

Government of South Australia

Response to the Nuclear Fuel Cycle Royal Commission

November 2016



Acknowledgement of Country

The Government of South Australia acknowledges Aboriginal people as the first peoples and nations of South Australia. We recognise and respect their cultural connections as the traditional owners and occupants of the land and waters of South Australia and that they have and continue to maintain a unique and irreplaceable contribution to the state.

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Premier's foreword



The Nuclear Fuel Cycle Royal Commission presented all South Australians with an opportunity to discuss in detail the risks and opportunities of our state becoming further involved in nuclear activities. I want to thank the former Commissioner, Rear Admiral the Honourable Kevin Scarce AC CSC RAN (Rtd), for providing the community with an outstanding evidence-based factual resource on which to base its conversations.

The report was the foundation for the largest consultation program in our state's history. Thank you to all the South Australians who took part in this important conversation.

Each of the 12 recommendations has been carefully considered. This report provides a detailed response to each of them.

Of key interest to the community was the discussion over the storage and disposal of used nuclear fuel from overseas countries. After considerable statewide discussion, community feedback and detailed investigation, it is clear that there is a diversity of views in the community about this proposal.

Having considered all the community feedback, the government has decided that discussion should continue on a proposed nuclear waste facility.

The government has also concluded that the only path forward is the restoration of bipartisanship and broad social consent, secured through a statewide referendum.

Continued public debate about South Australia's role in the nuclear fuel cycle is important and ultimately it is a matter that the people should decide.

The government supports the Royal Commission's recommendations to grow our mining sector through investment and streamlining approvals, as well as to ensure responsibility for remediation.

The government will also collaborate on energy and low-carbon policies and seek to capitalise on commercialisation opportunities at the South Australian Health and Medical Research Institute (SAHMRI). I appreciate the extensive community input and contribution to this decision-making process.

South Australia faces significant economic challenges. We are now transitioning to a modern and innovative economy, and we must look ahead.

The Royal Commission outlined the risks and opportunities of further engagement in the nuclear fuel cycle, and how this could benefit the state, both financially and in job creation. The report made a substantial contribution to our state, and opened the doors to a wide range of possible nuclear, resource and energy options for all South Australians to consider.

As detailed in this document, the government has decided to support nine of the Royal Commission's 12 recommendations. The supported recommendations will grow the state's prosperity and wellbeing and play an important role in our economic transition.

Jay Weatherill
Premier of South Australia

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Summary

The Nuclear Fuel Cycle Royal Commission recommendations and the South Australian Government's position on each recommendation is set out below.

The Royal Commission recommended that the South Australian Government:

- 1** pursue the simplification of state and federal mining approval requirements for radioactive ores, to deliver a single assessment and approvals process
> **Support**
- 2** further enhance the integration and public availability of pre-competitive geophysical data in South Australia
> **Support**
- 3** undertake further geophysical surveys in priority areas, where mineral prospectivity is high and available data is limited
> **Support**
- 4** commit to increased, long-term and counter-cyclical investment in programs such as the Plan for Accelerating Exploration (PACE) to encourage and support industry investment in the exploration of greenfield locations
> **Support**
- 5** ensure the full costs of decommissioning and remediation with respect to radioactive ore mining projects are secured in advance from miners through associated guarantees
> **Support**
- 6** remove at the state level, and pursue removal of at the federal level, existing prohibitions on the licensing of further processing activities, to enable commercial development of multilateral facilities as part of nuclear fuel leasing arrangements
> **Do not support**
- 7** promote and actively support commercialisation strategies for the increased and more efficient use of the cyclotron at the South Australian Health and Medical Research Institute (SAHMRI)
> **Support**
- 8** pursue removal at the federal level of existing prohibitions on nuclear power generation to allow it to contribute to a low-carbon electricity system, if required
> **Do not support**
- 9** promote and collaborate on the development of a comprehensive national energy policy that enables all technologies, including nuclear, to contribute to a reliable, low-carbon electricity network at the lowest possible system cost
> **Support**
- 10** collaborate with the Australian Government to commission expert monitoring and reporting on the commercialisation of new nuclear reactor designs that may offer economic value for nuclear power generation
> **Support**
- 11** pursue the opportunity to establish used nuclear fuel and intermediate level waste storage and disposal facilities in South Australia consistent with the process and principles outlined in Chapter 10 of the [Royal Commission] report
> **Support continued investigation**
- 12** remove the legislative constraint in section 13 of the *Nuclear Waste Storage Facility (Prohibition) Act 2000* that would preclude an orderly, detailed and thorough analysis and discussion of the opportunity to establish such facilities in South Australia.
> **Do not support**

Introduction

About this report

This report is the South Australian Government's response to the Nuclear Fuel Cycle Royal Commission, which was established in March 2015 to independently investigate the potential for the state to increase its participation in the nuclear fuel cycle.

The state economy is transitioning from traditional industries to high-tech industries that will create jobs, businesses and opportunities. To support this transformation, South Australia must remain open to ideas and prepared to explore all possible opportunities.

Nuclear activities offer new opportunities, but they are not new to South Australia. The state has a significant and longstanding involvement in the exploration, mining and milling of radioactive minerals, and in the processing and manufacture of materials containing radioactive and nuclear substances.

We hold one-quarter of the world's uranium resources and five of the nation's seven uranium mines, one of which – Olympic Dam – contains the world's largest uranium deposit. We also store the low and intermediate level nuclear waste that we generate in our medical and commercial activities.

We are also involved in nuclear medicine: the cyclotron at the South Australian Health and Medical Research Institute (SAHMRI) produces radioisotopes for medical applications and is used for research and development of new techniques and products.

