

SUMMARY

South Australia can safely increase its participation in nuclear activities. Such participation brings social, environmental, safety and financial risks. The state is already managing some of these risks, and the remainder are manageable.

Some new nuclear fuel cycle activities (see Figure S.1) are viable. One in particular, the disposal of international used fuel and intermediate level waste, could provide significant and enduring economic benefits to the South Australian community.

Viability analysis undertaken for the Commission determined that a waste disposal facility could generate more than \$100 billion income in excess of expenditure (including a \$32 billion reserve fund for facility closure and ongoing monitoring) over the 120-year life of the project (or \$51 billion discounted at 4 per cent). Given the significance of the potential revenue and the extended project timeframes, the Commission has found that were such a project to proceed,

it must be owned and controlled by the state government, and that the wealth generated should be preserved and equitably shared for current and future generations of South Australians. This presents an opportunity that should be pursued.

Social consent is fundamental to undertaking any new nuclear project. Social consent requires sufficient public support in South Australia to proceed with legislating, planning and implementing a project. Local community consent is required to host a facility. In the event that this involves regional, remote and Aboriginal communities, consent processes must account for their particular values and concerns.

Political bipartisanship and stable government policy are also essential. This is particularly important given the long-term operation of facilities and the need for certainty for potential client nations.

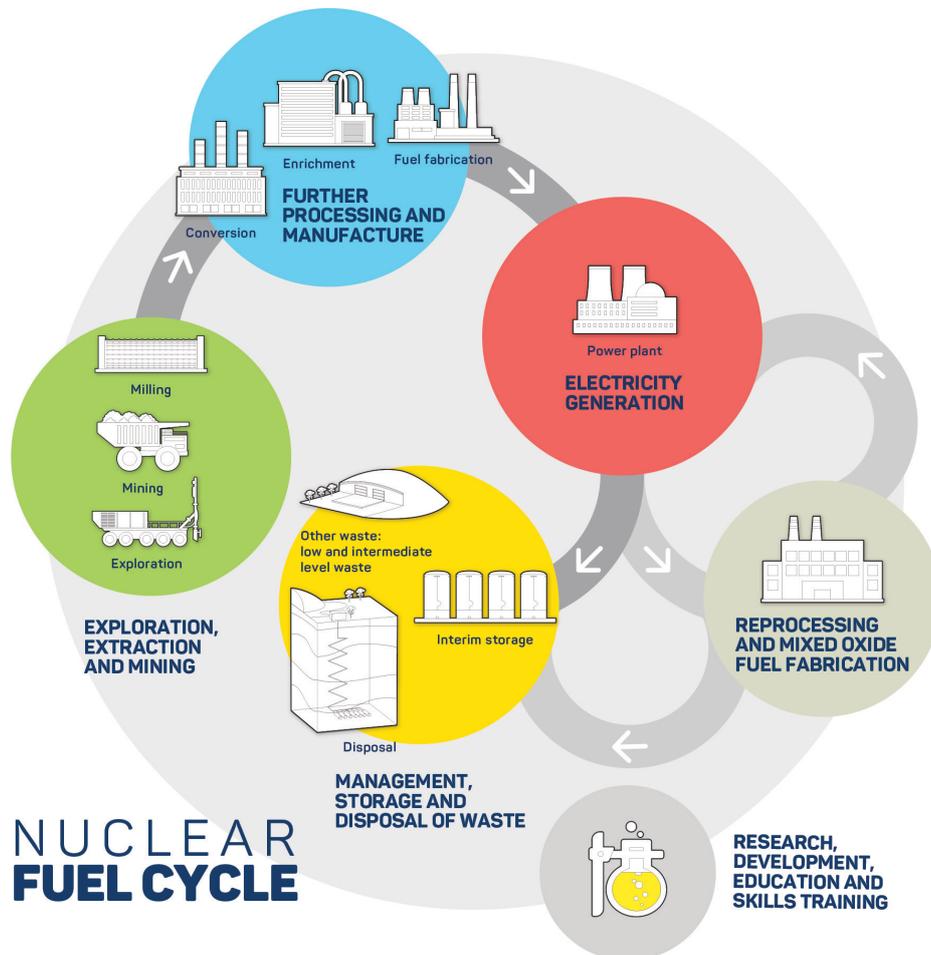


Figure S.1: The nuclear fuel cycle

EXPLORATION AND MINING OF RADIOACTIVE ORES

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 existing regulatory approvals processes for new uranium mines are unnecessarily duplicative at the state and federal levels. The Commission therefore recommends 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.**

There is good geological reason to believe new commercial deposits of uranium could be found in South Australia, but the challenge is that vast areas in the state remain unexplored. There are a number of barriers to industry investment in further exploration while commodity prices are relatively low.

Expanded uranium exploration and mining would provide additional benefits to the state. To realise this potential, the Commission recommends that the state government **further enhance the integration and public availability of pre-competitive geophysical data in South Australia.** It should **undertake further geophysical surveys in priority areas, where mineral prospectivity is high and available data is limited.** It should also **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.**

While lessons learned from legacy sites in Port Pirie and Radium Hill are now incorporated in contemporary regulatory standards for new operations, the Commission recommends that for future developments 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.**

FURTHER PROCESSING AND MANUFACTURE FROM RADIOACTIVE ORES

The Commission found the most significant environmental and safety risks associated with further processing of uranium for use in nuclear reactors are posed by chemicals rather than radioactivity. Many of these materials are already used and safely managed in Australia. Some risks would require new regulatory frameworks.

