Australian Government
Australian Bureau of Agricultural and Resource Economics

OUTLOOK FOR URANIUM

ABARE submission to the House of Representatives Standing Committee on Industry and Resources' inquiry into developing Australia's non-fossil fuel energy industry

William Mollard and Andrew Maurer

May 2005

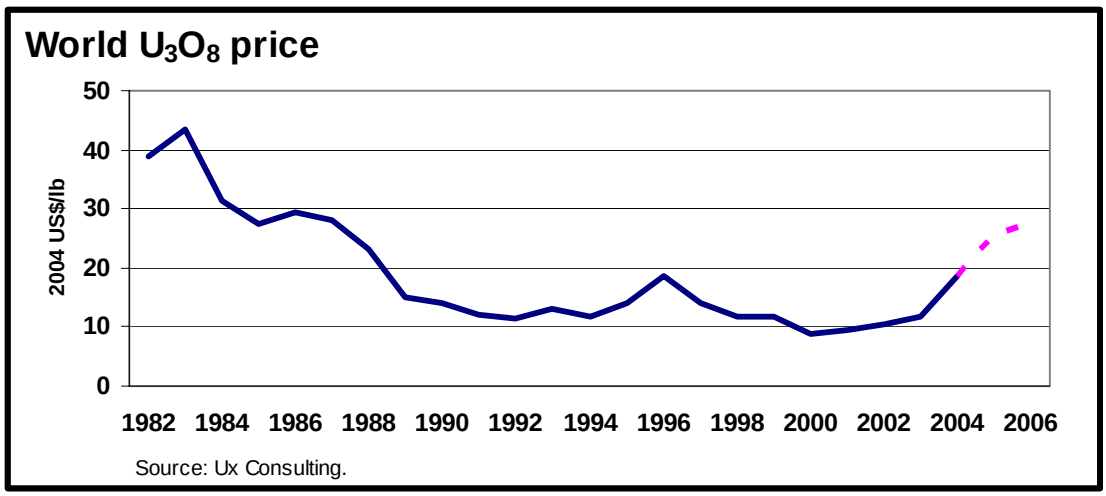
abare | Tel +61 2 6272 2000 | GPO Box 1563 Canberra | Edmund Barton Building
www.abareconomics.com | Fax +61 2 6272 2001 | ACT 2601 Australia | Macquarie Street, Barton, ACT 2600

Outlook for uranium

- World U_3O_8 prices are forecast to rise in the short term, with the underlying deficit between uranium consumption and production and a reduction in the availability of secondary supplies of uranium leading to a decline in stocks.
- In response to a large increase in uranium prices over the past two years, uranium exploration expenditure in Australia has increased substantially. However, increased exports in the short-term will be the result of higher expected production at existing Australian uranium mines.
- With Australia having large resources of uranium that can be extracted at relatively low cost, domestic output could increase substantially over the medium term. This would result in a strong increase in Australia's export earnings.