The Royal Commission heard from 132 expert witnesses, including 41 international experts, over 37 sitting days. It received more than 250 submissions from individuals, organisations, industry and government; conducted its own research; commissioned independent studies; and undertook site inspections in 12 countries that participate in the nuclear fuel cycle.

The Royal Commission's evidence and research found that the state could safely increase its participation in nuclear activities, and the activity that could provide the most significant and enduring economic benefits was the storage and disposal of international used nuclear fuel and intermediate level waste. Importantly, the Commission also found that social and community consent – sufficient public support – was fundamental to any new nuclear activity. The report also states that political bipartisanship and stable government policy are essential due to the long-term operation of the facilities and the need for certainty for potential client nations.

The government's response to the Royal Commission's recommendations, feedback from the community and industry, and the Citizens' Juries' reports is provided from page 4. The government agency responsible for implementing the actions and the next steps are identified in each section.

Community consultation

Following the release of the Royal Commission's report in May 2016, the state's largest community consultation program – involving more than 50 000 South Australians – commenced.

The program was led by the government's Nuclear Fuel Cycle Royal Commission Consultation and Response Agency (CARA) and overseen by an Advisory Board chaired by the Honourable John Mansfield AM QC.

The program aimed to raise the community's awareness and understanding of the Royal Commission's recommendations and findings, and to enable all South Australians to have their say on the issues.

Details of the consultation program and the community feedback are contained in the *Nuclear Fuel Cycle Royal Commission Consultation and Response Agency Community Views Report*, available at www.nuclear.sa.gov.au

In summary, the program involved three stages:

1. Citizens' Jury One

In June and July 2016, the first Citizens' Jury of 52 South Australians identified that the storage and disposal of used fuel and intermediate level waste was the most significant opportunity identified by the Royal Commission.

The jury identified four key themes to guide the community discussion: safety; informed community consent; trust, accountability and transparency; and economics and the benefits/risks for the state.

2. Statewide consultation

As part of the consultation program, more than 130 information days and events were held across the state by CARA. Events were held in metropolitan, regional and remote communities; in halls, parks, schools, tertiary institutions, workplaces, libraries, government centres, agricultural field days, and shopping centres.

The program provided multiple avenues for all South Australians to receive information and provide feedback. For some feedback channels, people were randomly selected to participate to align with the state's census profile (representative feedback); for others, anyone could participate (self-selected feedback).

As part of the program, nearly 200 business, academic and research leaders attended a workshop for industry to discuss the Royal Commission's recommendations and provided their feedback and insights on the risks and opportunities involved in the state's potential to increase its participation in nuclear activities.

3. Citizens' Jury Two

The second Citizens' Jury, involving more than 300 people, was tasked with deliberating on the question: 'Under what circumstances, if any, could South Australia pursue the opportunity to store and dispose of nuclear waste from other countries?' Jury members considered the community's feedback from the consultation program and added their own perspectives. They deliberated over six days and presented a report to the Premier of South Australia on 6 November 2016. The report found that two-thirds of the jury did not want the government to pursue the opportunity under any circumstances and one-third supported a commitment to pursue under the circumstances outlined in the report.

The reports of Citizen Jury One and Two are available at www.nuclear.sa.gov.au

Response to the recommendations

Exploration, extraction and milling

The government supports the Royal Commission's finding that expanded uranium exploration and mining would provide additional benefits to the state.

South Australia hosts about 80 per cent of Australia's and 25 per cent of the world's known uranium resources. The state has an established and reliable uranium mining industry that adds significant value to its economy.

In 2015/16 South Australia produced a record value of uranium totalling \$557 million from the sale of 5367 tonnes of uranium oxide concentrate (UOC), generating \$22.6 million in royalties. During the past decade, the state's uranium industry has attracted investment of \$410 million in exploration for uranium deposits, and produced 43 727 tonnes of UOC worth \$3.5 billion, which has been exported globally for low emissions power generation, generating \$140 million in royalties to the state government for the benefit of South Australians.¹

However, international uranium markets are currently oversupplied due to a downturn in demand since 2011, and long-term demand is difficult to predict because it depends on global policy measures, primarily the extent to which nuclear energy is used to reduce greenhouse gas emissions. Significant investment in new reactors is currently underway in China, India, Russia and South America. Recent data shows that it is likely that prices will begin rising late in 2017, given the structural trend towards higher global demand.²

Supporting a dynamic and globally competitive uranium exploration and mining sector is a key feature of one of the state's Economic Priorities: to unlock the full potential of South Australia's resources, energy and renewable assets.

Considerable progress has been made towards the economic priority. In 2015 South Australia was ranked as having the world's³:

- best geological database to encourage investment
- 5th best mining legal system
- 10th best location for mining investment.

The Royal Commission found that barriers remain to the successful exploration for mineral deposits, including uranium, in South Australia. It found that removing these barriers and supporting explorers in counter-cyclical investment would enable the industry to take advantage of subsequent recoveries in minerals markets.

The government recognises that more can be done to support an expansion in uranium mining, and this section outlines our planned initiatives to increase opportunities across the uranium exploration, mining, services and training sectors.

Recommendation 1

That the South Australian Government pursue the simplification of state and federal mining approval requirements for radioactive ores, to deliver a single assessment and approvals process.

