by the State Government. *PACE* 2020 directly supports and influences: innovative geoscience projects and the delivery of new pre-competitive data; best practice policy development and streamlining mining approvals; collaborative programs with the industry, universities and other government agencies; and the global promotion of South Australia's mineral wealth.

Over the first two years of *PACE* 2020, the spending on mineral exploration in South Australia hit a post-GFC (Global Financial Crisis) high in 2011/12, confirming that South Australia remains a major destination for investment in exploration across a wide range of minerals. *PACE* 2020's suite of collaborative programs, continual delivery of precompetitive geoscientific data and persistence in global marketing has been instrumental in returning exploration expenditure to well over $300 million a year.

The Australian Bureau of Statistics figures show spending on mineral exploration in South Australia rose to $328.4 million in the 12 months to the end of June 2012, up 28.9% compared with the same 12-month period in 2011. Combined spending on mineral and petroleum exploration in South Australia during the same period

exceeded $500 million – only the second time this milestone has been reached. This impressive rate of growth reaffirms South Australia's reputation as the next great mining and energy frontier.

The launch of SARIG 2020 (South Australian Resources Information Geoserver) has brought about a new era of data delivery and online business. SARIG 2020 is currently delivering its most diverse range of geoscientific data, information and products to the exploration and mining community, and companies are now utilising new online systems for more streamlined business interactions. Potential investors also now rely on SARIG 2020 as a key information source, accessing new state infrastructure, production statistics, and mining and exploration project information.

The independent Fraser Institute Annual Survey of global mining companies[1] currently ranks South Australia as No. 1 in the world against all other mining jurisdictions, in the category of "Geological Database". SARIG 2020 is a key element in maintaining South Australia's international reputation for online world class geoscientific information.

The South Australian Government has capitalised on its promotion of the State's prospectivity through *PACE* 2020 by attracting several new international and national exploration and mining companies to the State, and has seen the brokering of new strategic partnerships with Canada, China, India and Chile.

This report highlights in greater detail the key *PACE* 2020 outcomes and milestones delivered to the State between 2010 and 2012.

1 Fraser Institute Annual Survey of Mining Companies 2010/2011

1

PACE 2020 Structure

Pathways to Discovery

- New statewide and regional datasets
- New geophysics and spectral data
- Multi-element reanalysis of historic calcrete samples

Pathways to Prospectivity

- Multidisciplinary mineral systems analysis
- Multidisciplinary approach with mineral systems focus

Innovation through Integration

- Unique and innovative products and data delivered through SARIG 2020
- 3D modelling of mineral systems and prospective terranes

PACE exploration

PACE Partnerships

- *PACE* Targeting – geophysical surveying
- *PACE* Discovery Drilling – exploration drilling
- *PACE* Geochronology – mineral systems dating

PA

SA Geothermal

- Partnership with South Australian Centre for Geothermal Energy Research
- Precompetitive data, state prospectivity model and reservoir modelling
- Research into enhanced (engineered) geothermal systems (EGS) and hot sedimentary aquifer (HSA) systems

PACE energy

Unconventional Gas Resources

- Investigation of South Australia's unconventional gas potential
- Research into factors affecting productivity in unconventional reservoirs

CO2CRC

- Support for the Cooperative Research Centre for Greenhouse Gas Technologies (CO2CRC), Australian School of Petroleum, University of Adelaide
- Research into carbon capture and storage methods and technologies

Discovery to Development

- Six-month target approvals for mining lease assessment
- Online tenement applications, tracking, management and reporting

Next Generation Policy

- World's best practice in resources industry regulation and management
- Next generation suite of industry policies and guidelines

PACE mining

Water for Mining

- Partnerships with key agencies and industry to address water issues
- Mapping the state's groundwater systems

Communities

- Community engagement strategy and toolkits for industry
- Continuing support for regional and remote communities

CE 2020

Data Pathways

- Launch and expansion of SARIG 2020
- National Virtual Core Library online
- Digitising of historic company reporting

PACE global

Building Awareness

- Linking investors with explorers
- Fostering greater awareness of the resources sector
- South Australian Minerals and Petroleum Expert Group (SAMPEG) ambassadors

South Australian Resources Analysis

- Triple bottom line Minerals ScoreCard
- South Australian minerals industry annual review

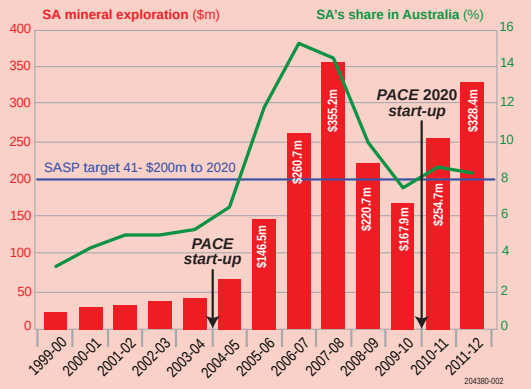
2 Top 50 outcomes and deliverables 2010–12

PACE 2020

Outcomes

Combined spending on mineral and petroleum exploration for 2011–12 exceeded $500 million in South Australia — only the second time this milestone has been reached.