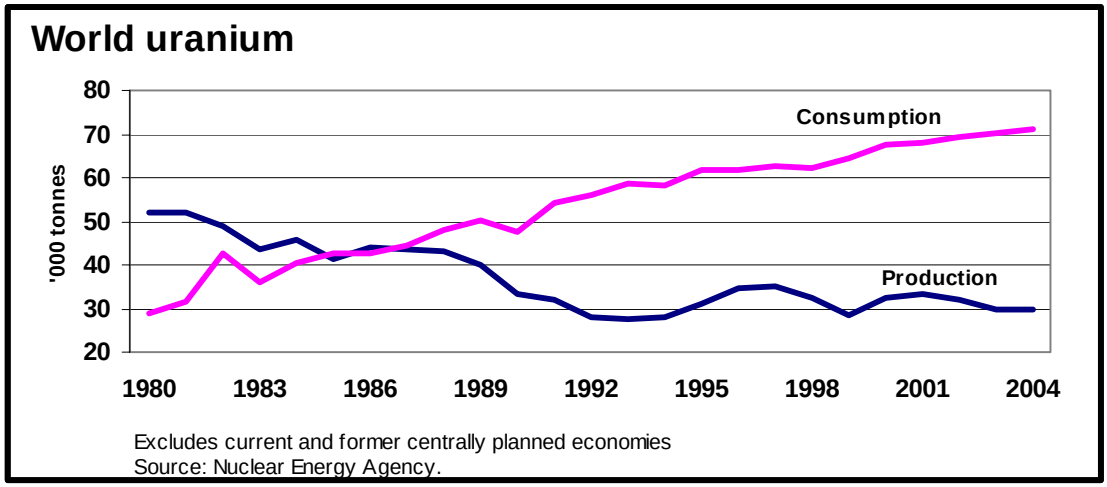
Uranium prices increasing strongly

The dwindling supply of uranium from secondary sources and associated increased concern over the future security of supply (given low and falling stocks) have resulted in a strong increase in world prices for uranium mine output (U_3O_8). Prices rose from approximately US$10 per pound in early 2003 to over US$26 per pound in early May 2005. With these trends expected to continue in the short-term, the average price of U_3O_8 is expected to increase by 43 per cent in 2005, to US$26.50 per pound, and by a further 7 per cent in 2006, to US$28.50 per pound.



Secondary supplies of uranium at low levels

Since the early 1990s, a large percentage of world uranium demand has been met by secondary supplies of uranium, particularly from Russia (Neff, 2004). In 2004, uranium produced from mine output of U_3O_8 only accounted for around 57 per cent of world uranium consumption. Secondary supplies of uranium come mainly from the reprocessing of spent nuclear fuel and the conversion of highly enriched uranium (HEU) from the disarmament of nuclear weapons.



The Euratom Supply Agency has indicated that given the planned growth of nuclear power in China and Russia, supplies of secondary uranium from Russia are likely to fall (ERA, 2004). Tenex (a Russian foreign trade company) has indicated that, beginning in 2008, it will no longer export its share of HEU feed from Russia. This will reduce secondary supplies to western markets (Melbye, 2004).

Such announcements are increasing market perceptions of a looming tightness in the secondary market.

Nuclear power capacity to increase in short-term

The only significant commercial use for uranium is as fuel for nuclear power plants. Nuclear power generation grew rapidly in the 1970s and 1980s, with electricity production from nuclear plants expanding from 100 terawatt hours in 1970 to 2000 terawatt hours in 1990. By 2003, electricity production from nuclear power plants had grown to approximately 2525 terawatt hours. The slowing rate of growth is largely a reflection of growing concern over the safety of nuclear reactors following incidents such as those at Chernobyl in Russia in 1986 and Tokaimura in Japan in 1999 (Grant Samuel, 2004).

While the International Energy Agency (IEA) expects nuclear capacity to increase moderately over the medium to longer term, the share of nuclear power in total electricity generation is expected to decline. Growing concerns over the environmental effects of carbon dioxide emissions from coal-fired electricity generation and relatively high world oil prices have increased debate on the role of nuclear power, particularly in countries that have ratified the Kyoto Protocol. While this may increase the attractiveness of nuclear power in some countries, constructing nuclear power plants requires substantial investment and long construction periods. Consequently, any significant change in the world energy mix is not likely in the short to medium term.

Despite a substantial amount of capacity expected to be added in Japan, China, India, Russia and South Korea, total growth in nuclear capacity will be largely offset by reactor retirements, particularly in Europe. For example, Belgium, Germany and Sweden plan to phase out nuclear power, largely in response to continued political pressure (Grant Samuel, 2004). In contrast, the United States announced a ‘Nuclear Power 2010’ initiative in 2002 which was designed to facilitate the development and construction of advanced nuclear reactors (Near Term Deployment Roadmap, 2001). Further, American President George Bush recently indicated that he will encourage the construction of nuclear power plants to reduce US dependency on foreign fuel sources (New York Times, 27 April 2005).

Nuclear power plants can source uranium from purchases of uranium or by reprocessing spent nuclear fuel to recover additional uranium. As a result, demand for uranium is affected by the relative cost of enrichment and uranium. However, with enrichment facilities currently operating at high capacity levels, any increase in supply of reprocessed uranium will require additional enrichment capacity (Grant Samuel, 2004). Consequently, consumption of uranium converted from U_3O_8 over the short term is expected to grow in line with growth in nuclear power generation.

World demand for uranium is forecast to increase by around one per cent in both 2005 and 2006, with capacity increases in South Korea and China more than offsetting a closure in Sweden. As part of Sweden's nuclear phase out plan, the 600 megawatt Baresebäck 2 reactor will be closed in 2005. In South Korea, the 1000 megawatt Ulchin 6 nuclear plant is due for completion in late 2005. Unit 2 of the Tianwan nuclear power plant is expected to begin commercial operation in China in December 2005.