What the Royal Commission found

The Commission found that the administrative and regulatory processes that manage current exploration and mining operations are sufficient to support a safe expansion of activity; however, the regulatory approvals processes for new uranium mines have been unnecessarily duplicative at the state and federal levels.⁴

Approvals for new mines are usually handled exclusively by the relevant state or territory government. However, because federal legislation (the *Environment Protection and Biodiversity Conservation Act 1999*) refers to uranium mining as a 'nuclear action', Commonwealth Government approval is also required.⁵

The Commission found that duplication of government administration has increased the anticipated costs of, and timeframes required for, regulatory approval for new uranium mines. It heard evidence from industry that duplication of mining approvals had caused project delays; in one instance causing a project to miss favourable market conditions.⁶

What we heard

The Council of Australian Governments (COAG) has agreed to prioritise the reduction of environmental red tape by creating a one-stop shop for state/territory and federal environmental assessments and approvals.⁷ The state government has signed a memorandum of understanding (MOU) to work with the federal government on this reform.

As part of the reform, South Australia has entered into an assessment bilateral agreement with the federal government that allows for certain assessment processes run under the South Australian *Mining Act 1971* to satisfy the EPBC Act, waiving the requirement for a proponent to be subjected to two separate assessment processes for one action.

These assessments cover mining and retention leases, miscellaneous purpose licences and exploration programs for environment protection and rehabilitation, and the agreement applies to those applications considered 'nuclear actions' under the EPBC Act.

Our position

Support

The removal of duplication of federal and state mining assessment and approval requirements for new uranium mines would increase efficiency, reduce costs borne by industry and enhance South Australia's status as a favourable investment destination.

What we will do

We will pursue expanding the existing assessment bilateral agreement under the EPBC Act related to the *Mining Act 1971* to further streamline government processes for mining assessments and approvals, which would reduce regulatory approval timeframes, while maintaining existing high standards of environmental protection.

Responsibility

The agency responsible for implementing the government's actions is the Department of State Development.

Next steps

The Department of State Development will pursue enhancing the existing assessment bilateral agreement between the federal and state governments relating to mining approvals processes.

Recommendations 2-4

That the South Australian Government:

2. further enhance the integration and public availability of pre-competitive geophysical data in South Australia
3. undertake further geophysical surveys in priority areas, where mineral prospectivity is high and available data is limited
4. commit to increased, long-term and counter-cyclical investment in programs such as the Plan for Accelerating Exploration (PACE) to encourage and support industry investment in the exploration of greenfields locations.

What the Royal Commission found

The Commission found that expanded uranium exploration would provide additional benefits to the state and that there is good geological reason to believe that new commercial deposits of uranium could be found here, but the challenge is that vast areas of the state remain unexplored. It found that there are a number of barriers to industry investment in further exploration while commodity prices are relatively low. These barriers are shared with exploration projects for other minerals.⁸

To remove these impediments, the Commission found that:

- integrating the different geophysical aspects within the state government's South Australian Resource Information Geoserver (SARIG) and making it accessible to the public would deliver benefits to explorers⁹
- exploration in greenfield (unexplored) areas carries greater risk due to the lower probability of success combined with the high cost of exploration and the need for expertise in interpreting high-resolution geoscientific data and locating mineral deposits. These issues have led to a paucity of drilling data across large areas of South Australia¹⁰
- PACE has underpinned an additional \$700 million in private mineral exploration investment over 10 years, has increased the state's mining revenue by \$2400 million, and contributed to significant mineral discoveries¹¹
- counter-cyclical investment – a time when overall exploration expenditure is low – would leave South Australia better placed to take advantage of subsequent recoveries in the markets for minerals commodities.

What we heard

SARIG – ranked as the world’s best geological database to encourage investment in mineral exploration – allows the viewing of data from multiple geophysical measurement techniques; however, it does not integrate this data into a mathematical model of the geological subsurface. Industry said it is very important to use all available data to better understand regional geology. It would like the SARIG public interface to be improved and customised for easier use and analysis.

The challenge of increasing greenfield exploration is recognised by industry and academic institutions, as well as governments. For example, the federal government’s UNCOVER is a national strategy that seeks to increase collaboration and information sharing among stakeholders to address common issues associated with extensive cover.¹² The aim is to reduce barriers to investment in exploration of the state’s highly prospective, greenfield areas. The far west of South Australia represents a challenging area for exploration. Collaborations between industry and the government have been built through UNCOVER, which has led to an increase in the geological and surface characterisation of the area, increasing investor confidence.

Industry has expressed a desire for an expansion of the PACE and SARIG programs, including increased funding. In addition, industry suggests leveraging the state government’s copper strategy, primarily PACE Copper, to drive growth in uranium mining opportunities.

Our position

Support

Combining the SARIG dataset into a single comprehensive framework would increase its ability to support minerals exploration and discoveries in South Australia.

The next major mineral discoveries will come from beneath the barren cover rocks that account for more than 80 per cent of the state, where exploration has previously been obscured. While some of the world’s most prospective regions for uranium exploration occur here, such as the eastern Gawler Craton and the Curnamona Province, these areas are typically deeply covered and require drilling to test subsurface samples. Undertaking further geophysical surveys where mineral prospectivity is high would support these discoveries.

An independent expert review of all PACE programs between 2004 and 2013 found that for every \$1 of expenditure on PACE, there has been \$20 of exploration investment and \$48 in mining revenue.¹³ Additional government support to increase exploration investment would create jobs and business opportunities across the uranium exploration, mining, services and training sectors in South Australia.

What we will do

Expansion of uranium mining in South Australia would require the discovery of new ore and mineral deposits, as well as advances in metallurgical processing technologies to extract uranium from host ore bodies. Further integrating the state’s geophysical and other geoscience data and making it publicly available would help to achieve these requirements.

We will build on South Australia’s global ranking as the 10th best destination for mining investment attractiveness to position the state as the pre-eminent destination for uranium discovery, knowledge and supply. To do this we will implement a targeted Uranium Discovery and Development Strategy, which will be focused on increasing exploration investment in prospective regions and uncovering new styles of deposits. The immediate implementation of the strategy will position the state to take advantage of a subsequent recovery in markets for mineral commodities.

