Bight Basin Capability Statement

Opportunity

The creation of an energy industry in the Bight Basin would be an enormous boost to the economy of South Australia and Eyre Peninsula. As with any large investment, there are risks that need to be considered before investment goes ahead. Apart from the technical risks of finding and extracting energy resources, there are risks related to environmental impact, workforce management, social license to operate and regulatory costs. All key institutions in South Australia have a role to play in encouraging and supporting progress in the State. With key strengths in engineering, science, economics and social planning, the University of Adelaide is well positioned to play a key supporting role.

To assist energy companies, state and local government to understand what we may be able to contribute, this document outlines the University of Adelaide’s research capabilities that stand ready to support this opportunity.

State priorities

The State Government has developed ten economic priorities for South Australia’s future. These priorities are areas where the State Government believes that it can make the most difference to the lives of everyday working people and the most difference to the future prosperity of our State.

A development in the Bight Basin creates opportunities to contribute to four of these priorities.

- Unlock the full potential of South Australia’s resources, energy and renewable assets.
- Growth through innovation.
- Promoting South Australia’s international connections and engagement.
- South Australia’s small businesses have access to capital and global markets.
Improved intelligence for energy exploration

The University of Adelaide has had a long involvement with geological research. The Australian School of Petroleum (ASP) is a world-class centre for petroleum education, training and research. It is one of only a few institutions in the world offering fully integrated teaching and research programs in the disciplines of petroleum geoscience, engineering and management. The School is ideally placed to be a research partner with companies undertaking exploration in the Bight Basin.

The Geology and Geophysics Department of the University of Adelaide is an international leader in understanding continental evolution, biogeoscience, near-surface geophysics, regolith geoscience and mineral exploration. The academics in both groups have very strong links with the South Australian minerals and petroleum industry.

- Peter McCabe (Australian School of Petroleum) has had a long research interest in the Bight Basin. As a leader of the US Geological Surveys World Energy Assessment team he was promoting the Bight as a future world class petroleum province 15 years ago. He has collaborated with Geoscience Australia on geological research of the Bight Basin and presented a paper at the International Geological Congress in 2012. Over the last two years, Professor McCabe has been a member of the Independent Science Panel that oversees the BP-funded and CSIRO-coordinated research effort in the Bight. He has been active in leading an effort to get an IODP (Integrated Ocean Drilling Program) in the Bight.

- Simon Holford (Australian School of Petroleum) also has had a long professional interest in the Bight Basin. He examined the tectonic history of Australia's southern margin from 2008 to 2011. Subsequently his research team have undertaken research projects on the structural geology and geologic history of the Bight Basin.

- Tony Hall (Geology and Geophysics) manages the school's Biogeochemistry Facility and can provide analytical services to the exploration industries (GCMSL, GC-FID, Rock Eval, TOC & XRD). He has undertaken the geochemical work on the ‘bar-bails’ that have washed up on South Australia’s coastline.

- Martin Hand (Geology and Geophysics) has carried out studies on the palaeogeographic evolution of Australia and Antarctica related to the history of the Bight.

Engineering and optimisation

Engineering expertise is critically important for the success of major energy developments. As well as the Australian School of Petroleum, the University of Adelaide has cutting edge research capability across a wide spectrum of engineering expertise that could be deployed to projects and issues related to petroleum exploration and production.

The Faculty of Engineering, Computer and Mathematical Sciences encompasses a broad range of basic and applied research capabilities spanning a wide range of engineering technology and practice and fundamental and applied mathematics and computer sciences. As well as capabilities listed in the previous section, the Faculty includes the following expertise in engineering and optimisation of processes.

- The School of Chemical Engineering boasts a vibrant and dynamic research team that undertakes cutting edge research of both fundamental and applied natures in three main areas: nano and materials engineering, bio and pharmaceutical engineering and clean and sustainable engineering.

- The Teletraffic Research Centre (TRC) provides mathematical modelling solutions for the transport and commercial industry sectors. The outputs of the Centre’s work are delivered in many forms, as determined by particular client needs, and range from delivery of complex software systems through to technical reports and also include educational courses and seminars. Our clients range from major car makers such as Holden, to road paving companies such as Emolium, to foam producers such as Dunlop Foams Group. In addition to bringing cost savings to our partners, our skills help them to understand their internal operations and identify opportunities for more efficient production processes and use of capital investment.