Private mineral exploration expenditure



PACE exploration

Pathways to Prospectivity

1. New Tieyon 1:100K map sheet and data
2. New Mulyungarie 1:100K map sheet and data
3. New Marree 1:250K map sheet and explanatory notes
4. 1st Edition 1:2M Statewide Regolith Map and data package
5. Callabonna 1:250K explanatory notes

Pathways to Discovery

6. New Statewide Gravity Map
7. Statewide Hydrogeochemical Survey (100+ analyses)
8. Statewide ASTER coverage (16 new layers)
9. Mount Woodroffe HyMap mineral maps (9 datasets and report)
10. Multi-element Calcrete Reanalysis (15,400+ samples)
11. Cariewerloo Basin AEM data, 3D Model and data package

Innovation through Integration

12. New 3D models (inc. Gawler Craton Depth to Basement; Eastern Gawler IOCG Cover)
13. 2nd Edition 1:2M Statewide Palaeochannel Map and data package
14. New Uranium Map and SA Uranium Systems Report Book
15. Frome AEM Regional Survey (Geoscience Australia (GA) led Partnership)
16. Gawler Craton MT workshop and online delivery

Partnerships

17. *PACE* Discovery Drilling 2010 (complete) and 2012 (in progress)
18. New collaborative geophysics (*PACE* Targeting) and geochronology (*PACE* Geochronology)
19. *PACE* Geochronology 2010 and 2012 Report Books
20. Establishment of DET CRC Drilling Centre at Brukunga
21. New geoscientific partnership with China National Nuclear Coorporation (CNNC), and Saskatchewan Government, Canada

** Deliverables available at www.minerals.dmitre.sa.gov.au/pace2020*

PACE mining

Discovery to Development

22. Process Mapping and Optimisation Program (59 licensing and regulation processes)
23. Compilation of the Online Tracking of Exploration Licence Applications

Next Generation Policy

24. Multiple Land Use Framework (MLUF)
25. Assessment of South Australian mining regulatory framework (internal)
26. South Australian Rehabilitation Liability Calculator

Water and Mining

27. Goyder Institute for Water Research Collaboration
28. DMITRE/DEWNR Partnership to streamline assessment, permitting and licensing processes

Communities

29. Community Engagement Framework Situation Analysis and Engagement Strategy (internal)
30. Regional Development Australia Far North (RDAFN) Indigenous Mining Employee Mentor program
31. APY Exploration and Mining Liaison Officer position

PACE energy

SA Geothermal

32. $500,000 research funding to the South Australian Centre for Geothermal Energy Research (SACGER)

Unconventional Gas Resources

33. Cooper Basin Atlas
34. Research funding of $50,000 per annum to the Geofrac Consortium at the University of Adelaide (2012–14)
35. Research funding of $50,000 per annum to the ARC Linkage Project at the University of Adelaide (2012–14)

CO2CRC

36. Commitment of $50,000 per annum to the CO2CRC (2010–15)

PACE global

Data Pathways

37. Launch of SARIG 2020
38. Seismic lines with SEG-Y images on SARIG 2020 (including links to approximately 35,000 new records)
39. New Electrical Survey Map Layer (900+ reports)
40. New Petrophysical Data layer (1600+ records)
41. New Mines and Mineral Deposits Map Layer (Project status, statistics, company links)
42. New RESIC Infrastructure Data on SARIG 2020 (26 Map Layers)
43. Delivery of the Online Tracking of Exploration Licence Applications
44. Auto-population of SARIG 2020 forms and registration of online applications in tenement systems.

South Australian Resources Analysis

45. South Australian Mining Project Application (SAMPA) delivered through SARIG 2020
46. South Australian Mineral Exploration Review (2011–12)
47. Social Assessment Study (internal)
48. South Australian Copper Review (internal)