As part of the strategy, the government will:

- integrate the geoscience data obtained from drilling programs into a next-generation SARIG to provide explorers with sophisticated modelling capabilities from targeted drilling
- lead a Uranium Discovery Drilling Initiative for a major uranium drilling program in the eastern Gawler Craton and Curnamona Province to explore these highly prospective areas
- expand the South Australia Drill Core Reference Library at the Tonsley precinct to house the Uranium Discovery Drilling Initiative headquarters, and host research and innovation institutional partners to improve the state's exploration capabilities
- implement an industry drilling collaboration, 'Discovery Drilling', focused on priority uranium targets in collaboration with exploration companies, to take advantage of a subsequent recovery in mineral commodity markets
- establish a Drilling Service, Technology and Training Development Centre to bring together and collaborate with South Australian companies in the mining equipment technology and services sector
- provide support for start-up Aboriginal companies with a focus on drilling, sampling and Aboriginal cultural heritage service opportunities.

Responsibility

The agency responsible for implementing the government's actions is the Department of State Development.

Next steps

The Department of State Development will consult with other relevant state and federal agencies, the mineral resources and services sectors, research institutes and universities, and regional communities on the options to progress a Uranium Discovery and Development Strategy for South Australia.

Recommendation 5

That the South Australian Government ensure the full costs of decommissioning and remediation with respect to radioactive ore mining projects are secured in advance from miners through associated guarantees.

What the Royal Commission found

The Commission found that the risk of negative post-closure effects from exploration and mining is addressed by government holding a financial security or bond. The amount of the bond reflects the estimated cost of remediation and is usually adjusted over the mine's operational life.

This system was not standard practice when Olympic Dam was established and mine owner BHP Billiton has made an internal financial provision to address estimated remediation and closure costs. Any future major expansion of the mine would likely come under an amendment to the existing indenture.¹⁴

The Commission also found that the former state-owned Radium Hill mine and associated Rare Earths Treatment Plant at Port Pirie, which closed in 1961 and 1962 respectively, were not operated, regulated or decommissioned in accordance with current practice, and nor would they have been permitted under the current regulatory framework.¹⁵

What we heard

To ensure ongoing community confidence in mining operations, any subsequent amendments to the *Roxby Downs (Indenture Ratification) Act 1982 (SA)*, should include provisions for current regulatory practices, such as holding financial securities for post-mine rehabilitation costs.

The second Citizens' Jury report highlighted the ongoing remediation challenges at the Port Pirie and Radium Hill sites as contributing to the lack of trust in government to manage environmental issues in the best interests of the state.¹⁶

Our position

Support

The effective regulation of, and continuing social licence to operate, uranium mines demand that industry, not the state, meet the cost of mine decommissioning and remediation.

What we will do

Under section 62 of the *Mining Act 1971*, the state government requires financial assurances in the form of bonds or bank guarantees from mining and exploration companies to cover the assessed environmental remediation costs should a company not be able to meet its liabilities.

We will reduce the exposure risk to taxpayers of uranium mine rehabilitation and closure liabilities by:

- reviewing the financial assurance system under the Mining Act and investigating other arrangements that would encourage the progressive reduction of mine closure liabilities
- negotiating with BHP Billiton towards an improved level of financial assurance for Olympic Dam
- developing an effective long-term management plan for the environmental rehabilitation and remediation of the former Port Pirie and Radium Hill sites, in partnership with state and federal government regulatory agencies, considering the community feedback in relation to these sites.

Responsibility

The agency responsible for implementing the government's actions is the Department of State Development.

Next steps

The Department of State Development will:

1. as part of the Leading Practice Review of South Australia's mining laws (an objective of which is to implement flexible financial assurance models to increase community confidence in mine closure and environmental rehabilitation performance), release a discussion paper on different options for an effective and efficient financial guarantee system to cover the full cost of rehabilitating mining areas
2. start a dialogue with BHP Billiton about a contemporary financial assurance arrangement for Olympic Dam
3. progress the development of an effective long-term management plan for leading practice environmental rehabilitation and remediation measures, and site safety and security infrastructure to reduce exposure to potential hazards at the former Radium Hill mining and Port Pirie uranium processing sites, in partnership with state and federal regulatory agencies.

Further processing and manufacture

The Royal Commission considered a number of specific activities in the further processing of minerals and the processing and manufacturing of radioactive and nuclear substances (but not for, or from, military uses). Some of these activities, such as uranium enrichment, fuel fabrication and reprocessing of nuclear fuel, are prohibited by Commonwealth legislation and were also found to be not commercially viable.¹⁷

However, the Royal Commission found that expanding our activities in nuclear medicine could offer a range of opportunities for South Australia related to advanced manufacturing and the commercialisation of research and development. This finding is consistent with other analysis prepared for the Commission showing that the development of a nuclear waste storage and disposal facility would be of significant value for broader science, technology, engineering and mathematics (STEM) research and education in the state with the potential to attract international researchers and industry.¹⁸

These knowledge-based industries share many strengths, including creative and highly skilled workforces and sophisticated use of technology to drive innovation. We are committed to growing these capabilities to transform South Australia into a modern, high technology and globally competitive economy.

Partnerships between government, industry and universities will drive this transformation. In the recent State Budget¹⁹, we announced initiatives to support this collaboration funding for the University of South Australia's Future Industries Institute to encourage innovation and new industry and to assist start-up enterprises.

Recommendation 6

That the South Australian Government remove at the state level, and pursue removal of at the federal level, existing prohibitions on the licensing of further processing activities, to enable commercial development of multilateral facilities as part of nuclear fuel leasing arrangements.