- Delivering award-winning research of an international standard, the School of Civil, Environmental and Mining Engineering has three areas of focus: water systems, civil structures and mining and geosystems. Across a wide variety of research themes, including water systems asset management, decision support and optimisation, hydrology and climate, structural loading resilience, structural stability and geostatistics.

- The School of Computer Science undertakes a wide range of cutting edge research activities with highly qualified and experienced academic staff. The School is prominent in the areas of computer vision, distributed and high performance computing, Internet computing, web technologies, evolutionary systems, algorithms, software architectures and computer science education. Producing real, internationally recognised commercial outcomes, the School’s researchers construct and use an array of rare and unique computing resources.

- The School of Electrical and Electronic Engineering has a strong research focus with staff and students active in a wide variety of projects. The School’s vision is to increase the scale and impact of world-class research undertaken. Research activities span the strategically chosen areas of health technologies, sensing and security and sustainable energy, with the School’s internationally prominent academic staff actively contributing to real-world problems through consulting and advanced fundamental and applied research.

- The School of Mathematical Sciences is recognised for excellence in research spanning Applied Mathematics, Pure Mathematics and Statistics. The School is highly respected internationally for its research strengths in statistics, geometry, stochastic modelling and theoretical and applied mechanics and nanomechanics, and its staff are Australian leaders in postgraduate research training in these areas.

Environmental assessment and monitoring

To gain and maintain a social license to operate in the Great Australian Bight (GAB), it will be valuable for energy companies to have access to a credible, independent assessment of the baseline conditions of the environment before they begin production, but also to have monitoring data available post development to ensure that the environment is not unnecessarily impacted.

The Environment Institute is one of only five elite research institutes within the University of Adelaide. The research centres and groups of the Institute are all at the leading edge of environmental research, with discipline strengths in marine ecology, biodiversity conservation and evolution, earth science, climate change, aquatic ecology, water supply management, landscape management and genetics.

Professor Sean Connell and Bronwyn Gillanders wrote Australia’s first textbook on marine ecology in Australia. They lead a strong research team of marine biologists, ecologists and modellers who understand the biology and ecology of the Bight Basin in great detail. They have a deep understanding of the drivers of change on communities in the GAB as diverse as seagrasses, mammals, fish, invertebrates and phytoplankton. Prof Gillanders leads the Spencer Gulf Ecosystem and Development Initiative which provides independent advice to major industries with an interest in the Gulf - more details in box on next page.

Environmental monitoring systems and data management is a key requirement of large resource developments such as what is expected to occur in the Bight Basin. Professor Andrew Lowe is an Associate Science Director for Australia’s Terrestrial Ecosystem Research Network (TERN), a $45 million investment to improve Australia’s collection and sharing of ecosystem data. His work in TERN is focused on establishing a network of scientists and infrastructure to describe the state and dynamics of Australian ecosystems, and share long-term ecosystem data sets. This has led to a new approach to build the infrastructure and community values necessary to share long-term ecosystem science data and knowledge for the benefit of the Australian ecosystem science and management communities.
Regional planning for success

There are challenges associated with coordinating the planning powers of state and local governments for major mineral and energy developments. The emergence of regional planning initiatives are showing early promise as a way of ensuring major development projects are effectively managed by different layers of government, and reflect the interests of all stakeholders.

The National Harmonised Framework calls for companies to establish baseline monitoring and continue monitoring their areas. Independent research bodies can also contribute by obtaining:

- baseline data against which to measure change.
- knowledge, predictive tools and appropriate data for predicting cumulative impact and change so that minor impacts can be prevented from turning into significant consequences.

The Centre for Housing, Urban and Regional Planning (CHURP) is a leading research centre in the social sciences and is already working on the Great Australian Bight Science Plan to establish a socio-economic base line for the region potentially affected by exploration and development. CHURP and its staff have a long history of work in this and related fields, including regional community engagement and development.

CHURP is a leading research group, undertaking both academic and sponsored research. They work closely with a range of organisations, including Australian and State government departments, local councils, not-for-profit organisations, private sector agencies and research institutions whose shared vision is to undertake high quality housing, urban and regional research and disseminate their findings for the betterment of society.