South Australia is technically capable of providing these services; however, there are significant barriers to entering these commercial markets. Further, these markets are currently over-supplied. The Commission considers that the provision of these services would not, either singularly or in combination, be commercially viable in the next decade.

There could be a potential competitive advantage if further processing services were linked with a guarantee to take back used fuel for permanent disposal. This concept of fuel leasing could in turn provide additional employment and technology-transfer opportunities. The Commission recommends 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.**

In relation to the production of medical isotopes, there are potential opportunities to expand existing facilities in the state. The Commission recommends 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).**

ELECTRICITY GENERATION FROM NUCLEAR FUELS

The Commission looked closely at reactor safety and the major accidents associated with nuclear power plants. While acknowledging the severe consequences of such accidents, the Commission has found sufficient evidence of safe operation and improvements such that nuclear power should not be discounted as an energy option on the basis of safety.

Taking into account the South Australian energy market characteristics and the cost of building and operating a range of nuclear power plants, the Commission has found it would not be commercially viable to develop a nuclear power plant in South Australia beyond 2030 under current market rules.

However, there will in coming decades be a need to significantly reduce carbon emissions and as a result to decarbonise Australia's electricity sector. Nuclear power, as a low-carbon energy source comparable with other renewable technologies, may be required as part of a lower-carbon electricity system. While the development of other low-carbon technologies will influence whether nuclear power would be required to meet Australia's future energy needs, it would not be able to play a role unless action is taken now

to plan for its potential implementation. The Commission recommends 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.**

In developing Australia's future electricity system there is a need to analyse the elements and operation of that system as a whole, and not any single element in isolation. This will be significant in determining the role that nuclear and any other technologies should play. The Commission recommends 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.**

Given the prospect that new reactor designs, and in particular smaller reactors, might be viably integrated in the Australian electricity network, the Commission recommends that the South Australian Government also **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.**

MANAGEMENT, STORAGE AND DISPOSAL OF RADIOACTIVE WASTE

There are large inventories of used nuclear fuel and intermediate level waste in safe but temporary storage around the world. Used nuclear fuel, a solid ceramic in metal cladding, generates heat, is highly radioactive and hazardous. The level of hazard reduces over time with radiation levels decreasing rapidly during the first 30 to 50 years of storage, with the most radioactive elements decaying within the first 500 years. However, the less radioactive but longer-lived elements of used nuclear fuel require containment and isolation for at least 100 000 years. The most serious accident involving used nuclear fuel involves potential exposure to radiation. Used fuel in storage or disposal cannot cause an explosion similar to that associated with a severe accident at a nuclear reactor.

There is international consensus that deep geological disposal is the best available approach to long-term disposal of used fuel. The Commission has found that there are now advanced programs in a number of countries that have developed systems and technologies to isolate and contain used nuclear fuel in a geological disposal facility for up to one million years. The most advanced of these will commence operation in the 2020s.

The safety of deep geological disposal is assured through the combined operation of geology and engineered barriers, and a detailed understanding of the radiological risks associated with used nuclear fuel. The evolution of geological conditions during the past hundreds of millions of years is well understood, and therefore future behaviour over hundreds of thousands of years can be predicted with confidence following detailed study. Engineered barriers are designed and constructed to complement the surrounding geology, and thereby provide a passively safe system of isolation and containment. The predicted future interactions between the used fuel, the engineered barriers and the surrounding geology are complex, but can be modelled and tested with a high degree of precision. The Commission has therefore found that South Australia has the necessary attributes and capabilities to develop a world-class waste disposal facility, and to do so safely.

To determine its viability, the Commission deliberately took a cautious and conservative approach to assessing used fuel inventories and potential global interest in international used fuel disposal. Based on those inputs, the Commission determined that a waste disposal facility could generate \$51 billion during its operation (discounted at the rate of 4 per cent). Further analysis indicated that by accumulating all operating profits in a State Wealth Fund, and annually reinvesting half the interest generated, a fund of \$445 billion could be generated over 70 years (in current dollar terms).

There is a range of complex and important steps that would need to be taken to progress such a proposal. The Commission has therefore recommended 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 this report.** This includes suggested immediate steps, and those that may arise in the future. The immediate steps are for the government to:

- a. make public the Commission's report in full
- b. define a concept, in broad terms, for the storage and disposal of international used fuel and intermediate level waste in South Australia, on which the views of the South Australian community be sought
- c. establish a dedicated agency to undertake community engagement to assess whether there is social consent to proceed

d. in addition, task that agency to:

- i. prepare a draft framework for the further development of the concept, including initial siting criteria
- ii. seek the support and cooperation of the Australian Government
- iii. determine whether and on what basis potential client nations would be willing to commit to participate.

The immediate next steps should be undertaken free from any debate about whether expenditure of public money in pursuing this opportunity is contrary to law. The government may quite properly want to seek further information or greater detail on matters considered by the Commission. It may also seek information in anticipation of a community request. Therefore, the Commission recommends 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.**