What the Royal Commission found

The Royal Commission found that the development of facilities in Australia to provide these services is prohibited by federal and state legislation. The Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* prohibits the Minister for the Environment from approving the construction or operation of a nuclear fuel fabrication plant, nuclear power plant, enrichment plant or reprocessing facility.²⁰ In South Australia, conversion and enrichment activities are prohibited by the *Radiation Protection and Control Act 1982*.²¹

The Commission found that South Australia would be technically capable of providing services to further process uranium for use in nuclear reactors.²² However, there are barriers to entry for an Australian operator seeking to provide further processing services, such as a global oversupply of these services and difficulties obtaining a commercial licence for the technology.²³

The Commission undertook business case assessments of these services and found that it is unlikely that the development of a new supply of nuclear fuel in South Australia would be commercially viable.²⁴ Further processing of uranium may be viable if there is substantial growth in the demand for services from nuclear power stations developed in Asia that cannot be met by existing global capacity or if a fuel leasing arrangement were established.²⁵

In the Commission's discussion, fuel leasing refers to the sale of uranium oxide concentrate (UOC) or a value-added form of nuclear fuel from South Australia to overseas customers before its return as used fuel for disposal.²⁶ The Commission found that fuel leasing may provide an opportunity for South Australian further processing facilities to enter new and otherwise closed markets.²⁷ However, any such arrangement would depend on the state establishing an international or regional long-term storage and geological disposal facility for used fuel.²⁸

What we heard

In relation to broader legislative changes, Citizens' Jury Two wanted to be sure that any changes were not seen as a go-ahead for an unrestricted expansion of the nuclear industry.²⁹

Our position

Do not support

The government will not pursue the removal of existing prohibitions at this time. Currently, there are limited economic opportunities for South Australia to develop further processing activities due to the significant barriers to entry and without established waste storage and disposal facilities.

Recommendation 7

That the South Australian Government promote and actively support commercialisation strategies for the increased and more efficient use of the cyclotron at the South Australian Health and Medical Research Institute (SAHMRI).

What the Royal Commission found

The Royal Commission found that there are opportunities to make greater use, and expand the capabilities, of the cyclotron at SAHMRI, which produces radioisotopes in relatively small volumes for medical applications in South Australia, and is also used for research and development of new techniques and products in nuclear medicine.³⁰

The Commission noted that South Australia has significant expertise and skill in this field, in hospitals and universities and at the Molecular Imaging and Therapy Research Unit at SAHMRI.³¹ Collaboration between these organisations could enable South Australia to develop an internationally recognised centre of expertise in nuclear medicine research.

What we heard

Maintaining and enhancing cyclotron facilities and developing new nuclear medicine treatments were identified as key areas for potential investment in the Commonwealth Government's National Research Infrastructure Roadmap Issues Paper.³² In SAHMRI's response to the paper, it identifies the value of strengthening links between cyclotron operators in Australia. The paper, which is expected to be finalised in early 2017, will guide Commonwealth Government investment in national research infrastructure during the next 10 years.³³

Our position

Support

Increasing the use and commercialisation of the SAHMRI cyclotron could enable the state to consolidate and develop an internationally recognised centre of expertise in nuclear medicine research. SAHMRI is already developing new radioisotopes for prostate cancer diagnosis and treatment, and production processes for flutemetamol, a product for the early diagnosis of Alzheimer's disease.

We encourage SAHMRI to further increase its commercial activities including efforts to attract private sector investment and a greater share of research grants to support its future cyclotron activities.

What we will do

Working through our existing relationships with SAHMRI, we will pursue potential opportunities including:

- increasing exports to interstate and Asian markets of a range of existing and potential new nuclear medicine products
- establishing an internationally recognised training centre in collaboration with industry to train Australian and international nuclear medicine technicians
- a research fellowship in nuclear medicine in partnership with South Australian universities to secure additional investment in research and development from the National Health and Medical Research Council and other organisations.

Responsibility

The agency responsible for implementing the government's actions is the Department of State Development.

Next steps

The agency will engage with the Commonwealth Government, SAHMRI and the university sector on the opportunity for collaboration, noting the anticipated release of the National Research Infrastructure Roadmap early in 2017.

Electricity generation

The government supports the Royal Commission's finding that it is necessary to significantly transform Australia's energy sector to both reduce emissions and support pathways to decarbonise other economic sectors such as transport. We also support the Commission's finding that this transformation needs to be guided by stable medium- to long-term government policies that encourage investment and are based on evidence, not opinion or emotion.

The Commission has also made specific findings on the potential benefits that nuclear power – as a low-carbon energy source comparable with other renewable technologies – may offer in the transition to a low-carbon system.

We are committed to maintaining the competitiveness of the state's economy during the transition of South Australia's energy markets. Our 10 Economic Priorities recognise the opportunities for the state to have an innovative, globally competitive economy, which government can help to achieve by supporting new industries and jobs as Australia moves towards a low-carbon future.

South Australia's Climate Change Strategy 2015–2050 outlines these aspirations for a low-carbon, resilient economy. A key element of the strategy is support for market-based mechanisms as the most efficient means to achieve emission reductions.

This strategy also complements our Low Carbon Investment Plan for South Australia, which has set targets in 2025 of achieving 50 per cent of electricity production from renewable energy and \$10 billion of investment in low-carbon energy generation.³⁴

Through these and other measures we are committed to creating in South Australia not only one of the lowest emissions-intensive power systems, but also one of the most reliable and secure.

Recommendation 8

That the South Australian Government pursue removal at the federal level of existing prohibitions on nuclear power generation to allow it to contribute to a low-carbon electricity system, if required.