Australian Population and Migration Research Centre (APMRC) is a premier research group with expertise in the areas of health and aged care, population projections, demographic analysis, spatial analysis and modelling, and web technologies. Their areas of research experience that are relevant to development in the Bight Basin include:

- Relationships between populations and their environment;
- Dynamics of non-metropolitan population challenges of attracting workers, especially skilled workers to neglected remote areas;
- Workforce development in rural and regional areas;
- Migration including fly-in/fly-out solutions;
- The role of international migration in regional development;
- Population characteristics of South Australia, Adelaide and Eyre Peninsula.

The South Australian Centre for Economic Studies (SACES) is a joint research unit of the University of Adelaide and the Flinders University. The Centre provides applied research, analysis and cost-benefit assessments, economic impact studies, regional economic development strategies and commentary on contemporary economic, social and public policy issues. Staff have expertise in project management, stakeholder consultations, statistical data analysis including econometric data analysis, data modelling, analysis of large data sets, and qualitative data analysis techniques such as focus groups, interviews and surveying.

SACES has undertaken a number of studies on the minerals sector, including socioeconomic impacts of mining on regional South Australia. The most recent study was on the economic impact of mining on the South Australian economy. A rapidly increasing workforce puts considerable pressure on regional towns and centres. Paved, water and waste management services need to be upgraded to cope with increased demand.

The Water Research Centre brings together a trans-disciplinary research team who have a track record in successfully solving management issues related to water. Their research strengths are in the optimal management of water assets, water quality, environmental water efficiency and hydrology and climate impacts.

The Centre for Energy Technology develops partnerships with leading industry, government agencies and other research organisations, for cost-effective and sustainable energy technologies, and their transport and storage. They undertake fundamental research and technology development in the areas of fluid mechanics, combustion, renewable energy, electrical energy and chemical processing.

Workforce management

Large resource developments create significant challenges related to workforce management including health issues, income disparity, labour shortages, conflicts with local and non-local populations and effects on social and civic infrastructure.

Many social issues are location and time specific, as are their solutions. A ‘one size fits all’ approach to an entire region has often been counteractive, exacerbating inequalities and social issues rather than providing solutions. The Australian Workplace Innovation & Social Research Centre (WISER) focuses on how organisational structure and practices, technology and economic systems, policy and institutions, environment and culture interact to influence the performance of workplaces and the wellbeing of individuals, households and communities.

The Director of WISER, A/Prof John Speoehr, specialises in socio-economic impact assessment including the distributional impacts and human dimensions of change on different population groups and locations. Public health is a sensitive issue associated with any large resource development. The Freemason’s Foundation Centre for Men’s Health has a strong research focus on healthy male ageing, health literacy, screening and prevention and men’s health issues rather than providing solutions. The Freemason’s Foundation Centre for Men’s Health has a strong research focus on healthy male ageing, health literacy, screening and prevention and men’s health issues.

A/Prof John Speoehr

The University of Adelaide has created a position of Dean of Indigenous Education, to provide strategic leadership for the recognition of Aboriginal and Torres Strait Islander knowledge and perspectives, the promotion of teaching and research in Indigenous studies, the employment of Aboriginal and Torres Strait Islander staff, and engagement with Indigenous communities.

Spencer Gulf Ecosystem and Development Initiative (SGEDI)

An example of how environmental expertise from the University of Adelaide can be brought together to support a major new development is the Spencer Gulf Ecosystem and Development Initiative (SGEDI). This was established in 2013 to provide all stakeholders with an interest in development within the Gulf with access to independent and credible information about Spencer Gulf and opportunities to develop it without unduly compromising its environment. Development in the Gulf will see an increase in shipping, port facilities, potential dredging, and desalination of sea water. The industry and people around the Gulf (and throughout South Australia and beyond) were keen to see this carefully managed. SGEDI aims to undertake the science and understanding that will support world class decision making while maintaining the Gulf’s unique ecosystem.

An independent and credible decision support system is being created to enable evidence-based assessment of development options with full consideration of social and economic benefits and cumulative environmental implications in a rapidly developing region.

The initiative is supported by BHP Billiton, Santos, Arrium, Alinta, Folders Ports, Centrex, Nystar, the Fisheries Development Corporation (which encompasses the key fishing and aquaculture interests), SA Government and Australian Government with, SARDI and Flinders University as research partners. It is now undertaking research, science and engagement to allow for an understanding of potential cumulative impacts and effective mechanisms by which such evidence can inform decision making.
For further enquiries

The University of Adelaide is committed to building partnerships with industry and government in relation to the Bight Basin. If you would like any further information on the capabilities we have outlined in this document please contact:

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