

UCL Australia Nuclear Working Group



About UCL

UCL was founded in 1826 to open up higher education in England to those who had been excluded from it – becoming the first university in England to admit women students on equal terms with men in 1878.

Academic excellence and research that addresses real-world problems inform our ethos to this day.

About UCL Australia

A department in the Faculty of Engineering Science (FES) at University College London (UCL) focused on education and research in sustainable management of energy and resources.

UCL's continued presence in Australia will be in **partnership** with the University of South Australia (UniSA).

- In 2015 UCL's FES and UniSA signed an memorandum of understanding with a framework for collaboration between FES and UniSA, through the new Future Industries Institute (FII).
 - In Feb 2016 the first agreement was signed for an MSc in Global Management of Natural Resources.
 - Joint education and research programmes are under development with student and staff exchange between the two institutions.

**SOUTH AUSTRALIAN
ROYAL COMMISSION
ON THE NUCLEAR FUEL CYCLE**

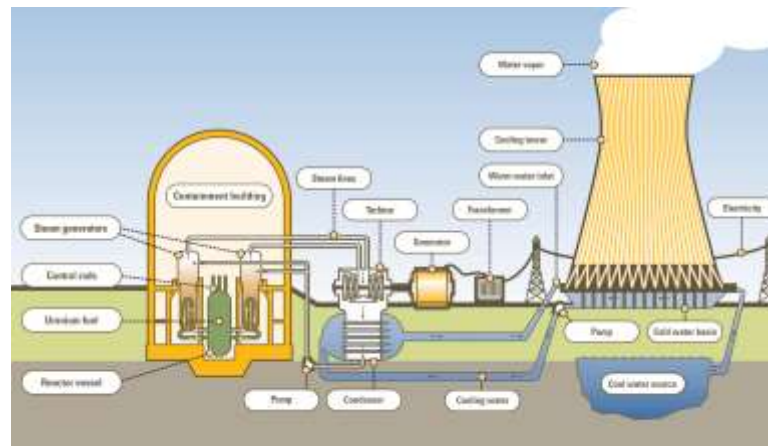
FURTHER PROCESSING AND MANUFACTURE

“In an already oversupplied and uncertain market, there would be no opportunity for the commercial development of further uranium processing capabilities in South Australia in the next decade. However, fuel leasing, which links uranium processing with its eventual return for disposal, is more likely to be commercially attractive, creating additional employment and technology-transfer opportunities.”



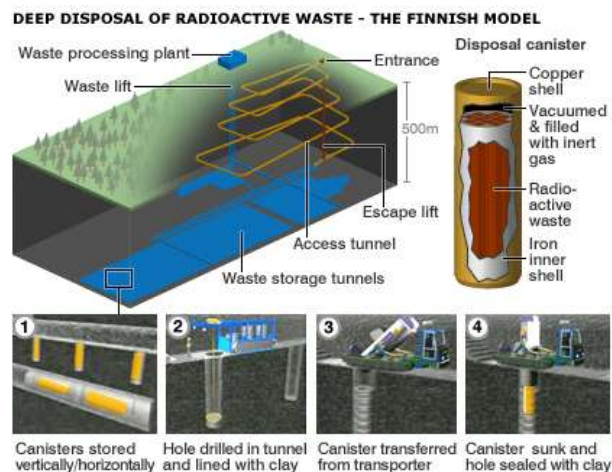
ELECTRICITY GENERATION

“Taking account of future demand and anticipated costs of nuclear power under the existing electricity market structure, it would not be commercially viable to generate electricity from a nuclear power plant in South Australia in the foreseeable future. However, Australia’s electricity system will require low-carbon generation sources to meet future global emissions reduction targets. Nuclear power may be necessary, along with other low-carbon generation technologies. It would be wise to plan now to ensure that nuclear power would be available should it be required.”



MANAGEMENT, STORAGE AND DISPOSAL OF WASTE

“The storage and disposal of used nuclear fuel in South Australia is likely to deliver substantial economic benefits to the South Australian community. An integrated storage and disposal facility would be commercially viable and the storage facility could be operational in the late 2020s. To deliver long-term benefits to future generations of South Australians, a special arrangement such as a state wealth fund should be established to accumulate and equitably share the profits from the storage and disposal of waste.”



UCL Australia Nuclear Working Group

Our goal is to share scientific knowledge in relation to the main issues identified by the Royal Commission.

The purpose is to assist and facilitate the process leading up to informed community decisions.