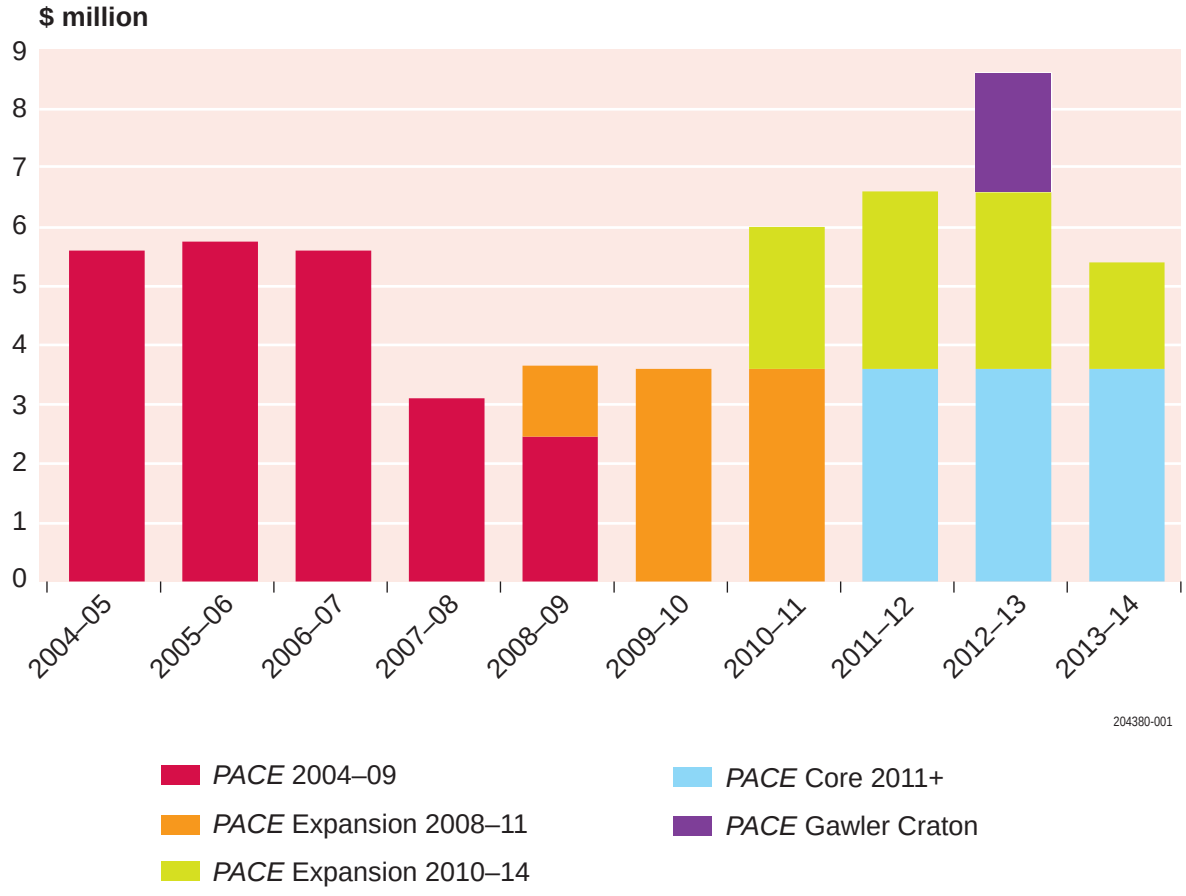
Building Awareness

49. SAMPEG Ambassadors
50. International, national, state and regional promotions through targeted events

3

PACE Funding

PACE Funding 2004–14

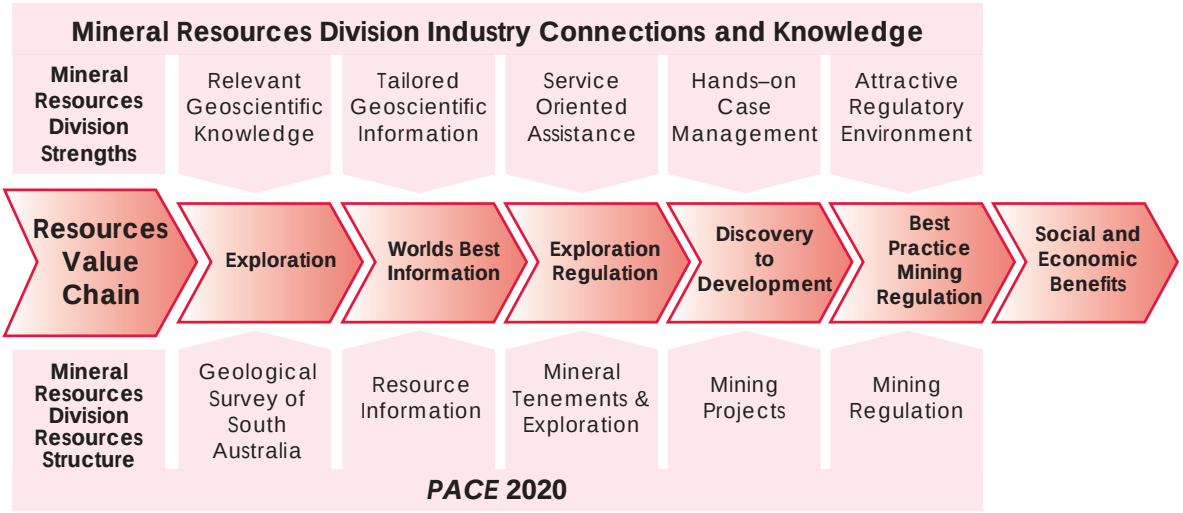


PACE 2020 Funding 2010–14

	2010–11 (A$ million)	2011–12 (A$ million)	2012–13 (A$ million)	2013–14 (A$ million)	Total (A$ million)
PACE Expansion	2.4	3.0	3.0	1.8	10.2
PACE Core Funding	3.6	3.6	3.6	3.6	14.4
Total *PACE* 2020	**6.0**	***6.6***	***6.6***	**5.4**	**24.6**