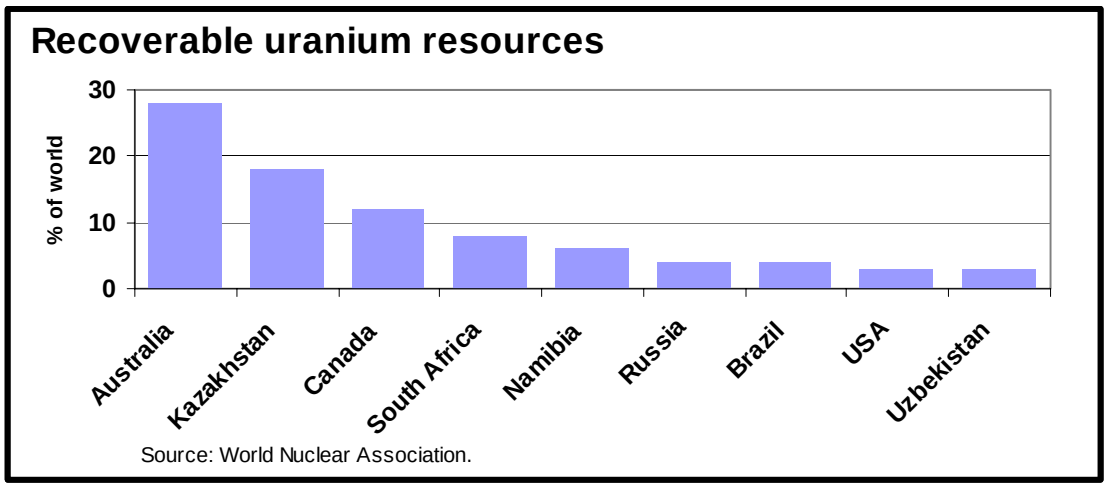
Nuclear energy output from Japan's two largest nuclear power companies, TEPCO and Kansai, is still below capacity following closures related to a number of safety issues. In May 2003, TEPCO commenced safety inspections on all of its reactors following the discovery that equipment inspection documentation had been falsified. As of late 2004, only 12 of TEPCO's 17 nuclear power plants had restarted. After a fatal accident at Kansai Electric Power Company's Mihama nuclear power plant in mid 2004, Kansai started safety inspections on their nuclear units. Technical, social and political constraints will delay the recommencement of these operations. However, new reactors are under construction, including the first unit of Tohuku's 1067 megawatt Higashidori nuclear power plant that is expected to begin commercial operations in late 2005.

In 2006, construction of the 1315 megawatt Shika 2 reactor in Japan is expected to be completed as is China Taipower's 1300 megawatt Lungmen 1 reactor in Chinese Taipei. Smaller reactors are also expected to be completed in Iran and India (with combined capacity of around 1400 megawatts).

World mine production

The recent increase in U_3O_8 prices has encouraged higher mine output and exploration activity. However, mine production is expected to only grow modestly over the short term. It takes a long time to develop a uranium deposit into an operating mine because of increasingly stringent environmental standards and handling requirements (Euratom, 2004).

Global mine production of uranium is forecast to increase by 5 per cent in 2005, largely due to higher production in both Canada and Australia. In 2004, Canada and Australia respectively accounted for an estimated 30 and 25 per cent of the world's uranium mine production.



Cameco, the world's largest producer of uranium, plans to increase production at its Canadian mines by over 3 per cent in 2005. This increase could be larger if the proposed capacity increases at McArthur River and Key Lake are approved (Cameco have applied for a licence to increase combined annual production capacity by 18 per cent). The expected level of Cameco's total production capacity has also been boosted by an extension of the mine life of the Rabbit Lake uranium mine to 2007 after additional reserves were identified.

In 2006, world uranium production is forecast to only rise modestly as increases in Canada and China (including the 200 tonne expansion of the Fuzhou mine) will be partly offset by the expected closure of the Rozna mine in the Czech Republic. Uranium production in Canada is expected to increase marginally, as higher output at existing operations offset mine closures. Construction of the Cigar Lake operation (the world's second largest high grade deposit) will begin in early 2005 and take an estimated 27 months to complete (Cameco, 2005).