What the Royal Commission found

While nuclear power generation in Australia is currently prohibited under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999*, the Commission found sufficient evidence to not discount nuclear power as a potential future source of electricity.³⁵

However, the Commission also found that it would not be commercially viable to develop a nuclear power plant in South Australia from 2030 – which is the earliest date it could start operating if planning were to start immediately. This finding is based on the Commission's estimate of the costs of establishing and operating a plant and the characteristics of the state's energy market.³⁶

Because nuclear power's commercial viability may be improved under a range of scenarios, including the introduction of more stringent emissions abatement policies, the Commission found that the removal of prohibitions on the development of nuclear power would enable it to be considered as part of a lower-carbon electricity system.³⁷

What we heard

The future cost competitiveness of nuclear power generation in Australia is uncertain.³⁸ It would require large, upfront investment in the National Electricity Market³⁹ in which demand is forecast to remain flat during the next 20 years, despite expected population growth of 30 per cent. Electricity consumption is forecast to decrease in the same period in South Australia.⁴⁰

Other issues that contribute to the uncertain viability of nuclear power include potential future cost reductions for other low-emission technologies and the future contribution of energy storage technologies to support local energy supply.⁴¹

Our position

Do not support

The government considers that nuclear power in the short to medium term is not a cost-effective source of low-carbon electricity for South Australia and, as such, pursuing the removal of Commonwealth legislative prohibitions cannot be justified.

Next steps

South Australia will continue to implement policies and programs that are economically responsible and support our climate change and carbon emission reduction commitments. As outlined in our response to Recommendation 10, this will extend to monitoring future advances in technology which may lower the cost of nuclear power as a low-carbon energy source.

Recommendation 9

That the South Australian Government promote and collaborate on the development of a comprehensive national energy policy that enables all technologies, including nuclear, to contribute to a reliable, low-carbon electricity network at the lowest possible system cost.

What the Royal Commission found

The Commission found that there is a need to analyse the elements and operation of Australia's future electricity system as a whole⁴², and that carefully considered government policies were required to ensure a low-carbon electricity system that was highly reliable at the lowest possible system cost.

What we heard

The Council of Australian Governments (COAG) Energy Council has the lead role in developing national energy policy. Recognising the need for national policy coordination, COAG Energy Council is working towards integrating energy and climate change policy, and has tasked Australia's Chief Scientist with reviewing the National Electricity Market. This will inform the forthcoming consideration of national energy policy by COAG and its Energy Council.

This analysis will also inform the federal government's review in 2017 of Australia's emissions reduction policies and assist the Energy Council to assess the emissions reduction mechanism most capable of integrating with the National Electricity Market. Options are being developed for the electricity sector to achieve a 28% reduction in emissions below 2005 levels by 2030. These options include advice on the economic and operational impacts of existing state and territory emission reduction policies.

Our position

Support

A secure, clean and affordable energy future for South Australia requires complementary and harmonised state and national energy and climate change policies.

What we will do

At the national level, we will advocate for the integration of national energy and climate change policy to enable emission reduction targets to be met while maintaining an affordable, sustainable and reliable energy supply.

A national Emissions Intensity Scheme would be highly effective in meeting Australia's future emission reduction targets. Such a scheme would set a target limit on carbon emissions per unit of electricity (such as a kilowatt hour) and would require electricity generators to pay for the carbon produced above this limit. The COAG Energy Council agreed at its August 2016 meeting to consider the economic and operational impacts of existing state and territory emission reduction policies. The advice will inform the Council's consideration of how to better integrate energy and emissions policy.⁴³

The state government has commissioned Frontier Economics to model a national Emissions Intensity Scheme.

Action is also being taken to ensure that the transition of South Australia's energy market supports energy security, proper retail energy competition and our emission reduction goals.

Recognising the importance of the interconnection of electricity supply between South Australia and the eastern states, we have provided \$0.5 million towards an assessment of options to create a new high-capacity interconnector to the state. This work will be progressed during the next 12 months. It could support greater energy security and reliability as well as provide potential new markets for renewable energy generated in South Australia.

We are seeking advice from the Essential Services Commission of South Australia as the state's independent electricity market regulator on whether electricity price increases by major retailers in South Australia are justified.

We are also conducting a tender to purchase 25 per cent of the government's own contracts for electricity supply from renewable energy providers that use technology such as battery storage and 75 per cent from a low-emissions generation source that introduces new competition into the energy market. In addition we are accepting applications for \$24 million in grants to incentivise companies to extract more gas and supply it to the local market, including electricity generators.

Responsibility

The agencies responsible for implementing the government's actions are the Department of State Development and Department of the Premier and Cabinet.

Next steps

On 9 December 2016, COAG will discuss the national energy market following a presentation from Australia's Chief Scientist. The COAG Energy Council will discuss the integration of energy and climate change policy at its 14 December 2016 meeting.

South Australia will continue to implement policies and programs that are economically responsible and support our climate change and carbon emission reduction commitments.

Recommendation 10

That the South Australian Government collaborate with the Australian Government to commission expert monitoring and reporting on the commercialisation of new nuclear reactor designs that may offer economic value for nuclear power generation.

What the Royal Commission found

The Royal Commission assessed that the earliest possible operational start date for a nuclear power plant in South Australia would be 2030.⁴⁴ Integration of a large plant into the South Australian region of the National Electricity Market would require significant upgrades to electrical transmission infrastructure, which would not be required for small plants.⁴⁵ However, these are not commercially viable at current costs.⁴⁶

The Commission heard evidence of the potential for reductions in the cost of nuclear power, including for both large plants and small modular reactors, which could improve their viability.⁴⁷ Assessment of this would require ongoing monitoring of developments in reactor technologies.

What we heard

Ensuring the future reliability and security of base-load electricity supply was a key theme emerging from consultations with industry stakeholders on the Royal Commission's recommendations. Ongoing investigation of nuclear power was encouraged as part of a mix of energy alternatives, including energy storage, battery technology, geothermal and hydro.