	2010–11 (A$ million)	2011–12 (A$ million)	2012–13 (A$ million)	2013–14 (A$ million)	Total (A$ million)
PACE Exploration	1.0	0.75	0.75	0.6	3.1
PACE Mining	0.5	1.0	1.0	0.5	3.0
PACE Energy	0.4	0.25	0.25	0.2	1.1
PACE Global	0.5	1.0	1.0	0.5	3.0
Total *PACE* Expansion	**2.4**	**3.0**	**3.0**	**1.8**	**10.2**

Resources Value Chain



4

PACE Exploration

***PACE* Exploration presents a 21st century approach to developing the mineral and energy resources of South Australia, by expanding the exploration search space for explorers and providing them with new pathways for discovering the next generation of world-class mines.**

4.1 Highlights

- New 1:100K and 1:250K map sheets
- New integrated 3D modelling and prospectivity analysis
- New Statewide Gravity Map
- 1st Edition Regolith Map and 2nd Edition Statewide Palaeochannel Map
- New Uranium Map and SA Uranium Systems Report Book
- Statewide ASTER coverage (16 new layers)
- Mount Woodroffe HyMap mineral maps (9 datasets and report)
- Cariewerloo Basin AEM data, 3D model and dataset
- Frome Embayment AEM data and report (collaboration with Geoscience Australia)
- Gawler Craton MT workshop and online delivery
- Continued exploration drilling collaborations with *PACE* Discovery Drilling 2010 and 2012
- Successful launch of new collaborative geophysics (*PACE* Targeting) and geochronology (*PACE* Geochronology) programs
- *PACE* Geochronology 2010 and 2012 Report Books
- Establishment of DET CRC Drilling Centre at Brukunga
- New 3 way geoscientific partnership with China National Nuclear Coorporation (CNNC), and Saskatchewan Government, Canada

4.2 Pathways to Prospectivity

Objective: to expand the exploration search space and deliver new world class mines.

The Pathways to Prospectivity program uses new multi-disciplinary geoscience mapping in remote, frontier areas such as the Western and Northern Gawler Craton and Musgrave Province. The application of new ideas to proven South Australian terranes such as the Central Gawler Craton, Central and Eastern Flinders Ranges and Southern Curnamona will also add new dimensions to exploration in South Australia.

Highlight – Mapping

PACE 2020 has delivered new 1:250K and 1:100K map sheets and accompanying digital data for industry. New Tieyon (Musgraves) and Mulyungarie (Southern Curnamona) 1:100K maps and digital data sets have been released as well as the 1:250K Marree mapsheet and explanatory notes. Field mapping utilises the new SA Geodata Field Kit - Digital Field Note Book that captures the site's spatial details and records field notes, lithology, structure and site photographs. This information is uploaded into the SA Geodata database on returning to the office and delivered through SARIG 2020.

4.3 Pathways to Discovery

Objective: to deliver new baseline geoscientific data sets for direct detection of mineral and energy resources.

Pathways to Discovery delivers new baseline geoscientific data sets for direct detection of mineral and energy resources. Data releases since 2010 include regional geophysics, statewide hyperspectral analysis, and geochemical data such as hydrogeochemistry, multi-element calcrete sampling and bedrock geochemistry.

Highlight – State ASTER Coverage

The Japanese (ERSDAC) Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) satellite provides remote sensing data able to map mineralogy on a regional scale with sufficient spatial and spectral detail for mineral exploration. The statewide ASTER release was completed by CSIRO in 2012 and delivers 14 visible and near infrared (VNIR)–shortwave infrared (SWIR) products and 2 thermal infrared products. All ASTER data is available via SARIG 2020.

4.4 Innovation through Integration

Objective: to generate a unique and innovative suite of products for direct integration with company data libraries and exploration programs, delivered through SARIG 2020.

Innovation through Integration brings together the aforementioned programs in a series of unique and innovative products designed for direct integration with company data libraries and for use in exploration programs. The program utilises the latest technologies for data capture, analysis and management for delivery through the next generation South Australian Resource Information Geoserver (SARIG 2020).

Highlight – 3D Modelling

3D modelling is now becoming a mainstream scientific process, feeding into geophysical inversions, alteration and mineral potential modelling, thus allowing geological insights to be gained about target areas that may have been previously overlooked. New 3D modelling includes the Gawler Craton depth to basement model, Mt Painter Province stratigraphy and the Curnamona Sedimentary Basin models. In partnership with the Deep Exploration Technologies Cooperative Research Centre (DET CRC) the Eastern Gawler IOCG Province Cover and the regional Emmie Bluff models have also been released.

4.5 *PACE* Partnerships

Objective: to provide maximum leverage through collaborative programs that will engage with researchers, explorers, developers, government agencies and communities.

The 21st Century approach to developing the State's mineral and energy resources requires engagement with all aspects of the industry and its stakeholders. *PACE* Partnerships is designed to provide maximum leverage through collaborative programs that will engage with researchers, explorers, developers, government agencies and communities.

Highlight – PACE Discovery Drilling

A total of approximately $3 million has been committed to two rounds of *PACE* Discovery Drilling between 2010 and 2014. *PACE* Discovery Drilling 2010 awarded funding to 23 projects and saw 447 holes drilled totalling approximately 39km (including 5.9km of diamond core).