Australian production to rise modestly in short-term

Virtually all of Australia's production of U_3O_8 is exported. Australia's exports of U_3O_8 are forecast to increase by 30 per cent in 2004-05 to 11900 tonnes. This is largely due to an expected increase in production at Olympic Dam and a return to normal production at the Ranger mine in the Northern Territory following a disruption to mining activities in 2003-04. Production at Ranger was interrupted following contamination of a local water source. Corresponding mainly with higher export volumes, export earnings in 2004-05 are forecast to increase by 43 per cent to $522 million. Higher U_3O_8 spot prices are not expected to contribute significantly to higher export earnings in the short-term as a large proportion of Australia's uranium mine production is sold under long term contracts (that reflect previously low spot prices).

Beyond 2004-05, Australia's export earnings from U_3O_8 are likely to increase sharply as supply contracts are renegotiated in an environment of stronger world prices and as domestic production expands.

Australian uranium exploration expenditure increased by 52 per cent in 2003-04 to $10.5 million, stimulated by significant rises in world spot prices (ABS, 2005). Expenditure in the first half of financial year 2004-05 ($10.7 million) exceeded total expenditure in 2003-04.

Australia has the world's largest resources of low cost uranium (recoverable at less than US$40 per kilogram of uranium), accounting for around 39 per cent of total world resources (Geoscience Australia, 2004). Olympic Dam is the world's largest uranium deposit with proven reserves of approximately 365 000 tonnes of U_3O_8. An expansion of the Olympic Dam mine is being investigated and could underpin a significant increase in domestic U_3O_8 production over the medium term. In addition, given Australia's large resources, production may increase substantially over the medium to longer term through the expansion of existing mines and the development of new operations.

Selected Australian uranium mine projects

Project	State	Owner	Resource (tonnes U3O8)	Operating status
Olympic Dam	SA	WMC Resources	365000	Operating
Jabiluka	NT	ERA	71000	Potential
Yeelirrie	WA	WMC Resources	52500	Potential
Valhalla	QLD	Summit Resources	50281	Potential
Ranger	NT	ERA	43895	Operating
Kintyre	WA	Rio Tinto	35000	Potential
Beverley	SA	Heathgate	21000	Operating
Westmoreland	QLD	Rio Tinto/UG	21000	Potential
Koongarra	NT	Cogema	14540	Potential
Officer Basin	WA	PNC	12000	Potential
Angela Pamela	NT	Uranium Australia	11500	Potential
Oobagooma	WA	Paladin	9840	Potential
Manyingee	WA	Paladin	7680	Potential

Source: Company reports

Conclusion

Concerns regarding secondary supplies of uranium have supported strong increases in the world U_3O_8 price. With mine production only able to grow modestly in the short-term, increases in consumption will be met by further reductions in the reservoir of secondary supplies and uranium stocks. As a result, world U_3O_8 prices are forecast to increase in both 2005 and 2006.

With the long lead times between discovery and production, increased Australian production in the short-term will occur through higher output at existing operations. Over the medium to longer term, however, Australia's large and low cost uranium resources could support significant increases in U_3O_8 exports.

References

ABARE 2004, Australian Commodity Statistics 2004, Canberra.

ABS (Australian Bureau of Statistics) 2004, Mineral and Petroleum Exploration Australia, December quarter 2004, cat. No. 8412.0, Canberra.

Cameco 2005, 'Cameco Reports Higher Fourth Quarter Earnings', Quarterly Report (www.cameco.com).

Euratom Supply Agency 2004, 'Euratom Supply Agency Annual Report 2003', Luxembourg.

Grant Samuel and Associates Pty Limited 2004, 'Annex A', in WMC Resources Ltd, Target's Statement, (www.wmc.com/acrobat/xstrata/targetstata.pdf)

Geoscience Australia 2004, Australia's Identified Mineral Resources 2004, Canberra.

Heff, T.L. 2004, 'History as a prelude: the outlook for uranium', Paper presented to the Nuclear Energy Institute International Uranium Fuel Seminar 2004, 10-13 October 2004, Florida, United States.

Melbye, S. 2004, World Nuclear Association Annual Symposium 2004, 'UF6 Conversion Supply Post 2006. (www.world-nuclear.org/sym/2004/melbye)

Near Term Deployment Group 2001, 'A Roadmap to Deploy New Nuclear Power Plants in the United States by 2010: Volume 1 Summary Report', United States.

Nuclear Energy Agency 2004. Uranium 2003: Resources, Production and Demand, OECD.

Ux Consulting Company 2005. The UX Report (www.uxc.com)

World Nuclear Association 2004, 'Supply of uranium', (www.world-nuclear.org/info/inf75.htm)