Our strategy is to source independent and skilled experts in the different areas identified by the RC by using UCL's network of subject matter experts from academia and industry.

UCL Australia Nuclear Working Group

Members

Magnus Nyden – UCL professor in applied surface chemistry, former Director of UniSA's Ian Wark Research Institute.

- Head of Department at UCL Australia
- Head of UCL Australia's Nuclear Working Group.



Christian Ekberg – professor in Nuclear Chemistry at Chalmers University of Technology, Sweden

Spent two years at the Australian Nuclear and Safety Organisation, ANSTO.

- Research includes the production and recyclability of novel innovative nuclear fuels.
- Leads research projects in both Industrial materials recycling and nuclear chemistry.



Tim Stone – PhD, Oxford and a Visiting Professor at UCL Australia.

- British businessman and senior expert adviser.
- Interests in infrastructure, finance, nuclear power and water supply.
- Senior adviser to the secretary of state for the UK Department of Energy and Climate Change since 2007.



Jim Voss – Visiting Professor at UCL Australia, businessman and previously Managing Director of Pangea Resources Pty Ltd.

- Nuclear power and nuclear waste management.
- Advises governments on the management of spent nuclear fuel and nuclear fuel leasing.
- Interests in the deployment of carbon-abating energy technologies.



Paola Lettieri – UCL Professor and recipient of prestigious Royal Academy of Engineering and Leverhulme Trust Senior Research Fellowship.

- Life cycle approach for nuclear waste management.
- Collaborates with industry and government organisations, including the Nuclear Decommissioning Authority.
- Expertise on the Life Cycle Assessment (LCA) of energy systems and waste management.



Max Zanin – PhD in mineral processing technologies, Associate Professor at UniSA.

- Leads research projects for the minerals industry.
- Expertise ranges from flotation chemistry to physical separation processes, clean energy technologies, simulation and modelling.
- General interest in exploration and minerals processing.



Michael Pollitt – Cambridge Professor and Assistant Director of Energy Policy Research Group, member of Cambridge Corporate Governance Network.

- Advisor to UK Competition Commission, New Zealand Commerce Commission, Ofgem, Ofwat, ESRC, Norwegian Research Council, the DTI, World Bank and European Commission.
- Consultant for National Grid, AWG, Eneco, Nuon, Roche and TenneT.
- Coach at Cambridge MBA's Energy & Environment concentration, and University Energy Champion for Policy, Economics and Risk.



Jonathan Mirrlees-Black – PhD Oxford, senior advisor Cambridge Economic Policy Associates.

- Member of Centre for Competition and Regulatory Policy at City University, London.
- Visiting Professor at UCL Australia
- Independent consultant, advising on economics, finance, and strategy with a particular focus on energy.



Pam Sykes – Professor at Flinders University and Chair of the Institutional Biosafety Committee at Flinders Centre for Innovation in Cancer.

- Strategic Professor in Preventive Cancer Biology
- Leads research group and post-graduate students studying biological effects of low doses of ionising radiation.



Geraldine Thomas – Professor at Imperial College specialising in molecular pathology of cancer.

- Science communicator with opinion editorial pieces and comments following the Fukushima nuclear accident.
- In 2015 she appeared in the TV documentary series Uranium - *Twisting the Dragon's Tail*.
- Provided testimony to the SA Royal Commission in October 2015 regarding the effects and threats of radiation.



<https://youtu.be/GCTHsXGbpfs>

Mark Johnson - UCL Australia

- managing the communication process to facilitate community information and engagement.



THE NEXT STEPS –

**COMMUNICATING THE SCIENCE BEHIND SOME OF
THE PRESSING ISSUES**

2016-02-22

Pressing issues in relation to the nuclear fuel cycle in Australia

- Volatility of uranium demand affects capital expenditure and new projects
- Uranium Mining is a big share of South Australian economy
- South Australia is a unique geological environment for uranium
- Innovative Exploration Methods can lead to new discoveries
- Scientific Research can lead to cheaper, more efficient and environmental friendly processing of uranium ores
- Environment and Safety of Uranium Mining
- Community Perception of Uranium Mining
- How much radiation exposure do Australian's receive?
- How Is Australian Uranium Made into Nuclear Fuel?
- Does Nuclear Power Reduce Greenhouse Gas Emissions?
- How Are Radioactive Wastes Managed?
- Global Demand and Supply for Nuclear Reactor Fuel
- Is It Safe to Ship Highly Radioactive Materials?
- What is a Nuclear Reactor

On behalf of UCL Australia's Nuclear Working group

Magnus Nydén

Head of Department | University College London (Australia)

www.ucl.ac.uk/australia

University College London | London's Global University

Why South Australia is in a unique position to capitalise on global demand for uranium to generate electricity

South Australia has the world's largest deposit of uranium, but has recently limited its mining activities. The state displays key characteristics that will allow it to respond to global demand for mined uranium to generate electricity in the future.

