

The uranium fuel cycle converts mined uranium to a form suitable for generating electricity

In the uranium fuel cycle, only mining, milling and processing take place in Australia. All of these steps are subject to global supply and demand forces.

What is the uranium fuel cycle?

South Australian uranium is used as a source of fuel to generate electricity in many countries. However uranium straight from the ground is neither pure enough nor chemically suitable for electricity generation: a number of conversions must take place for this to happen.

Some of the main steps in the uranium fuel cycle are mining and milling, conversion, enrichment, fuel fabrication and production of electricity. In this cycle, only mining, milling and processing currently take place in Australia (see Figure below).



Steps in the uranium fuel cycle. Those occurring in Australia are indicated.

What happens after uranium mining, milling and processing in Australia?

Once uranium oxide (yellow-cake) is generated in Australia it is shipped overseas to a uranium conversion facility. Here, it is converted chemically to a gaseous form called uranium hexafluoride (UF₆), sometimes referred to as 'hex'.

Following conversion, how is uranium enriched?

After conversion to uranium hexafluoride, the uranium is processed in an enrichment plant. Centrifuges are used to concentrate elemental uranium (U²³⁵) from 0.7 percent weight to 'reactor grade', around 5 percent weight. The enriched uranium is then converted into another oxide form, UO₂, and is made into fuel for use in an electricity generating plant.

What are the market factors that influence the uranium fuel cycle?

The Organisation for Economic Co-operation and Development (OECD) has estimated that the annual contract value to convert Australia's uranium ore exports into fuel is approximately US\$500 million.

There is a global overcapacity of facilities for uranium enrichment. The resultant downward pricing pressure and financing limitations diminish the commercial attractiveness of building new uranium fuel production facilities in Australia. At the end of 2015, demand by enrichment facilities was only 83% of the available supply of uranium.