In May 2012 it was announced that 26 resource exploration projects, from 40 high-quality applications, were granted a share of $1.7 million from *PACE* Discovery Drilling 2012. Results from the latest round are expected to be released in December 2013 at which time it is expected the industry will have spent a further estimated $5.07 million on exploring these projects.

‘... maximum leverage through collaborative programs ...’

5 *PACE* Mining

***PACE* Mining seeks to provide a robust, transparent and timely approval process that streamlines the mining assessment and approval processes that are critical in determining the overall economic, environmental and social impact of a project.**

5.1 Highlights

- Process Mapping and Optimisation project
- Multiple Land Use Framework (MLUF)
- South Australian Rehabilitation Liability Calculator (phase One)
- Collaborations with Goyder Institute for Water Research
- Partnership with DEWNR and DMITRE
- Community Engagement Situation Analysis and Framework (Internal)
- RDAFN Indigenous Mining Employee Mentor program
- APY Exploration and Mining Liaison Officer

5.2 Discovery to Development

Objective: to facilitate a robust and transparent mining approval process whilst balancing the needs of the industry and community, and delivering mining licence approvals within 6 months.

South Australia saw a dramatic rise in exploration expenditure during the first seven years of *PACE* which has resulted in a multitude of new mineral discoveries entering the project pipeline. In order to maximise the value this momentum will generate within South Australia, Discovery to Development has been charged with identifying and implementing key streamlining strategies throughout the mining assessment and approval process's, and investigating innovative license tracking and tenement management systems.

Highlight – Process Mapping and Optimisation

The first year of Discovery to Development focused on undertaking detailed business process mapping to measure, compare and document current workflows and information management systems in order to identify key areas for improvement in customer delivery and enable greater transparency in the government decision making process.

This critical mapping has defined a series of priorities in both the workflow and data management areas, which will be the focus of targeted implementation programs over the remainder of *PACE* 2020.

Highlight – Online Business Solutions

As a result of consultation with industry, DMITRE identified several opportunities to increase transparency and streamline business processes by improving the functionality of online systems accessed via SARIG 2020.

In December 2012, the online tracking of Exploration Licence Applications was introduced to industry and is the first of a new range of online tools available through SARIG 2020 that will make the management of company tenement packages more efficient.

A future work program has been developed to further enable companies to utilise e-business capabilities and further streamline processes for both internal and external stakeholders. These on-line developments will continue for the life of PACE 2020.

A future work program has been developed to address online business needs for both internal and external stakeholders and developments will continue for the life of *PACE* 2020.

5.3 Next Generation Policy

Objective: the development and implementation of world's best practice in the regulation and management of exploration, mining and quarrying activity in South Australia.

Changes in legislation, such as the recent *Mining Act 1971* amendments, coupled with the goal of achieving a truly sustainable minerals and energy sector, is focusing the South Australian Government on creating the next generation of industry policies and guidelines.

Highlight – Multiple Land Use Framework (MLUF)

PACE 2020 will fund facilitated consultation and engagement with government, industry and community stakeholders on the proposed MLUF from January 2013 – as well as a report on outcomes and options from the facilitators (RSSA) which will occur after the first round of consultations (~February 2013).

5.4 Water and Mining

Objective: establish partnerships between key government agencies and specialised research organisations to address the key issues of the location, use and management of South Australia's water resources.

The Water and Mining program partners key government agencies and leading research organisations which share the common goal of mapping groundwater systems. This combined effort aims to identify future water resources for sustainable development of communities and industry in South Australia's arid north.

Highlight – Goyder Institute for Water Research Partnership

Through *PACE* Mining, DMITRE has partnered with the Goyder Institute to investigate water supplies for mining, industry development and communities. The Geological Survey of South Australia (GSSA) has provided key datasets and in-kind support and expertise to enable CSIRO geophysicists to determine the most effective geophysical systems, methods and parameters for the identification of possible water resources in remote areas. Areas in the Frome Embayment and Musgrave Ranges (APY Lands) were used as study areas.

Highlight – Department of Environment, Water and Natural Resources (DEWNR) Partnership

The Department of Environment, Water and Natural Resources (DEWNR) is committed to collaborating closely with DMITRE to support sustainable resource sector growth in South Australia. Under the PACE Mining: Water for Mining program, the opportunity for DMITRE to partner with DEWNR in mapping key cross-agency workflows has been developed and is presented in this project.

Through *PACE* 2020, DEWNR will be provided with funding ($150,000 per annum for up to two years) and in-kind support via a DMITRE Business Analyst to map, review and identify opportunities for tighter integration of the assessment, permitting and licensing processes relating to the mineral and energy industries. This project aims to map key cross-agency workflows to streamline assessment and approval pathways.

5.5 Communities

Objective: to promote engagement between an effective government, socially aware industry and an informed community creating confidence in the South Australian mineral and energy sector.

The Communities program continues the South Australian Government's strong tradition of engagement and cultural exchange in regional and remote areas. This will ensure meaningful and progressive dialogue between government, the industry and community.