Our position

Support

As part of understanding future energy market scenarios, all energy sources should be monitored. Notwithstanding that nuclear power is currently not commercially viable nor supported in South Australia, analysis of whether it has a role in a low-carbon energy system delivered at the lowest-possible system cost would require keeping track of developments in reactor designs.

What we will do

We will progress this recommendation through collaboration with the Australian Nuclear Science and Technology Organisation (ANSTO). As the custodian of Australia's nuclear capabilities and expertise, ANSTO monitors the worldwide development and commercialisation of new nuclear reactor designs, and provides advice to government and other stakeholders. Under the Commonwealth's *Australian Nuclear Science and Technology Organisation Act 1987*, it is mandated to cooperate with the states and other organisations in Australia in matters related to nuclear science and technology and their applications.

Responsibility

The agency responsible for implementing the government's actions is the Department of State Development.

Next steps

The Department of State Development will leverage work undertaken by ANSTO in monitoring and reporting on international technical developments, and the commercial applicability for Australia and South Australia in respect of both small modular nuclear power reactors and large nuclear power plants.

Management, storage and disposal of radioactive waste

The Royal Commission assessed the feasibility of establishing facilities in South Australia for the management, storage and disposal of nuclear and radioactive waste from the use of power generation, industry, research and medicine (but not from military uses). It also assessed the circumstances necessary for those facilities to be established and to be viable, and the risks and opportunities that would be associated with establishing, operating and regulating those activities.

The Commission found that globally there are substantial quantities of used fuel from nuclear reactors in temporary storage awaiting permanent disposal. The Commission noted that while this waste is safely and securely stored in wet storage within nuclear reactors or in dry cask storage in purpose-built facilities, in many countries there are no facilities available for its permanent disposal.⁴⁸

The international agreement governing the management of spent nuclear fuel is the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.⁴⁹ This treaty, which has been ratified by 42 countries, requires nations that generate used fuel to take care of it domestically. The same convention also allows countries to pursue international or regional solutions for the disposal of spent nuclear fuel.

The Commission found that establishing a repository for the disposal of such waste from other countries could provide significant and enduring economic benefits to the South Australian community. The concept assessed by the Commission was for facilities owned by the South Australian Government and operated for the benefit of the South Australian community.

The International Atomic Energy Agency (IAEA) has prepared guidance on initiating multinational cooperation for the development of a radioactive waste repository, which offers further broad insights and guidance.

Based on experience in Finland and Sweden, the IAEA estimated that 15 to 20 years would be required from project inception to the start of construction.⁵⁰ Critical factors for development include⁵¹:

- public confidence in and acceptance of the project, especially in the host country
- an agreed need for cooperation among the participating countries and well-developed national strategies for waste management among these countries
- a well-developed siting strategy that allows host communities to arrive at an informed decision on consent
- compliance with all safety requirements and the confidence of responsible regulators
- a robust contractual framework that is binding on the participating countries and encourages continued future cooperation.

The IAEA guidance is broadly consistent with the concept for storage, management and disposal facilities outlined in the Royal Commission's report. An important difference is that the IAEA outlines a model for multinational cooperation where facilities are jointly owned in a partnership.

Recommendation 11

That the South Australian Government pursue the opportunity to establish used nuclear fuel and intermediate level waste storage and disposal facilities in South Australia consistent with the process and principles outlined in Chapter 10 of the [Royal Commission] report.

What the Royal Commission found

The Royal Commission found that the storage, management and disposal of international radioactive waste presents a significant economic opportunity for South Australia. The Commission's assessment of the economic opportunity showed that a project to develop radioactive waste management facilities and their associated infrastructure would be viable under a range of cost, revenue and market share scenarios.⁵² It further found that, given the size of the opportunity, the activity should be undertaken by government⁵³ and that a State Wealth Fund should be established to preserve the benefits for future generations.⁵⁴

The Commission also found that there is international scientific consensus that deep geological disposal is the best technical solution for the long-term management of used nuclear fuel. Geological disposal facilities satisfy the twin objectives of isolation and containment through a combination of suitable geology and specifically engineered barriers, so that containment is not reliant on the performance of any barrier alone.⁵⁵ The Commission found that the concept of deep geological disposal has been the subject of research, development and demonstration for more than 30 years.⁵⁶

The Commission concluded that South Australia has a unique combination of attributes, including its geology, low levels of seismic activity, arid environment, mature and stable political, social and economic structures, and sophisticated frameworks for securing long-term agreement with Aboriginal communities, which made developing a geological disposal facility in the state feasible.⁵⁷

While the Commission acknowledged that a market does not exist for a multinational repository solution, it found that there is a significant global inventory of used nuclear fuel awaiting permanent disposal⁵⁸ and there would be international interest in a South Australian facility.⁵⁹ It also acknowledged that there would be a range of complex and important steps that would need to be taken to progress such a proposal, including assessing social consent to proceed.⁶⁰

The Commission found that broad social consent and specific community consent must be obtained before any new nuclear activity in South Australia. It also stated that political bipartisanship and stable government policy are essential, particularly given the long-term operation of facilities and the need for certainty for potential client nations.

What we heard

As noted on page 3, the first Citizens' Jury focused on Recommendation 11. It produced a report that outlined four key themes that all South Australians should discuss: safety; informed community consent; trust, accountability and transparency; and economics and benefits/risks for the state. These themes informed the government's broader engagement with the South Australian community.

The *Community Views Report* provides detailed information about the breadth of the consultation program. It shows that there are differing views in the community about the proposal to explore the establishment of a nuclear waste storage and disposal facility. It also highlights that there were different reasons for people's participation in the debate. The report looks deeply into the themes of safety, consent, trust and economics.