What influences the global market for mined uranium?

Basic supply and demand forces as well as environmental and geopolitical considerations influence the mined uranium market.

The 2011 Fukushima disaster in Japan dramatically reduced the value of uranium: price per kilogram fell from US\$140 to US\$70. Uranium mining companies quickly lowered investments, limited the capacity of existing operations and deferred new production.

Australia's spend on uranium exploration has decreased from AU\$190 million in 2011, to AU\$98 million in 2012, and AU\$40 million in 2014.

Uranium from mining ores – also known as 'primary uranium' – competes in the global market with secondary sources of uranium. These include less pure mined materials, surplus stockpiles, spent nuclear fuel and highly enriched uranium. Secondary supply sources are all projected to decrease in the future, leading to an increased demand for mined uranium.

Quick facts: what is uranium?

- ✓ Uranium is a naturally-occurring radioactive element.
- ✓ Uranium ore is mined in open-cut or underground operations, or through recovery from drilling wells.
- ✓ Uranium ore is processed into uranium oxide concentrate, also known as yellowcake.
- ✓ Yellowcake is chemically and physically stable, and can be exported safely.

What's the story with uranium mining in South Australia?

Within South Australia lie the world's largest uranium resources recoverable at low cost. Uranium mined in South Australia is strictly for electricity generation, with small amounts available for medical and industrial applications.

South Australia's uranium mining industry has weakened since 2011. Production at BHP Billiton's Olympic Dam mine decreased by around 25% between 2010 and 2015. In 2012 the multi-million dollar expansion plan for Olympic Dam was put on hold indefinitely.

Despite the weak current market, South Australia is well positioned to respond promptly to increases in global demand by increasing production of mined uranium. In addition to its geological assets, this state is regarded as having excellent development potential, is known as a reliable supplier and is backed by government incentives to increase production.

Is there a place for uranium in meeting global electricity needs?


Mined uranium for electricity production – also known as nuclear energy – offers many benefits, including low carbon emissions, consistency and security. The International Atomic Energy Agency (IAEA) says the world's nuclear capacity may nearly double by 2035.

Australia's uranium industry can be an important part of global nuclear electricity generation in the future.

UCL Australia's Nuclear Working group


Magnus Nydén

FACT SHEETS: SHORT EDUCATIONAL VIDEOS



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UCL Australia

960 views · 1 year ago

"A video made by students, for students"

No Script, No Staff, its their UCL Story in their words.






www.ucl.ac.uk/australia

Many thanks to the following students/graduates for their help: Christopher Bartley, Owen Sharpe, Ying Luo, Herbert Abigaba, Pedro Oliva Carvalho, Seb McClay, Cristina Rocca.

[Read more](#)

Welcome to UCL Australia

Let the UCL Australia staff take you through the various aspects of the campus offering, from student facilities to the structure of the MSc programme to our multidisciplinary research in Energy and natural...

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About RiAus

RiAus is Australia's national science channel, promoting public awareness and understanding of science. At RiAus we make science fun, inspiring and accessible for all Australians.

WELCOME

The Australian Science Media Centre (AusSMC) is an independent, not-for-profit service for the news media, giving journalists direct access to evidence-based science and expertise.

We aim to increase the quantity and accuracy of science reporting in the media, and hence the public understanding of science.

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MAKING KNOWLEDGE EASILY ACCESSIBLE TO THE PUBLIC VIA MULTIPLE MEDIA CHANNELS



MEDIA

PUBLIC INFORMATION SESSIONS: GROTE LECTURE SERIES



EDUCATIONAL PROGRAMMES

Professional Development Course in Nuclear Energy.

At the end of this course participants will be able to:

- Describe the basics of how nuclear energy is used to generate electricity
- Explain how fuel is extracted, processed and turned into fuel for nuclear reactors
- Identify the major issues associated with decommissioning of nuclear energy power stations and storage of spent fuel
- Demonstrate knowledge of the global distribution of nuclear generation and how it compares to other generation methods
- Show an understanding of the economics of nuclear energy
- Understand the safety case for nuclear energy and storage and their relationship to public perception
- Identify the likely future trends in technology development in the industry.