Highlight – Community Engagement

The Community Engagement Situation Analysis and Framework were completed in 2012 and set a clear direction for meaningful engagement between government, industry and the broader community. Recommendations are currently being prioritised and an overall implementation plan is in development.

As part of DMITRE's engagement program, Minerals and Energy Officers have initiated specialised road shows throughout the State with the government's role in exploration, mining and energy generation as the centrepiece. Information on community engagement and awareness initiatives have been discussed at a number of regional field days, workshops and special community meetings.

Highlight – APY Exploration and Mining Liaison Officer

DMITRE has continued its commitment to Anangu Pitjantjatjara Yankunytjatjara (APY) Lands through *PACE* 2020 funding ($180,000 per annum; 2010–2014) the appointment of a dedicated Indigenous Liaison officer committed to exploration and mining activities. This position acts as a focal point for all mineral and energy activity in the APY Lands facilitating industry–community liaison. The Exploration and Mining Liaison Officer also works closely with the GSSA and MER Indigenous Liaison officers conducting mapping and research in the APY Lands.

Highlight – RDAFN Indigenous Mining Employee Mentor

The Indigenous Mining Employee Mentor is an initiative of the Port Augusta City Council (PACC), Regional Development Australia Far North (RDAFN) and the Department of Families, Housing, Community Services and Indigenous Affairs (FaCHSIA).

The primary goal of the program is to provide Indigenous people and their families working in the resources sector with greater understanding of the expectations of employment and to empower and develop independence through successful and meaningful employment.

The Indigenous Mining Employee Mentor will assist mining employees 'off site' by bridging the gap between the mine site and community/home environment, as well as supporting the employees family, and providing referral to wrap around support services. This position is driven by the increased activity in the mining and energy sector and the primary aim of the program is to raise the level of Indigenous participation in the South Australian Mining and Resource Sector.

‘... promote engagement between an effective government, socially aware industry and an informed community ...’

6 *PACE* Energy

***PACE* Energy brings together a series of projects, collaborative programs and sponsorships to support South Australian energy explorers and researchers. A number of these projects and collaborations link to current national and international geothermal research efforts including Geoscience Australia's new unconventional gas initiative.**

6.1 Highlights

- $500,000 research funding to the South Australian Centre for Geothermal Energy Research (SACGER)
- Commitment of $50,000 per annum to the CO2CRC (2010–15)
- Combined research funding of $100,000 per annum to the Geofrac Consortium and ARC Linkage Project at the University of Adelaide (2012–14)
- Cooper Basin Atlas

6.2 SA Geothermal

Objective: deliver key geothermal research, methodologies and data to the South Australian Geothermal community.

The SA Geothermal program is a partnership with the South Australian Centre for Geothermal Energy Research (SACGER), part of the Institute for Mineral and Energy Resources (IMER) at the University of Adelaide. SACGER is focused on investigating South Australia's geothermal prospectivity by: improving the knowledge of the thermal state of the South Australian crust; Engineered Geothermal Systems (EGS); and Hot Sedimentary Aquifer systems (HSA).

Highlight – SACGER

PACE 2020 committed $500,000 to the centre in 2011 to support key research programs, aid in the commercialisation of South Australia's vast geothermal energy resources and position the State to sustain its leadership in attracting geothermal energy investment. This funding helped SACGER to leverage additional funding of $1.5 million from other agencies and the centre now has approximately 24 personnel working on SACGER or collaborative projects.

In August 2012, the University of Adelaide was awarded $1.25 million by the Commonwealth Government's Australian Renewable Energy Agency (ARENA) for research-driven analysis in evaluating why the achieved fluid flow rates of Hot Sedimentary Aquifer reservoirs in Australia are significantly lower than expected. SACGER will lead the research, collaborating with CSIRO and partnering with DMITRE and geothermal companies for a total research investment of $3.5 million.

6.3 Unconventional Gas Resources

Objective: realise the full potential of South Australia's unconventional gas potential through cooperative research, industry partnership and leading policy development.

The Unconventional Gas Resources program is focused on ensuring that DMITRE and the South Australian energy industry has the critical research, information and datasets necessary to understand the State's unconventional resource potential and to ensure the government can provide accurate and timely policy advice, thereby encouraging effective investment attraction.

Highlight – Geofrac Consortium

The Geofrac Consortium was launched in June 2012 with three main long term project research areas:

- Predictive modelling of local stress and understanding how stress impacts flow rates.
- Understanding the controls on and distribution of natural fractures, and understanding how those natural fractures impact fracture stimulation.
- Documenting fine-scale variations in sedimentology and clay geochemistry in shales and understanding how this controls the petroleum system (i.e. source-reservoir-seal) at a fine scale.

PACE 2020 has committed research funding of $100,000 per annum (2012–14) to the Consortium. Partners include: Santos, Beach Energy, BG/ QGC, Halliburton and JRS Petroleum.

Research will use the world-class Cooper Basin/Moomba Big Lake data set of 3D seismic data, production data from ~250 wells, and fracture stimulation data to interrogate predictive models for well productivity in unconventional reservoirs.