Within the four broad themes, the priority issues were:

Safety – transport of waste, the environment, people (workers, nearby communities, future generations), and storage and disposal of waste

Community consent – community consent is required; people need to be informed, aware and educated; and Aboriginal consent is required

Trust, accountability and transparency – government transparency and lack of trust in government

Economics and benefits/risks for the state – increased state revenue, more jobs, and environmental risk and its economic impact.

The second Citizens' Jury report stated that the jury generally had a strong conviction in taking a position one way or another. Two-thirds of the jury did not want to pursue the opportunity under any circumstances and one-third supported a commitment to pursue the opportunity under the circumstances outlined in the jury report.

The Royal Commission found that South Australia has the necessary attributes, including geological stability, and capabilities to develop a waste disposal facility. While this would position us well to take advantage of the opportunity, the debate has identified a number of key issues and a diversity of views in the community.

Throughout the consultation program, trust, accountability and transparency of government was a recurring topic. This relates to confidence that the economic benefits could be realised, that the community's voice would be heard and that a large-scale project could be successfully delivered. While safety was the most important issue in the community's representative feedback, it was not as prominent in Citizens' Jury Two's report. Importantly, the consultation has highlighted the need for a bigger conversation about how Aboriginal people want to be seen, valued and recognised, and on 'unfinished business' from the past.

Our position

Support continued investigation

Having considered all the community feedback, the government has decided that discussion should continue on a proposed nuclear waste facility.

The government has also concluded that the only path forward is the restoration of bipartisanship and broad social consent, secured through a statewide referendum.

Continued public debate about South Australia's role in the nuclear fuel cycle is important and ultimately it is a matter that the people should decide. Not political parties.

If broad social consent were to be achieved through a referendum, a local Aboriginal community would be given a final right of veto on any future facility on their lands.

The Royal Commission was clear that bipartisanship on this issue is critical.

Without bipartisanship support, the option of a nuclear waste disposal facility for South Australia cannot proceed further. A referendum would, of course, require bipartisan support.

From now, we will facilitate continued discussion and work to restore a bipartisan position in relation to this matter.

Responsibility

Nuclear Fuel Cycle Royal Commission Consultation and Response Agency (CARA).

Next steps

CARA will provide advice to government in consultation with the CARA Advisory Board.

Recommendation 12

That the South Australian Government remove the legislative constraint in section 13 of the *Nuclear Waste Storage Facility (Prohibition) Act 2000* that would preclude an orderly, detailed and thorough analysis and discussion of the opportunity to establish such facilities in South Australia.

What the Royal Commission found

Section 13 of South Australia's *Nuclear Waste Storage Facility (Prohibition) Act 2000* prohibits the government from expending public funds to encourage or finance the construction or operation of nuclear waste storage facilities. An amendment made to section 13 in April 2016 enables the use of public money 'for the purpose of encouraging or financing community consultation or debate on the desirability or otherwise of constructing or operating a nuclear waste storage facility in South Australia'.⁶¹

The Commission noted that the government may want to quite properly seek further information or more detail about matters raised by the Commission or in response to a community request. The Commission states that government should not have to answer a legal question each time as to whether such activity falls outside section 13.

The Commission found that current prohibitions under the Act on the construction or operation of a nuclear waste storage facility (section 8) and on the importation of nuclear waste (section 9) should remain in force.⁶²

What we heard

The second Citizens' Jury report raises concerns that the removal of section 13 from the Act would 'open the door for unrestricted expansion of the nuclear industry'. The jury recommended that if any legislative change were to happen it should be incremental, and in the first instance to enable an assessment of the economic viability of the proposal.⁶³

Our position

Do not support

The government will not pursue policy or legislative change at this time. We will, however, continue to facilitate discussion and remain open to pursuing this opportunity for South Australia, consistent with the response to Recommendation 11.

Operational overview

On 1 July 2016, the Nuclear Fuel Cycle Royal Commission Consultation and Response Agency (CARA) was formed as an attached office under South Australia's *Public Sector Act 2009*.

An Advisory Board was established to provide strategic oversight throughout the consultation program.

The *Community Views Report* summarising the consultation program led by CARA and the Advisory Board's report are available at www.nuclear.sa.gov.au

The total cost associated with CARA's activities in 2016/17 is anticipated to be \$8.2 million. This supported the following activities:

- citizens' juries involving more than 300 South Australians (\$1.5m)
- a statewide consultation program with events in more than 130 metropolitan, regional and remote locations (\$2.1m)
- communications to raise awareness and encourage participation (\$1.4m)

- analysis of community feedback and research (\$0.5m)
- staffing and office expenses (\$1.7m)
- corporate overheads and legal fees (\$0.6m)
- Advisory Board (\$0.4m).

The government agencies identified in this report will lead the implementation of those Royal Commission recommendations supported.

Notes

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- 5 *Environment Protection and Biodiversity Conservation Act 1999* (Cth), section 21; NFCRC Report, p. 21.
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- 21 *Radiation Protection and Control Act 1982 (SA)*, section 27.
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- 23 *ibid.*, pp. 31–34.
- 24 *ibid.*, p. 31.
- 25 *ibid.*, p. 36.
- 26 *ibid.*, p. 108.
- 27 *ibid.*, p. 109.
- 28 *ibid.*
- 29 *South Australia's Citizens' Jury on nuclear waste – Final report*, November 2016, p. 5, www.nuclear.sa.gov.au
- 30 NFCRC Report, p. 38.
- 31 *ibid.*
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- 33 *ibid.*, p. 5.
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- 39 *ibid.*, p. 55–56.

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