Highlight – ARC Linkage Project

In 2012 the University of Adelaide was awarded an ARC Linkage Grant to develop an integrated approach to unconventional gas exploration and development. This project is a collaboration between University of Adelaide, CSIRO, DMITRE, Santos, Central Petroleum Ltd and Petrofrontier (Australia) Pty Ltd with *PACE* 2020 funding of $50,000 per annum (2012-2014).

New drilling technology provides a potential revolution in hydrocarbon supply while lowering carbon emissions if exploitation of unconventional shale reservoirs can be made economic. While reserves are demonstrated, the poor understanding of relevant shale properties has led to an untenable failure rate of well production. This research will identify the geological processes critical to carbon burial, diagenesis, and hydrocarbon generation in shale. It will use new microbeam technologies that allow the nano-scale organomineral interactions characteristic of shale to be studied for the first time. It will increase the fundamental understanding of carbon sequestration and apply it to exploration tools of specific use in Australian Basins.

Highlight – Cooper Basin Atlas

The Cooper Basin is the State's premier energy resource and remains the country's largest oil and gas producing onshore basin. It is critical that DMITRE fully understands the basin's gas resource potential, particularly now that new unconventional plays are being explored and evaluated. This project focuses on Continuous Gas Accumulations.

The Cooper Basin Atlas: *Understanding Australia's Premier Onshore Energy*

Province project began in mid 2012 and will develop regional Cooper Basin (South Australia) datasets to:

- Assist explorers to identify play fairways for Continuous Gas Accumulations (Basin Centred Gas Accumulations, Shale Gas, and Deep Coal Seam Gas).
- Provide DMITRE with the datasets necessary to understand and estimate the future resource potential of the Cooper Basin, to ensure accurate and timely policy advice is available to government, and to enable effective investment attraction.
- Provide critical basic regional datasets to input into Geofrac and the Australian Research Council (ARC) Linkage project at the University of Adelaide.
- Advance recommendations from the Roadmap for Unconventional Gas Projects in SA produced by DMITRE in December 2012 http://www.petroleum.dmitre.sa.gov.au/SA_Unconventional_Gas_roadmap
- Undertake an independent assessment of the unconventional gas resources of the Cooper Basin in collaboration with the USGS (United States Geological Survey) and Geoscience Australia.

6.4 CO2CRC

Objective: to ensure South Australia remains at the forefront of geosequestration and greenhouse gas mitigation research and policy.

The aim of this program is to sustain the work of the Adelaide node of the Cooperative Research Centre for Greenhouse Gas Technologies (CO2CRC) based at the Australian School of Petroleum, University of Adelaide.

Highlight – CO2CRC

The CO2CRC is one of the world's leading collaborative research organisations focused on carbon dioxide capture and geosequestration.

The CO2CRC is a joint venture comprising participants from Australian and global industry, universities and other research bodies from Australia and New Zealand, and Australian Commonwealth, State and international government agencies.

PACE 2020 has committed $50,000 per annum to the South Australian node of the CO2CRC until 2015 to:

- Sustain the CO2CRC in South Australia at the Australian School of Petroleum,

University of Adelaide and prevent its relocation.

- Maintain local expertise in carbon capture and storage (CCS) methods and technologies to assist major mining and energy resource projects to access technical support to meet needs for mitigating greenhouse gas emissions with CCS technologies and methods.
- Enable South Australia to capitalise on the concentration of experts for geothermal, petroleum, geosequestration and water management research at the University of Adelaide.
- Maintain a critical mass essential to underpinning efficiency, intellectual vibrancy and hence the competitiveness of the University of Adelaide in both research and education.

‘Collaborative research will lead to untapping South Australia’s vast unconventional gas resources’

7

PACE Global

***PACE* Global will focus on the provision of world leading geoscientific data, publications and information. *PACE* Global is dedicated to maintaining South Australia's reputation as a world leader in the quality of geoscientific information delivery.**

7.1 Highlights

- Auto-population of SARIG 2020 forms and registration of online applications in tenement systems
- Selected seismic lines with SEG-Y images on SARIG 2020 (including links to approximately 35,000 new records)
- New Electrical Technique, Petrophysical and Land Access data layers in SARIG 2020
- New RESIC (Resources and Energy Sector Infrastructure Council) infrastructure data layers on SARIG 2020
- All original hard copy drillhole records up to 1992 available digitally
- South Australian Mining Project Application (SAMPA)
- Mineral Exploration Review
- SA Copper Review
- Continued efforts of SAMPEG Ambassadors
- International, national, state and regional promotions through targeted events.

7.2 Data Pathways

Objective: to ensure all customers have unsurpassed access to South Australia's wealth of geoscientific data and information anywhere in the world, 24 hours a day, 7 days a week.

Data Pathways is focused on ensuring that the members of the minerals and energy sector have unrivalled access to South Australia's wealth of geoscientific data and information, 24 hours a day, 7 days a week, world-wide. It emphasises the role of data availability and delivery and customer interactions via the web.

Highlight – SARIG 2020

The South Australian Resources Information Geoserver – SARIG 2020 – has long been the South Australian Government's world leading geoscientific data delivery application. The technology behind SARIG 2020 provides sophisticated access to over 125 years of state geoscientific knowledge, from the early explorers through to current day exploration and mining companies.

The new SARIG 2020 launched in May 2011 established itself as an instant success, incorporating a combination of innovative map screen displays; identify function; the ability to perform complex searches and queries; as well as multiple options of data retrieval from the DMITRE Resources and Energy Group's range of corporate databases.

Highlight – Data Audit

A detailed review of current data libraries – their quality, deficiencies and gaps, and management processes – was conducted as part of an ongoing strategy to implement innovative solutions and value-adds to affirm South Australia's position as world's best provider of geoscientific information. This audit ensures that the minerals and energy industries have access to the most diverse range of new and historical data, and has allowed new data management strategies and procedures to be developed.

The review also led to the development of CATAPP, an online catalogue application that serves as the repository for metadata descriptions and location of datasets generated by MER. CATAPP has been initially developed as an internal application and now acts as the single point of truth for the descriptions and location of all datasets. In summary the catalogue:

- Provides a single point of truth for dataset identification, location and metadata
- Provides a powerful database search capability to locate datasets of interest
- Promotes knowledge sharing within MER
- Promotes dataset reuse across MER
- Is integrated with existing business processes including SARIG 2020 creating greater efficiencies

Highlight – Historical Data Scanning

The Historical Data Scanning is an ongoing program to complete the digitising of highly valuable and unique hard copy collections including: drillhole records; mineral assay reports; mining registers; DMITRE report books; plans and air photos.

To date, all original hard copy drillhole records including minerals, petroleum, stratigraphic, water and engineering holes, up to 1992, have been scanned and approximately 40% of report books have been scanned.

7.3 South Australian Resources Analysis

Objective: to provide the government industry, investors and the wider community with a comprehensive, relevant and contemporary suite of information, statistics and analysis of the South Australian minerals and energy resources sector.

The provision of more accurate and sophisticated statistical data and analysis has become essential in assessing the current status and future directions of the South Australian resources industry. There is also a greater expectation that in addition to the economic costs, the social and environmental aspects are also measured and analysed, to provide a more holistic assessment of the industry.

Highlight – Mineral Industry Reports, Publications and Market Intelligence

A suite of new reports, publications and market intelligence capture has been developed with the specific purpose of providing quality information regarding the quantification of key mineral industry measures in South Australia. The reports provide detailed analysis of the industry and disseminate critical information to a broad range of South Australian mineral industry stakeholders.

The reports form a core body of work aimed at disseminating detailed information regarding the minerals

industry in South Australia and highlighting investment opportunities in the South Australian minerals industry. The South Australian Exploration Review and Annual Industry Review provides a detailed analysis of the minerals industry across the value chain.

These reports effectively combine with commissioned commodity analyses already used by senior staff and executive to deliver high calibre presentations at national and international venues to highlight South Australia's competitive advantages and investment opportunities for a broad range of mineral commodities on a national and global scale.

Highlight – SA Mineral Industry Annual Survey and Mineral Industry Triple Bottom Line (TBL) ScoreCard

The Mineral Industry Annual Survey underpins the TBL Mineral Industry ScoreCard and aims to expand on the success of the current economic Minerals ScoreCard to encompass social and environmental indicators.

Social and environmental indicators are not yet readily available through DMITRE reporting or Australian Bureau of Statistics (ABS) statistical catalogues, therefore much of the scope in the development of the industry survey has been to determine the relevant indicators in line with emerging global commodity markets, value-chain opportunities and community's social and environmental expectations of the minerals industry.

The Mineral Industry TBL ScoreCard will provide critical information for planning purposes and highlight areas for Government strategic intervention and provide global context and positioning of the South Australian minerals industry to attract investment in the State's resources sector.

7.4 Building Awareness

Objective: to increase awareness of the South Australian minerals and energy industry locally, nationally and internationally, in order to foster a greater understanding of the sector, and entice potential investors to South Australia.

The State Government will engage the world resources and investment community on the international stage, promoting South Australia as a preferred exploration, mining and investment destination. Building Awareness will ensure a State Government presence at key minerals and energy events globally to showcase precompetitive data, prospectivity and the services and support available in South Australia.

Highlight – SAMPEG

Addressing outdated investor perceptions of opportunities in South Australia's resource sector is the focus of the South Australian Minerals and Petroleum Expert Group. Members of the Expert Group play a key role in promoting investment in South Australia's resources sector.

Since 2004 members have been advising the South Australian Premier and government on resource industry policy in order to realise the potential of South Australia's resource sector. They have also worked hard to promote South Australia as a preferred investment destination for exploration and mining, whilst helping to improve the community's perception of the importance of a sustainable resources industry to South Australia.

‘... unsurpassed access to South Australia’s wealth of geoscientific data ...’

DELIVERING RESULTS

Government of South Australia

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Report Book 2013/00001

This report is also available on DMITRE minerals website (see above).
All dollar figures are in Australian dollars, unless otherwise indicated.

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